# AIR ASSIMILATIVE CAPACITY FOR SULFUR DIOXIDE AND NITROGEN DIOXIDE IN THE EASTERN AND SOUTHERN REGIONS OF THAILAND

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Thesis
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AIR ASSIMILATIVE CAPACITY FOR SULFUR DIOXIDE AND NITROGEN DIOXIDE IN THE EASTERN AND SOUTHERN REGIONS OF THAILAND

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ABSTRACT

Industrial site selection based on environmental criteria with the purpose of minimizing environmental impacts is a major problem. It is especially important when the proposed industry causes air pollution. In this research, the air assimilative capacity of the Eastern and Southern regions of Thailand was estimated by using ventilation coefficient data and an air quality model. A Box Model was used to predict the spatial and temporal distributions of two pollutants, namely sulfur dioxide and nitrogen dioxide. Screen View was applied to verify the assimilative capacity result by mean of air pollution dispersion theory. Meteorological characteristics of the study area in the year 2010 were selected in the analysis. For spatial analytical results, both the Eastern and Southern regions of Thailand were aligned with the coast which has an influence on potential of pollutant dispersion. Overall results indicated that the closer the area to the sea, the higher potential for air pollution dispersion. Temporal results indicated that the influence of the northeast monsoon resulted in the high dilution ability of the atmosphere. The period of November to January had higher potential for air pollutant assimilation than other months. In conclusion, the assimilative capacity of the atmosphere depended on the potential of air pollutant dispersion which was directly proportional to the ventilation coefficient. The temporal variation of the potential of air pollutant dispersion mainly depended on prevailing wind of each area. In addition, the assimilation potential in terms of the emission load which was estimated can be used for the siting of emission sources in the region under different industrial growth scenarios. This approach might provide guidelines to the environmental regulatory authorities and to the industries for environment friendly industrial development.

KEY WORDS: AIR ASSIMILATIVE CAPACITY / AIR POLLUTION / AIR QUALITY MODEL / VENTILATION COEFFICIENT

142 pages

ขีดความสามารถทางอากาศในการรองรับซัลเฟอร์ไดออกไซด์และไนโตรเจนไดออกไซด์ในภาคตะวันออกและภาคใต้ของประเทศไทย

AIR ASSIMILATIVE CAPACITY FOR SULFUR DIOXIDE AND NITROGEN DIOXIDE IN THE EASTERN AND SOUTHERN REGIONS OF THAILAND

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บทคัดย่อ

การเลือกที่ตั้งอุตสาหกรรมบนพื้นฐานของกฎเกณฑ์ทางด้านสิ่งแวดล้อมด้วยวัตถุประสงค์เพื่อการลดผลกระทบต่อสิ่งแวดล้อมที่เป็นปัญหาหลัก สำคัญอย่างยิ่งเมื่ออุตสาหกรรมเป็นสาเหตุของการเกิดมลพิษทางอากาศ ในงานวิจัยนี้ขีดความสามารถในการรองรับทางอากาศของภาคตะวันออกและภาคใต้ของประเทศไทยถูกประเมินโดยใช้ค่าสัมประสิทธิ์การระบายและแบบจำลองคุณภาพอากาศ Box Model ถูกนำมาใช้ในการคาดการณ์ลักษณะเชิงพื้นที่และเชิงเวลาของมลพิษสองชนิดคือ ซัลเฟอร์ไดออกไซด์และไนโตรเจนไดออกไซด์ Screen View นำมาใช้ในการพิสูจน์ผลของค่าขีดความสามารถในการรองรับทางอากาศโดยใช้ทฤษฎีการแพร่กระจายมลพิษทางอากาศ ส่วนของข้อมูลทางด้านอุตุนิยมวิทยาของพื้นที่ศึกษาใช้ข้อมูลปี ค.ศ. 2010 มาทำการวิเคราะห์ในงานวิจัย ผลการวิเคราะห์เชิงพื้นที่พบว่า ทั้งภาคตะวันออกและภาคใต้ของประเทศไทยมีแนวพื้นที่ติดกับทะเลซึ่งมีอิทธิพลต่อศักยภาพการแพร่กระจายสารมลพิษ ในภาพรวมของทั้งสองภูมิภาคพบว่ายิ่งพื้นที่ใกล้กับทะเล ยิ่งมีศักยภาพสูงสำหรับการกระจายสารมลพิษ สำหรับผลการวิเคราะห์เชิงเวลาพบว่า อิทธิพลของลมมรสุมตะวันออกเฉียงเหนือส่งผลให้ความสามารถในการเจือจางทางอากาศมีค่าสูง ช่วงเดือนพฤศจิกายนถึงเดือนมกราคมจึงมีศักยภาพในการรองรับมลพิษทางอากาศมากกว่าเดือนอื่นๆ โดยสรุปแล้วขีดความสามารถในการรองรับทางอากาศขึ้นอยู่กับศักยภาพของการแพร่กระจายมลพิษทางอากาศซึ่งเป็นสัดส่วนโดยตรงกันกับค่าสัมประสิทธิ์การแพร่กระจาย ขีดความสามารถในการรองรับมลพิษทางอากาศจึงแตกต่างกันในแต่ละช่วงเวลาขึ้นกับคุณลักษณะของลมประจำถิ่นในพื้นที่ นอกจากนี้ค่าศักยภาพในการรองรับในส่วนของปริมาณการระบายมลพิษทางอากาศที่ถูกประเมินนี้สามารถใช้เป็นข้อมูลเพื่อการพิจารณาการเลือกที่ตั้งแหล่งกำเนิดมลพิษทางอากาศในภูมิภาค ภายใต้สถานการณ์การเติบโตของอุตสาหกรรมที่แตกต่างกัน วิธีการนี้ถือเป็นแนวทางให้กับหน่วยงานที่กำกับดูแลสิ่งแวดล้อมและโรงงานอุตสาหกรรมเพื่อการพัฒนาอุตสาหกรรมที่เป็นมิตรต่อสิ่งแวดล้อม

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| AFWA | Air Force Weather Agency |
| ARW | Advanced Research WRF |
| DTC | Developmental Testbed Center |
| FAA | Federal Aviation Administration |
| GIS | Geographic Information System |
| NCAR | National Center for Atmospheric Research |
| NCEP | National Centers for Environmental Prediction |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Oxide of Nitrogen |
| NWP | Numerical Weather Prediction |
| $SO_2$ | Sulfur Dioxide |
| U.S. EPA | US Environmental Protection Agency |
| VC | Ventilation Coefficient |
| WPS | WRF Preprocessing System |
| WRF | Weather Research and Forecasting |
| WRF-DA | WRF Data Assimilation |
| WSF | WRF Software Framework |

# CHAPTER I
# INTRODUCTION

## 1.1 Rationales and Justifications

Development of industry significantly contributes to regional economic growth. However, Industrial development is one of the important causes of environmental problems which can be minimized if industrial development planning is done keeping in view the environmental considerations. At present, Industrial siting is being mainly planned keeping in view the raw material availability, access to the market, transport facilities and other related economic considerations without paying enough attention to environmental aspects, which are normally accepted as one of the significant criteria for siting of new industries. Improper siting of industries can seriously affect the environmental quality. Site selection based on environmental criteria with the purpose of minimizing adverse environmental impacts is a vital prerequisite. This is especially important when the proposed industry is air pollution in nature (Goyal and Rao, 2007). As for the status of ambient air quality in Thailand, The Pollution Control Department reported the level of air quality, periodically. Monitoring data of the Eastern and the Southern Regions of Thailand from 2009-2012 were summarized and presented in Table 1.1 to Table 1.8. Sulfur dioxide ($SO_2$) and nitrogen dioxide ($NO_2$) concentration, the maximum value of average 1 hour in the year 2009-2012 did not exceed the standard as shown in Figure 1.1-1.4.

**Table 1.1** Summarized of air quality status of Eastern Region of Thailand in 2009 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | |
| Pluak Daeng, RAYONG | 24 | 0 | 0/7,798 | 2 | 36 | 0 | 0/7,531 | 6 | 2.7 | 0 | 0/6,812 | 0.3 | 1.9 | 0 | 0/6,979 | 0.3 | 138 | 0 | 33/8,241 | 21 | 143.3 | 10.9 | 1/295 | 33.7 |
| Map Ta Phut health station, Mueang, RAYONG | 87 | 0 | 0/8,248 | 6 | 65 | 0 | 0/8,183 | 13 | 2.8 | 0 | 0/8,199 | 0.5 | 1.8 | 0.1 | 0/8,507 | 0.5 | 126 | 0 | 10/8,256 | 20 | 141.1 | 18 | 5/336 | 50.4 |
| Telephone exchange, Mueang, RAYONG | 42 | 0 | 0/7,909 | 3 | 84 | 0 | 0/7,948 | 11 | 2.2 | 0 | 0/8,007 | 0.6 | 1.5 | 0 | 0/8,330 | 0.6 | 117 | 0 | 3/7,936 | 19 | 81.2 | 5.8 | 0/342 | 17.1 |
| Field Crops Research Center, Mueang, RAYONG | 47 | 0 | 0/8,245 | 2 | 63 | 0 | 0/8,242 | 10 | 1.3 | 0 | 0/8,273 | 0.4 | 0.9 | 0 | 0/8,608 | 0.4 | 136 | 0 | 30/8,167 | 23 | 117 | 5.9 | 0/343 | 29.5 |
| Laem Chabang Stadium, Si Racha, CHON BURI | 72 | 0 | 0/7,665 | 3 | 69 | 0 | 0/7,713 | 12 | 1.7 | 0 | 0/7,666 | 0.3 | 1.4 | 0 | 0/8,107 | 0.3 | 134 | 0 | 10/7,826 | 19 | 139.9 | 12.5 | 1/318 | 40 |
| Mueang, CHON BURI | 19 | 0 | 0/8,200 | 4 | 129 | 0 | 0/8,195 | 16 | 3.5 | 0 | 0/8,076 | 0.3 | 1.6 | 0 | 0/8,371 | 0.3 | 161 | 0 | 33/8,138 | 22 | 55.9 | 16.4 | 0/335 | 28.6 |
| Plaeng Yao, CHACHAENGSAO | 80 | 0 | 0/7,998 | 2 | 36 | 0 | 0/8,100 | 5 | 1.9 | 0 | 0/7,933 | 0.3 | 1.3 | 0 | 0/8,224 | 0.3 | 126 | 0 | 28/8,124 | 27 | 80.8 | 9.8 | 0/348 | 32 |

**Table 1.2** Summarized of air quality status of Eastern Region of Thailand in 2010 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | |
| Pluak Daeng, RAYONG | 90 | 0 | 0/7,728 | 2 | 77 | 0 | 0/8,174 | 5 | 2.4 | 0 | 0/8,131 | 0.3 | 1.5 | 0 | 0/8,402 | 0.3 | 130 | 0 | 9/8,448 | 20 | 99.6 | 10.7 | 0/357 | 34.3 |
| Map Ta Phut health station, Mueang, RAYONG | 75 | 0 | 0/8,292 | 5 | 71 | 0 | 0/8,271 | 11 | 2.6 | 0 | 0/8,312 | 0.4 | 1.7 | 0 | 0/8,653 | 0.4 | 127 | 0 | 11/8,166 | 21 | 136.7 | 10.5 | 1/348 | 43.3 |
| Telephone exchange, Mueang, RAYONG | 25 | 0 | 0/7,515 | 3 | 62 | 0 | 0/7,402 | 10 | 2.1 | 0 | 0/7,576 | 0.6 | 1.6 | 0.1 | 0/7,836 | 0.6 | 141 | 0 | 9/7,571 | 20 | 63.3 | 7.3 | 0/316 | 20.6 |
| Field Crops Research Center, Mueang, RAYONG | 37 | 0 | 0/7,017 | 3 | 53 | 0 | 0/6,992 | 8 | 1.4 | 0 | 0/7,027 | 0.3 | 1.1 | 0.1 | 0/7,214 | 0.3 | 133 | 0 | 32/6,993 | 32 | 93.2 | 4.6 | 0/285 | 28.1 |
| Laem Chabang Stadium, Si Racha, CHON BURI | 56 | 0 | 0/8,173 | 3 | 115 | 0 | 0/8,173 | 12 | 1.6 | 0 | 0/8,109 | 0.3 | 1.1 | 0 | 0/8,513 | 0.3 | 110 | 0 | 1/8,018 | 15 | 146.3 | 16 | 1/356 | 43.4 |
| Municipality Youth Center, Si Racha, CHON BURI | 42 | 0 | 0/7,428 | 3 | 50 | 0 | 0/7,543 | 10 | 3 | 0 | 0/7,533 | 0.6 | 2.4 | 0 | 0/7,806 | 0.6 | 123 | 0 | 10/7,442 | 17 | 50.6 | 7.5 | 0/331 | 18.6 |
| Mueang, CHON BURI | 17 | 0 | 0/8,346 | 3 | 68 | 0 | 0/8,345 | 15 | 2.4 | 0 | 0/8,243 | 0.3 | 1.8 | 0 | 0/8,588 | 0.3 | 113 | 0 | 9/8,128 | 21 | 41.9 | 5.5 | 0/365 | 16.3 |
| Plaeng Yao, CHACHAENGSAO | 73 | 0 | 0/8,166 | 2 | 33 | 0 | 0/8,219 | 5 | 3.1 | 0 | 0/8,161 | 0.5 | 2.1 | 0 | 0/8,491 | 0.5 | 121 | 0 | 23/8,259 | 29 | 63.2 | 11.2 | 0/356 | 26.2 |

**Table 1.3** Summarized of air quality status of Eastern Region of Thailand in 2011
(The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | | PM2.5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | |
| Pluak Daeng, RAYONG | 14 | 0 | 0/7,952 | 1 | 39 | 1 | 0/7,822 | 7 | 2.1 | 0 | 0/7,954 | 0.3 | 1.1 | 0 | 0/8,272 | 0.3 | 132 | 0 | 11/7,940 | 22 | 95.3 | 14 | 0/341 | 39.2 | # | # | # | # |
| Map Ta Phut Health Promoting Hospital, Mueang, RAYONG | 82 | 0 | 0/8,116 | 7 | 75 | 0 | 0/7,907 | 14 | 2.3 | 0 | 0/8,298 | 0.5 | 1.6 | 0 | 0/8,634 | 0.5 | 133 | 0 | 22/7,939 | 25 | 115.4 | 7.1 | 0/319 | 38.9 | # | # | # | # |
| Telephone exchange, Mueang, RAYONG | 36 | 0 | 0/2,628 | 4 | 59 | 0 | 0/2,612 | 10 | 2 | 0 | 0/1,530 | 0.7 | 1.7 | 0 | 0/1,591 | 0.7 | 119 | 0 | 15/2,638 | 27 | 58 | 10.4 | 0/111 | 24.1 | # | # | # | # |
| Provincial Agricultural Extension Office, Mueang, RAYONG | 20 | 1 | 0/3,788 | 3 | 64 | 0 | 0/3,706 | 11 | 3.5 | 0 | 0/3,787 | 0.8 | 2.2 | 0 | 0/2,919 | 0.8 | 118 | 4 | 4/3,763 | 24 | 104.1 | 12.8 | 0/144 | 34.9 | 56.1 | 5.1 | 2/207 | 16.3 |
| Field Crops Research Center, Mueang, RAYONG | 50 | 0 | 0/6,955 | 3 | 62 | 0 | 0/6,731 | 8 | 1.7 | 0 | 0/7,217 | 0.4 | 1.3 | 0 | 0/7,456 | 0.4 | 136 | 0 | 42/7,061 | 28 | 105.3 | 9.6 | 0/255 | 35.2 | # | # | # | # |
| Laem Chabang Stadium, Si Racha, CHON BURI | 56 | 0 | 0/7,889 | 4 | 91 | 0 | 0/7,656 | 13 | 1.4 | 0 | 0/7,799 | 0.3 | 1.2 | 0 | 0/8,090 | 0.3 | 104 | 0 | 1/7,766 | 17 | 108.6 | 13 | 0/314 | 39.4 | # | # | # | # |
| Municipality Youth Center, Si Racha, CHON BURI | 29 | 0 | 0/7,199 | 3 | 57 | 0 | 0/7,551 | 10 | 3.5 | 0 | 0/7,629 | 0.6 | 1.7 | 0 | 0/7,939 | 0.6 | 126 | 0 | 16/7,917 | 22 | 45.3 | 7.5 | 0/332 | 20 | # | # | # | # |
| Mueang, CHON BURI | 15 | 0 | 0/7,909 | 3 | 70 | 0 | 0/7,843 | 12 | 2.8 | 0 | 0/8,180 | 0.5 | 2.1 | 0 | 0/8,517 | 0.5 | 140 | 0 | 11/7,785 | 21 | 38.1 | 6 | 0/345 | 15.2 | # | # | # | # |
| Plaeng Yao, CHACHAENGSAO | 79 | 0 | 0/6,670 | 3 | 36 | 0 | 0/7,403 | 4 | 2 | 0 | 0/8,101 | 0.6 | 1.8 | 0 | 0/8,446 | 0.6 | 102 | 0 | 1/7,822 | 26 | 63.3 | 9.8 | 0/352 | 27.3 | # | # | # | # |
| Aranyaprathet, SA KAEO | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | 76 | 4.2 | 0/145 | 34.9 | # | # | # | # |

**Table 1.4** Summarized of air quality status of Eastern Region of Thailand in 2012
(The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | $O_3$ | | | | PM10 | | | | PM2.5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | | Max. | Min. | Time>Std./Std. | |
| Pluak Daeng, RAYONG | 18 | 0 | 0/6,596 | 3 | 34 | 0 | 0/7,636 | 6 | 2.4 | 0 | 0/7,212 | 0.3 | 1.4 | 0 | 0/7,485 | 0.3 | 116 | 0 | 7/6,898 | 14 | 102 | 0 | 43/7,151 | 14 | 86.1 | 8.4 | 0/296 | 33.4 | # | # | # | # |
| Map Ta Phut Health Promoting Hospital, Mueang, RAYONG | 76 | 0 | 0/7,717 | 7 | 56 | 0 | 0/8,106 | 14 | 2.4 | 0.1 | 0/8,359 | 0.5 | 1.6 | 0.1 | 0/8,479 | 0.5 | 150 | 0 | 8/7,301 | 20 | 95 | 1 | 53/7,837 | 20 | 128.7 | 5 | 2/306 | 41.4 | # | # | # | # |
| Provincial Agricultural Extension Office, Mueang, RAYONG | 20 | 0 | 0/8,410 | 3 | 63 | 0 | 0/8,355 | 11 | 3 | 0 | 0/8,400 | 0.9 | 1.8 | 0.3 | 0/8,735 | 0.9 | 142 | 0 | 22/8,407 | 24 | 103 | 2 | 77/8,750 | 24 | 87.5 | 11.6 | 0/352 | 32.5 | 55.3 | 4.4 | 3/328 | 17.6 |
| Field Crops Research Center, Mueang, RAYONG | 34 | 0 | 0/7,642 | 2 | 62 | 0 | 0/7,925 | 9 | 1.3 | 0 | 0/7,962 | 0.4 | 1.1 | 0 | 0/8,259 | 0.4 | 164 | 0 | 29/7,708 | 25 | 112 | 1 | 137/7,99( | 25 | 77.6 | 4.7 | 0/317 | 30.7 | # | # | # | # |
| Government Complex, Mueang, RAYONG | 63 | 0 | 0/8,403 | 4 | 60 | 0 | 0/8,398 | 14 | 1.7 | 0 | 0/8,408 | 0.7 | 1.5 | 0.2 | 0/8,744 | 0.7 | 149 | 0 | 5/8,361 | 21 | 93 | 1 | 39/8,696 | 21 | 86.1 | 14.3 | 0/363 | 34.9 | # | # | # | # |
| Laem Chabang Stadium, Si Racha, CHON BURI | 43 | 0 | 0/7,607 | 3 | 71 | 0 | 0/5,786 | 11 | 1.7 | 0 | 0/7,447 | 0.3 | 1.1 | 0 | 0/7,689 | 0.3 | 109 | 0 | 5/7,155 | 18 | 91 | 0 | 40/7,353 | 18 | 89.9 | 13.6 | 0/298 | 33.5 | # | # | # | # |
| Municipality Youth Center, Si Racha, CHON BURI | 19 | 0 | 0/6,398 | 2 | 59 | 1 | 0/5,984 | 15 | 3.9 | 0 | 0/7,209 | 0.6 | 3.6 | 0 | 0/7,440 | 0.6 | 140 | 0 | 8/6,577 | 18 | 113 | 0 | 46/6,799 | 18 | 47.6 | 5.3 | 0/344 | 15.4 | # | # | # | # |
| Mueang, CHON BURI | 17 | 0 | 0/7,773 | 2 | 74 | 0 | 0/7,177 | 16 | 2.9 | 0 | 0/7,763 | 0.6 | 2 | 0 | 0/8,050 | 0.6 | 119 | 0 | 7/7,799 | 20 | 94 | 0 | 34/8,110 | 20 | 27.5 | 4.8 | 0/342 | 13.1 | # | # | # | # |
| Plaeng Yao, CHACHAENGSAO | 38 | 0 | 0/5,543 | 2 | 62 | 0 | 0/6,340 | 4 | 2.1 | 0 | 0/7,843 | 0.4 | 1.8 | 0 | 0/8,169 | 0.4 | 106 | 0 | 3/7,667 | 22 | 85 | 2 | 55/7,964 | 22 | 63.9 | 9.5 | 0/330 | 26.7 | # | # | # | # |
| Aranyaprathet, SA KAEO | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | 94 | 6.5 | 0/294 | 34.5 | # | # | # | # |

**Table 1.5** Summarized of air quality status of Southern Region of Thailand in 2009 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | |
| Mueang, PHUKET | 21 | 0 | 0/8,298 | 1 | 54 | 0 | 0/8,201 | 7 | 2 | 0 | 0/8,146 | 0.3 | 1.2 | 0 | 0/8,498 | 0.3 | 80 | 1 | 0/8,266 | 20 | 66.7 | 8.1 | 0/336 | 28.1 |
| Hat Yai, SONGKHLA | 15 | 0 | 0/7,874 | 2 | 43 | 0 | 0,8,044 | 7 | 1.9 | 0 | 0/8,126 | 0.5 | 1.5 | 0.1 | 0/8,434 | 0.5 | 70 | 0 | 0/8,135 | 17 | 73 | 10.5 | 0/350 | 35.6 |
| Mueang, NARATHIWAT | # | # | # | # | # | # | # | # | 2.3 | 0 | 0/8,015 | 0.4 | 1.3 | 0 | 0/8,327 | 0.4 | # | # | # | # | 52.2 | 12 | 0/327 | 27.3 |
| Mueang, YALA | # | # | # | # | # | # | # | # | 2.2 | 0 | 0/7,074 | 0.4 | 1.3 | 0 | 0/7,275 | 0.4 | # | # | # | # | 66 | 7.6 | 0/294 | 30.2 |

**Table 1.6** Summarized of air quality status of Southern Region of Thailand in 2010 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | |
| Mueang, SURAT THANI | 12 | 0 | 0/7,066 | 2 | 32 | 0 | 0/7,308 | 8 | 6.1 | 0 | 0/7,250 | 0.4 | 2.4 | 0 | 0/7,527 | 0.4 | 72 | 0 | 0/7,035 | 14 | 82.1 | 11.8 | 0/299 | 35.4 |
| Mueang, PHUKET | 10 | 0 | 0/8,158 | 2 | 42 | 0 | 0/8,179 | 7 | 2.3 | 0 | 0/8,213 | 0.3 | 1.5 | 0 | 0/8,542 | 0.3 | 77 | 0 | 0/8,171 | 18 | 67.7 | 8.9 | 0/355 | 24.5 |
| Hat Yai, SONGKHLA | 11 | 0 | 0/7,864 | 2 | 81 | 0 | 0/8,020 | 5 | 1.8 | 0 | 0/8,289 | 0.4 | 1.2 | 0 | 0/8,619 | 0.4 | 78 | 1 | 0/7,893 | 17 | 68.8 | 15.2 | 0/345 | 33.3 |
| Mueang, NARATHIWAT | # | # | # | # | # | # | # | # | 3.5 | 0 | 0/8,221 | 0.3 | 1.2 | 0 | 0/8,542 | 0.3 | # | # | # | # | 57 | 14.8 | 0/341 | 27.5 |
| Mueang, YALA | # | # | # | # | # | # | # | # | 3.8 | 0 | 0/7,811 | 0.5 | 1.3 | 0.1 | 0/8,043 | 0.5 | # | # | # | # | 61.2 | 7.7 | 0/288 | 29.1 |

**Table 1.7** Summarized of air quality status of Southern Region of Thailand in 2011 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | PM10 | | | | PM2.5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std./Std. | |
| Mueang, SURAT THANI | 10 | 0 | 0/7,827 | 2 | 35 | 0 | 0/8,172 | 8 | 1.7 | 0 | 0/8,084 | 0.3 | 1 | 0 | 0/8,412 | 0.3 | 72 | 0 | 0/7,279 | 15 | 61.3 | 10.4 | 0/287 | 28.2 | # | # | # | # |
| Mueang, PHUKET | 12 | 0 | 0/8,065 | 2 | 50 | 0 | 0/8,309 | 8 | 2.9 | 0 | 0/8,323 | 0.4 | 2.2 | 0 | 0/8,665 | 0.4 | 83 | 0 | 0/7,776 | 25 | 61.6 | 6.4 | 0/311 | 25.4 | # | # | # | # |
| Hat Yai, SONGKHLA | 9 | 0 | 0/6,941 | 1 | 36 | 0 | 0/7,210 | 8 | 1.6 | 0 | 0/7,894 | 0.5 | 1.2 | 0 | 0/8,214 | 0.5 | 74 | 0 | 0/7,406 | 16 | 88.4 | 14.6 | 0/309 | 39.8 | # | # | # | # |
| Mueang, NARATHIWAT | # | # | # | # | # | # | # | # | 3 | 0 | 0/8,027 | 0.4 | 1.7 | 0 | 0/8,363 | 0.4 | # | # | # | # | 77.5 | 8.1 | 0/307 | 33.4 | # | # | # | # |
| Mueang, YALA | # | # | # | # | # | # | # | # | 2 | 0 | 0/7,074 | 0.5 | 1.4 | 0.1 | 0/7,263 | 0.5 | # | # | # | # | 61.9 | 9.6 | 0/274 | 27.9 | # | # | # | # |

**Table 1.8** Summarized of air quality status of Southern Region of Thailand in 2012 (The Pollution Control Department, 2013)

| Station | $SO_2$ | | | | $NO_2$ | | | | CO | | | | CO | | | | $O_3$ | | | | $O_3$ | | | | PM10 | | | | PM2.5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 8 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) | Average 1 hour (ppb) | | | Average 1 year (ppb) |
| | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std ./Std. | | Max. | Min. | Time>Std./Std. | |
| Mueang, SURAT THANI | 15 | 0 | 0/1,856 | 3 | 26 | 0 | 0/4,978 | 6 | 1.8 | 0 | 0/6,373 | 0.4 | 0.9 | 0 | 0/6,562 | 0.4 | 64 | 0 | 0/5,606 | 12 | 52 | 0 | 0/5,791 | 12 | 68.1 | 15.5 | 0/15 | 37.8 | # | # | # | # |
| Mueang, PHUKET | 16 | 0 | 0/7,984 | 1 | 38 | 0 | 0/7,759 | 9 | 2.3 | 0 | 0/6,417 | 0.5 | 1.3 | 0 | 0/6,687 | 0.5 | 69 | 0 | 0/7,790 | 21 | 67 | 0 | 0/8,073 | 21 | 75.5 | 4.3 | 0/333 | 21.1 | # | # | # | # |
| Hat Yai, SONGKHLA | 16 | 0 | 0/7,455 | 1 | 33 | 0 | 0/7,579 | 8 | 1.8 | 0 | 0/8,050 | 0.4 | 1.5 | 0 | 0/8,345 | 0.4 | 72 | 0 | 0/7,931 | 11 | 51 | 0 | 0/8,211 | 11 | 113.2 | 12.3 | 0/338 | 33.6 | 80.9 | 4.5 | 6/181 | 18.9 |
| Mueang, NARATHIWAT | # | # | # | # | # | # | # | # | 2.4 | 0 | 0/8,307 | 0.5 | 1.3 | 0 | 0/8,645 | 0.5 | # | # | # | # | # | # | # | # | 88.1 | 14.1 | 0/312 | 33.2 | # | # | # | # |
| Mueang, YALA | # | # | # | # | # | # | # | # | 2.1 | 0 | 0/6,987 | 0.4 | 1.3 | 0.1 | 0/7,228 | 0.4 | # | # | # | # | # | # | # | # | 82 | 10.1 | 0/285 | 26.4 | # | # | # | # |

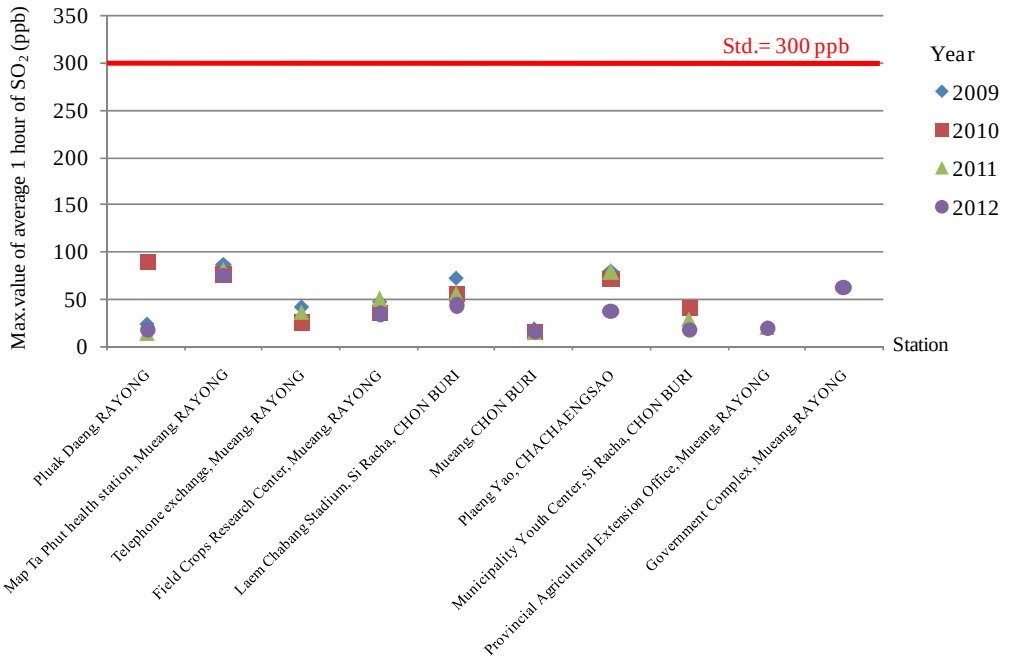



**Figure 1.1** Maximum value of average 1 hour of $SO_2$ concentration from monitoring station at the Eastern Region in the year 2009-2012

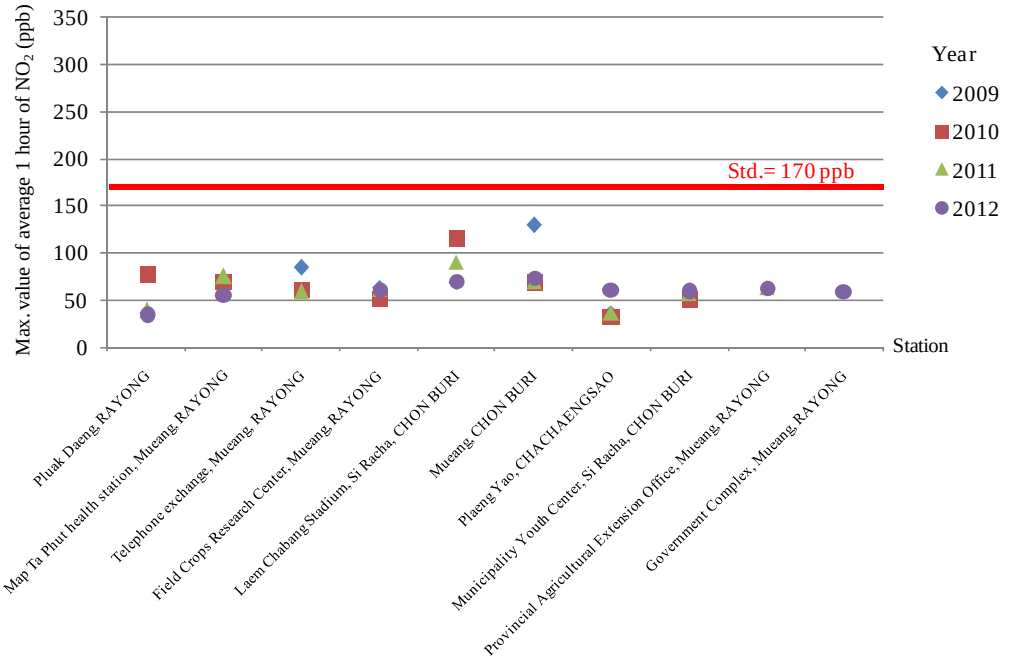



**Figure 1.2** Maximum value of average 1 hour of $NO_2$ concentration from monitoring station at the Eastern Region in the year 2009-2012

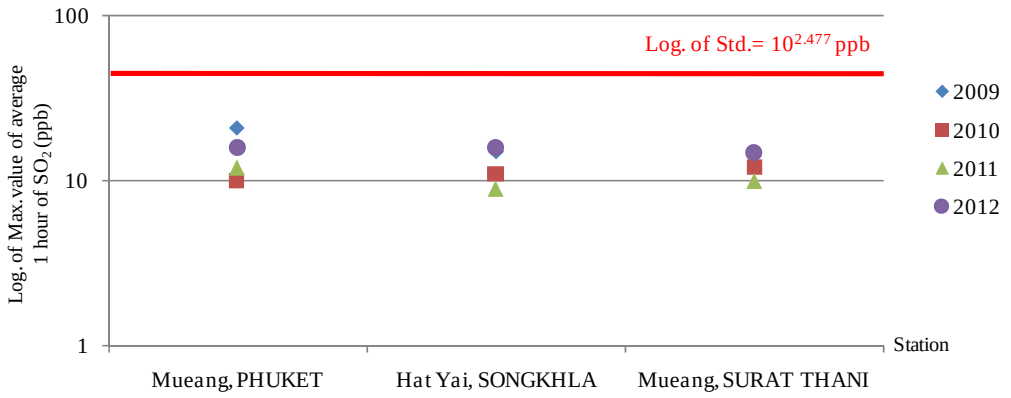



**Figure 1.3** Log. of maximum value of average 1 hour of $SO_2$ concentration from monitoring station at the Southern Region in the year 2009-2012

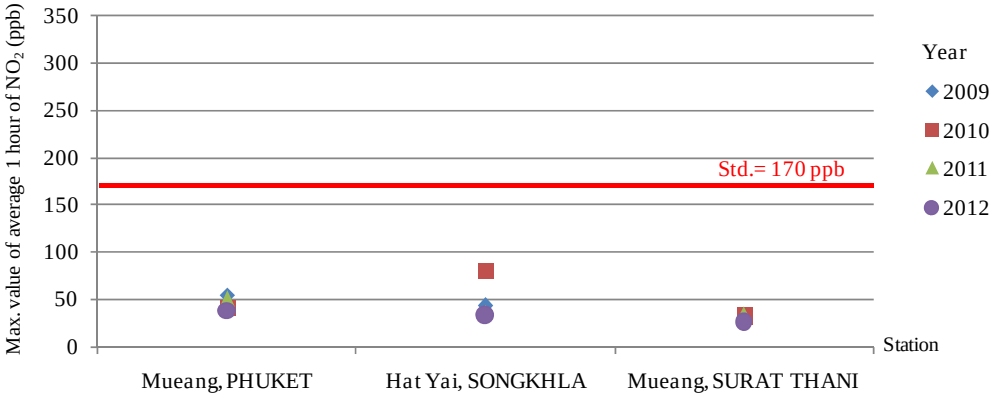



**Figure 1.4** Maximum value of average 1 hour of $NO_2$ concentration from monitoring station at the Southern Region in the year 2009-2012

The Eastern Region of Thailand is the most industrially developed region especially chemical industry and power plant which is important air pollution sources such as $SO_2$ and $NO_2$ (CAI-Asia Center, 2010). Pollution control focus on emission loads from the source that can be released will not exceed emission standard. The main point of pollution control management, although emission of all factories does not exceed the standard, the pollution emitted into the atmosphere excess air quality standards or not. (The area also has the atmospheric assimilation potential or not.) In the other region of Thailand, the Southern Region, mostly of the factory located in the industrial complex is medium size factory. Location of The Eastern and Southern Regions is faced with the sea. Therefore, both of regions were compared in this study. Table 1.9 compared industrial characteristics of the factory in the Eastern and the Southern Regions of Thailand.

**Table 1.9** Industrial characteristics of the factory in the Eastern and the Southern Regions of Thailand (Thailand Energy and Environment Network, 2013), (Department of Industrial Works, 2011)

| Region | Total area ($km^2$) | Industrial Estate | | Total No. of factory |
|---|---|---|---|---|
| | | No. of Industrial Estate | No. of factory | |
| East | 34,475 | 22 | ~1,343 | ~7,514 |
| South | 73,839 | 2 | ~23 | ~6,634 |

The assimilative capacity of atmosphere is estimated through dispersion models in terms of concentration of pollutants. Box Model, dispersion model for area source, is used to predict the spatial and temporal distribution of two pollutants namely $SO_2$ and $NO_2$. Details of this approach are presented through a case study carried out for the Eastern and Southern Regions of Thailand. The air assimilative capacity environment is defined as the maximum amount of pollution load that can be discharged without violating the best designated use of the air emission resource in the planning region (Goyal *et al.*, 2006). In this study, ventilation coefficient (mixing height and wind speed) is used as major meteorological input in the analysis.

## 1.2 Research objectives

1.2.1 To develop air assimilative capacity for the Eastern and Southern Regions of Thailand.

1.2.2 To evaluate spatial and temporal profile of emission loading in the Eastern and Southern Regions of Thailand.

## 1.3 Research variables

1.3.1 Dependent variables

- Air Pollutant concentration
- Ventilation coefficient

1.3.2 Independent variables

- Air assimilative capacity

1.3.3 Control variables

- Wind speed
- Wind direction
- Mixing height

## 1.4 Scope of study

**Study area**: The Eastern and Southern Regions of Thailand
(in the district level)

**Study period**: 1 January – 31 December 2010

## 1.5 Expected outcome

The atmospheric assimilation potential in the district level for the Eastern and Southern Regions of Thailand

## 1.6 Definition of keywords

1.6.1 Air assimilative capacity

Assimilative capacity of air environment is the maximum amount of pollution load that can be discharged without violating the best designated use of the air resource in the planning region. The phenomena governing the assimilative capacity of air environment include dilution, dispersion and deposition. The air pollution assimilative potential of an airshed can be estimated as the ventilation coefficient for the area. The ventilation coefficient is an indicator of horizontal as well as vertical mixing potential. Estimation of assimilative capacity for an environment involves: Delineation of an airshed based on topography of the area and identification of micro-climatic zones depending topography and wind fields data, preparation of inventory and quantification of pollution loads (Goyal, 2004).

1.6.2 Air pollution

Air pollution is the presence of undesirable material in air, in quantities large enough to produce harmful effects. The undesirable materials may damage human health, vegetation, human property, or the global environment as well as create aesthetic insults in the form of brown or hazy air or unpleasant smells (Noel de nevers, 2000).

1.6.3 Air Quality Model

Air quality models provide estimates of ambient air concentrations and/or deposition rates for one or more chemicals emitted from one or more sources. All air quality modeling systems are comprised of three major components which, when combined, provide a picture of predicted fate and transport of air toxics once released into the environment:

• An emissions (release) model;

• A meteorology model; and

• An air quality model that predicts the movements of chemicals through the atmosphere along with any physical and chemical changes that may occur (e.g., chemical reactions that degrade the pollutant).

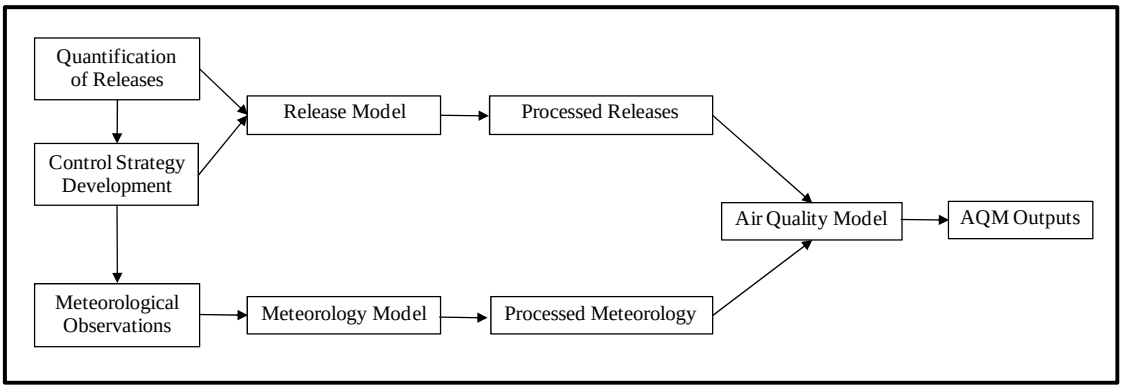



**Figure 1.5** Basic Components of an air quality modeling systems (U.S.EPA, 2013)

Specifically, the emissions and meteorology data are fed into the model (or the various components of the model) which are then run through various algorithms that simulate the physical and chemical processes in the atmosphere to provide estimated concentrations of chemicals (e.g., for inhalation exposure assessment, the exposure concentration at the point of exposure). Depending upon the specific model application being used, the release and meteorological data may simply be input to a single air quality model that includes both release and meteorological modules or the release and meteorological modules may be separated initially to "pre-process" the data and subsequently combined for the remaining calculations (U.S.EPA, 2013).

1.6.4 Ventilation coefficient

Ventilation coefficient (VC) is an indicator of horizontal and vertical mixing potential. It shows the rate whereat the air within the convective boundary layer is transported. This parameter plays an important role in the dispersion and is one of the factors that limit the pollution potential over a region of interest (Krishnan, and Kunhikrishnan, 2004).

## 1.7 Experimental setup

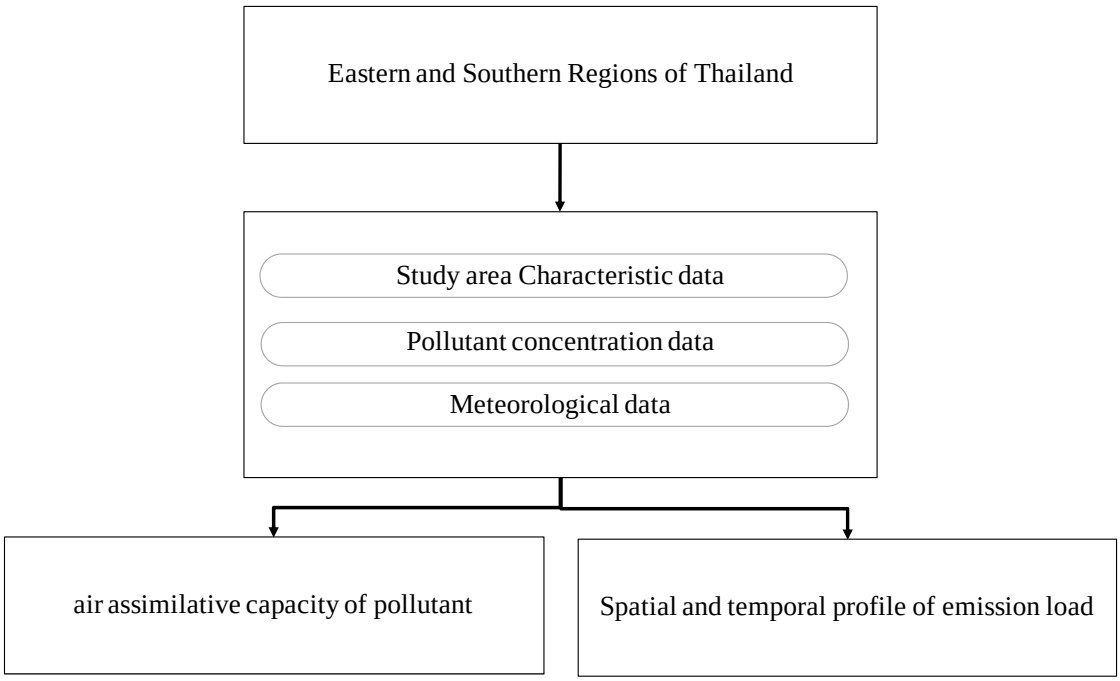



**Figure 1.6** Experimental setup of the study

# CHAPTER II
# LITERATURE REVIEWS

## 2.1 Description of sulfur dioxide

### 2.1.1 General description

Sulfur dioxide ($SO_2$) is one of a group of highly reactive gasses known as "oxides of sulfur." The largest sources of $SO_2$ emissions are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%). Smaller sources of $SO_2$ emissions include industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. $SO_2$ is linked with a number of adverse effects on the respiratory system (U.S.EPA, 2013).

$SO_2$ is derived from the combustion of sulfur-containing fossil fuels and is a major air pollutant in many parts of the world. Oxidation of sulfur dioxide, especially at the surface of particles in the presence of metallic catalysts, leads to the formation of sulfurous and sulfuric acids. Neutralization, by ammonia, leads to the production of bisulfates and sulfates.

$SO_2$ is a colorless gas that is readily soluble in water. Sulfuric acid is a strong acid formed from the reaction of sulfur trioxide ($SO_3$) with water. Sulfuric acid is strongly hygroscopic. As a pure material it is a colorless liquid with a boiling point of 330 °C. Ammonium bisulfate ($NH_4HSO_4$), which is also a strong acid but is less acidic than sulfuric acid as a pure material, is a crystalline solid with a melting point of 147 °C. The formation of very small droplets of sulfuric acid occurs by nucleation. Many vapors are able to condense on the surface of existing very fine nuclei and lead to the growth of composite particles. Sulfuric acid vapor, unlike many other vapors, exhibits the property of being able to condense and produce nuclei de novo (Lippmann and Ito, 2005).

### 2.1.2 Sources

Natural sources, such as volcanoes, contribute to environmental levels of $SO_2$. In most urban areas, man-made contributions are of the greatest concern. These include the use of sulfur-containing fossil fuels for domestic heating, stationary power generation and motor vehicles. In recent years the use of high sulfur coal for domestic heating has declined in many European countries, and power generation and motor vehicles are now the predominant sources. This has led to a continued reduction in levels of $SO_2$ in cities such as London, which were once heavily polluted. The use of tall chimneys at power stations has led to wider dispersion and dilution of $SO_2$. These changes in pattern of usage have led to urban and rural concentrations becoming more similar in the economically developed countries; indeed, in some areas, rural concentrations now exceed those in urban areas. In many developing countries, however, the use of high-sulfur coal is increasing for power production, as well as for domestic heating and cooking, and ground-level $SO_2$ concentrations remain at very high levels (Lippmann and Ito, 2005).

### 2.1.3 Occurrence in air

As a result of changes in sources, annual mean levels of $SO_2$ in the major cities of Europe have fallen since the second edition of Air quality guidelines for Europe (WHO, 2000) was published in 2000 and are now largely below 50 $\mu g/m^3$. Daily mean concentrations have also fallen and are now generally below 100 $\mu g/m^3$. Peak concentrations over shorter averaging periods may still be high, both in cities with a high use of coal for domestic heating and when plumes of effluent from power station chimneys fall to the ground (fumigation episodes). Transient peak concentrations of several thousand $\mu g/m^3$ may occur. Indoor concentrations of $SO_2$ are generally lower than outdoor concentrations, since absorption occurs on walls, furniture and clothing and in ventilation systems. An exception is occupational exposure, where concentrations of several thousand $\mu g/m^3$ may occur.

Data on European concentrations of $SO_2$ and deposition of other sulfur compounds are based either on national monitoring networks, which are largely concentrated in urban areas, or on cooperative programmes for the study of long-range transport of pollutants. Natural background concentrations of sulfur dioxide in rural

areas of Europe are generally below 5 μg/$m^3$. The use of tall chimneys, which disperse emissions over wide areas, has led to this increasing to above 25 μg/$m^3$ in many areas. Concentrations of $SO_2$ in recent years in Asia vary from about 200 μg/$m^3$ in some Chinese cities to less than 20 μg/$m^3$ in others, such as Taipei and Hong Kong (Lippmann and Ito, 2005).

### 2.1.4 Routes of exposure

Inhalation is the only route of exposure to $SO_2$ that is of interest with regard to its effects on health (Lippmann and Ito, 2005).

### 2.1.5 Health impact: Toxicokinetics

Absorption of sulfur dioxide in the mucous membranes of the nose and upper respiratory tract occurs as a result of its solubility in aqueous media: 1 volume of water dissolves 45 volumes of $SO_2$ at 15 °C. Absorption is concentration-dependent, with 85% absorption in the nose at 4–6 μg/$m^3$ and about 99% at 46 μg/$m^3$. Amdur, 1986 pointed out that at common ambient concentrations of sulfur dioxide, absorption in the upper airways may be inefficient.

Increased flow rates reduce the percentage of inspired sulfur dioxide absorbed in the nose and upper airways, and thus exercise promotes delivery to the smaller airways. Ammonia is found in the mouth (a product of bacterial metabolism) and may play a role in neutralizing acid aerosols. Sulfite and bisulfite are thought to be the major ions formed on absorption of $SO_2$. The key reactions are:

$$SO_2 + H_2O \rightarrow H_2SO_3 \quad \text{…Equation (2.1)}$$

$$H_2SO_3 + H_2O \rightarrow HSO_3 + H_3O \quad \text{…Equation (2.2)}$$

$$HSO_3 + H_2O \rightarrow SO_3 + H_3O \quad \text{…Equation (2.3)}$$

The pKa values of Equations (2.2) and (2.3) are 1.86 and 7.2, respectively. The pH of the surface fluid in the respiratory tract is 6.5–7.5, and thus appreciable amounts of both the bisulfite and the sulfite will be present. Absorbed bisulfite is converted to

sulfate by molybdenum-dependent sulfite oxidase. The highest concentrations of this enzyme occur in the liver and kidney, while lower levels are found in the lung. The importance of sulfite oxidase in removing absorbed sulfur dioxide from the respiratory tract in humans requires further study, although rats deficient in sulfite oxidase are reported to be more sensitive than control animals to inhaled $SO_2$.

The sulfite ion is a reducing agent and reacts with oxidized glutathione in the surface fluid of the airways. Studies of the metabolism of sulfur dioxide have shown that sulfate is also produced from sulfite. The toxicological significance of this process is not yet known (Lippmann and Ito, 2005).

### 2.1.6 $SO_2$ Standards in Asia

Most developing countries in Asia either use the 24-hr standard and/or the annual standard. Though some countries have 1-hr guidelines, they are not comparable to the US EPA or even the EU AQS except for some countries (Table 2.1).

**Table 2.1** Summary of $SO_2$ standards in selected Asian countries ($\mu g/m^3$) (CAI-Asia Center, 2010)

| Countries | $SO_2$ 1-hr | $SO_2$ 24-hr | $SO_2$ Annual |
|---|---|---|---|
| Afghanistan | - | - | - |
| Bangladesh | - | 366 | 78 |
| Bhutan (Industrial) | - | 120 | 80 |
| Bhutan (Mixed) | - | 80 | 60 |
| Bhutan (Sensitive) | - | 30 | 15 |
| Cambodia | 500 | 300 | 100 |
| China: Grade I | 150 | 50 | 20 |
| China: Grade II | 500 | 150 | 60 |
| China: Grade III | 700 | 250 | 100 |
| Hong Kong SAR | 800 | 350 | 80 |
| Hong Kong SAR[1] | - | 125 | - |
| India[2] | - | 80 | 50 |
| India[3] | - | 80 | 20 |
| Indonesia | 900 | 365 | 60 |
| Lao PDR | - | - | - |
| Malaysia | 350 | 105 | - |
| Mongolia | - | 20 | 10 |
| Myanmar | - | - | - |
| Nepal | - | 70 | 50 |
| Pakistan[4] | - | 120 | 80 |
| Pakistan[5] | - | 120 | 80 |
| Philippines | - | 180 | 80 |
| Republic of Korea | 392 | 131 | 52 |
| Singapore | 196 | 366 | 78 |
| Sri Lanka | 200 | 80 | - |
| Thailand | 780 | 300 | 100 |
| Viet Nam | 350 | 125 | 50 |

**Note:** China: Grade I = applies to specially protected areas, such as natural conservation areas, scenic spots, and historical sites

China: Grade II = applies to residential areas, mixed commercial/ residential areas, cultural, industrial, and rural areas

China: Grade III = special industrial areas; SAR = Special Administrative Region; PDR = People's Democratic Republic

1 = Proposed air quality objectives for Hong Kong SAR.

2 = NAAQS for Industrial, residential, rural and other Areas

3 = NAAQS for ecologically sensitive areas
(notified by central government)

4 = Draft: effective from 1 January 2009

5 = Draft: effective from 1 January 2012

## 2.2 Description of nitrogen dioxide

### 2.2.1 General description

Many chemical species of nitrogen oxides exist, but the air pollutant species of most interest from the point of view of human health is nitrogen dioxide ($NO_2$). $NO_2$ is the component of greatest interest and the indicator for the larger group of nitrogen oxides (Forastiere *et al*., 2005). $NO_2$ is formed quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. In addition to contributing to the formation of ground-level ozone, and fine particle pollution, $NO_2$ is linked with a number of adverse effects on the respiratory system (U.S.EPA, 2013).

$NO_2$ is a reddish brown gas with a characteristic pungent odor. Nitric oxide spontaneously produces the dioxide when exposed to air. Nitrogen dioxide gas is a strong oxidant, and reacts with water to produce nitric acid and nitric oxide.

$NO_2$ is an important atmospheric trace gas not only because of its health effects but also because: (a) it absorbs visible solar radiation and contributes to impaired atmospheric visibility; (b) it absorbs visible radiation and has a potentially direct role in global climate change; (c) it is, along with nitric oxide, a chief regulator of the oxidizing capacity of the free troposphere by controlling the build-up and fate of radical species, including hydroxyl radicals; and (d) it plays a critical role in determining ozone concentrations in the troposphere because the photolysis of $NO_2$ is the only key initiator of the photochemical formation of ozone, whether in polluted or in non-polluted atmospheres (EPA, 1993), (EPA, 1995).

$NO_2$ is subject to extensive further atmospheric transformations that lead to the formation of strong oxidants that participate in the conversion of $NO_2$ to nitric

acid and sulfur dioxide to sulfuric acid and subsequent conversions to their ammonium neutralization salts. Thus, through the photochemical reaction sequence initiated by solar-radiation-induced activation of nitrogen dioxide, the newly generated pollutants are an important source of organic, nitrate and sulfate particles currently measured as PM10 or PM2.5. For these reasons, $NO_2$ is a key precursor of a range of secondary pollutants whose effects on human health are well-documented (Forastiere *et al*., 2005).

### 2.2.2 Sources

On a global scale, emissions of nitrogen oxides from natural sources far outweigh those generated by human activity. Natural sources include intrusion of stratospheric nitrogen oxides, bacterial and volcanic action, and lightning. However, because natural emissions are distributed over the entire surface of the earth, the resulting background atmospheric concentrations are very small. The major sources of anthropogenic emissions of nitrogen oxides into the atmosphere are the combustion processes in stationary sources (heating, power generation) and in mobile sources (internal combustion engines in vehicles and ships) (Forastiere *et al*., 2005).

In most ambient situations, nitric oxide is emitted and transformed into $NO_2$ in the atmosphere. Oxidation of nitric oxide by atmospheric oxidants such as ozone occurs rapidly, even at the low levels of reactants. Altshuller, 1956 calculated that 50% conversion of nitric oxide would take less than one minute at a nitric oxide concentration of 120 $\mu g/m^3$ (0.1 ppm) in the presence of an ozone concentration of 200 $\mu g/m^3$ (0.1 ppm). Consequently, this reaction is regarded as the most important route for atmospheric $NO_2$ production, other contributions coming from specific non-combustion industrial processes such as the manufacture of nitric acid, the use of explosives, and welding. Indoor sources include tobacco smoking and the use of gas-fired appliances and oil stoves. Thus, differences in the nitrogen oxides (nitric oxide and nitrogen dioxide) emissions of various countries are due mainly to differences in fuel consumption.

### 2.2.3 Occurrence in air

Forastiere *et al.*(2005) found annual mean $NO_2$ concentrations in urban areas throughout the world are generally in the range of 20–90 μg/$m^3$ (0.01−0.05 ppm). Urban outdoor levels of $NO_2$ vary according to the time of day, the season of the year and meteorological factors. Typical daily patterns include a low background level of $NO_2$, upon which is superimposed one or two peaks of higher levels that correspond to rush-hour traffic emissions of nitrogen oxides. Hourly averages near very busy roads exceed 940 μg/$m^3$ (0.5 ppm) $NO_2$. Several studies have measured ambient concentrations in road tunnels in Europe and the United States and have shown that personal exposures in vehicles using these tunnels can be high. For example, a range of 179–688 μg/ $m^3$ $NO_2$ inside a car in a road tunnel during rush hour has recently been reported. The maximum hourly mean value may be several times the annual mean. Long-term monitoring activities during the 1960s and 1970s indicated an increase in concentrations of nitrogen oxides in many urban areas throughout the world. It is known that nitrogen dioxide concentrations are highly correlated with population , and population worldwide continues to grow.

Owing to the widespread use of unvented combustion appliances, $NO_2$ concentrations in homes may greatly exceed those found outdoors. The average $NO_2$ concentration over a period of several days may exceed 200 μg/$m^3$ (0.1 ppm) when unvented gas stoves are used for supplementary heating or clothes drying, or when kerosene (paraffin) heaters are used, but typically, means are lower. Maximum brief concentrations in kitchens are in the range of 230–2055 μg/$m^3$ (0.12–1.09 ppm) during cooking. The highest 15-minute concentration recorded for a home with an unvented gas space heater was 2716 μg/$m^3$ (1.44 ppm).

### 2.2.4 Routes of exposure

In the environment, $NO_2$ exists as a gas. Thus, the only relevant route of exposure to humans is inhalation, whether the source is outdoor or indoor air. Exposures to $NO_2$ from occupational sources are relatively rare compared to those from outdoor or domestic indoor sources (Forastiere *et al*., 2005).

### 2.2.5 Health impact: Toxicokinetics

In inhalation, 70–90% of $NO_2$ can be absorbed from the respiratory tract of humans, and this increases further with exercise. A significant portion of the inhaled $NO_2$ is removed in the nasopharynx (about 40–50% in dogs and rabbits); thus, as exercise shifts towards mouthbreathing, an increased delivery of nitrogen dioxide to the lower respiratory tract can be expected.

Mathematical modelling studies show that maximum exposure to $NO_2$ by the tissues of the lower respiratory tract is predicted to be at the junction of the conducting airways and the gas-exchange region of the lungs in humans, rats, guinea-pigs and rabbits. Although the actual tissue dose of nitrogen dioxide at a similar starting tracheal concentration differs across species, the shape of the exposure curves is similar. The region predicted to receive the maximum dose is that where the typical nitrogen-dioxide-induced morphometric lesion is observed in several species of animals. Using this mathematical model, it is predicted that, as tidal volume increases in humans (e.g. during exercise), the dose delivered to the gas-exchange region increases substantially more than that of the conducting airways.

Experimental studies have shown that $NO_2$ or its chemical products can remain within the lung for prolonged periods. Nitric and nitrous acids or their salts have been observed in the blood and urine after exposure to $NO_2$ (Forastiere *et al*., 2005).

### 2.2.6 $NO_2$ Standards in Asia

Most developing countries in Asia either use the 24-hr standard and/or the annual standard for $NO_2$. Though some countries have 1-hr guidelines, they are not comparable to the US EPA or even the European Union (EU) Air Quality Standards (AQS) except for very few countries (Table 2.2).

**Table 2.2** Summary of $NO_2$ Standards in Selected Asian countries ($\mu g/m^3$) (CAI-Asia Center, 2010)

| Countries | $NO_2$ 1-hr | $NO_2$ 24-hr | $NO_2$ Annual |
|---|---|---|---|
| Afghanistan | - | - | - |
| Bangladesh | - | - | 100 |
| Bhutan (Industrial) | - | 120 | 80 |
| Bhutan (Mixed) | - | 80 | 60 |
| Bhutan (Sensitive) | - | 30 | 15 |
| Cambodia | 300 | 100 | - |
| China: Grade I | 120 | 80 | 40 |
| China: Grade II | 240 | 120 | 80 |
| China: Grade III | 240 | 120 | 80 |
| Hong Kong SAR | 300 | 150 | 80 |
| Hong Kong SAR[1] | 200 | - | 40 |
| India[2] | - | 80 | 40 |
| India[3] | - | 80 | 30 |
| Indonesia | 400 | 150 | 100 |
| Lao PDR | - | - | - |
| Malaysia | 320 | 10 | - |
| Mongolia | 85 | 40 | 30 |
| Myanmar | - | - | - |
| Nepal | - | 80 | 40 |
| Pakistan[4] | - | 80 | 40 |
| Pakistan[5] | - | 80 | 40 |
| Philippines | - | 150 | - |
| Republic of Korea | 188 | 113 | 56 |
| Singapore | 188 | - | 100 |
| Sri Lanka | 250 | 100 | - |
| Thailand | 320 | - | - |
| Viet Nam | 200 | - | 40 |

**Note:** China: Grade I = applies to specially protected areas, such as natural conservation areas, scenic spots, and historical sites

China: Grade II = applies to residential areas, mixed commercial/ residential areas, cultural, industrial, and rural areas

China: Grade III = special industrial areas; SAR = Special Administrative Region; PDR = People's Democratic Republic

1 = Proposed air quality objectives for Hong Kong SAR.

2 = NAAQS for Industrial, residential, rural and other Areas

3 = NAAQS for ecologically sensitive areas
(notified by central government)

4 = Draft: effective from 1 January 2009

5 = Draft: effective from 1 January 2012

## 2.3 Regulation for controlling of ambient air pollution in Thailand

**Table 2.3** Ambient air quality standards (The Pollution Control Department, 2013)

| Pollutant | Average | Standard |
|---|---|---|
| 1.Carbon Monoxide (CO) | 1 hr | Not exceed 30 ppm. (34.2 mg/$m^3$) |
| | 8 hr | Not exceed 9 ppm. (10.26 mg/$m^3$) |
| 2.Nitrogen Dioxide ($NO_2$) | 1 hr | Not exceed 0.17 ppm. (0.32 mg/$m^3$) |
| | 1 year | Not exceed 0.03 ppm. (0.057 mg/$m^3$) |
| 3.Ozone ($O_3$) | 1 hr | Not exceed 0.10 ppm. (0.20 mg/$m^3$) |
| | 8 hr | Not exceed 0.07 ppm.(0.14 mg/$m^3$) |
| 4.Sulfur Dioxide ($SO_2$) | 1 year | Not exceed 0.04 ppm. (0.10 mg/$m^3$) |
| | 24 hr | Not exceed 0.12 ppm.(0.30 mg/$m^3$) |
| | 1 hr | Not exceed 0.3 ppm.(0.78 mg/$m^3$) |
| 5.Lead (Pb) | 1 month | Not exceed 1.5 µg/$m^3$ |
| 6.TSP | 24 hr | Not exceed 0.33 mg/$m^3$ |
| ( Particulate Matter Ø < 100 µm ) | 1 year | Not exceed 0.10 mg/$m^3$ |
| 7.PM-10 | 24 hr | Not exceed 0.12 mg/$m^3$ |
| ( Particulate Matter Ø < 10 µm ) | 1 year | Not exceed 0.05 mg/$m^3$ |
| 8.PM-2.5 | 24 hr | Not exceed 0.05 mg/$m^3$ |
| ( Particulate Matter Ø < 2.5 µm | 1 year | Not exceed 0.025 mg/$m^3$ |

## 2.4 WRF Model

The Weather Research and Forecasting (WRF) Model is a next-generation mesoscale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. It features two dynamical cores, a data assimilation system, and a software architecture allowing for parallel computation and system extensibility. The model serves a wide range of meteorological applications across scales ranging from meters to thousands of kilometers. The effort to develop WRF began in the latter part of the 1990's and was a collaborative partnership principally among the National Center for Atmospheric Research (NCAR), the National Oceanic and Atmospheric Administration (represented by the National Centers for Environmental Prediction (NCEP) and the (then) Forecast Systems Laboratory (FSL)), the Air Force Weather Agency (AFWA), the Naval Research Laboratory, the University of Oklahoma, and the Federal Aviation Administration (FAA).

WRF allows researchers the ability to produce simulations reflecting either real data (observations, analyses) or idealized atmospheric conditions. WRF provides operational forecasting a flexible and computationally efficient platform, while offering advances in physics, numerics, and data assimilation contributed by the many research community developers. WRF is currently in operational use at NCEP, AFWA, and other centers.

WRF has grown to have a large worldwide community of users (over 20,000 in over 130 countries), and workshops and tutorials are held each year at NCAR. There are two dynamical core versions of WRF, each with its own web page. The Advanced Research WRF (ARW) is supported to the community by the NCAR Mesoscale and Microscale Meteorology Division: http://www.mmm.ucar.edu/wrf/users. The WRF-NMM (NMM) is supported to the community by the Developmental Testbed Center (DTC): http://www.dtcenter.org/wrf-nmm/users.

The Advanced Research WRF (ARW) modeling system has been in development for the past few years. The current release is Version 3, available since April 2008. The ARW is designed to be a flexible, state-of-the-art atmospheric simulation system that is portable and efficient on available parallel computing

platforms. The ARW is suitable for use in a broad range of applications across scales ranging from meters to thousands of kilometers, including:

- •Idealized simulations (e.g. LES, convection, baroclinic waves)
- • Parameterization research
- • Data assimilation research
- • Forecast research
- • Real-time NWP
- • Hurricane research
- • Regional climate research
- • Coupled-model applications
- • Teaching

The Mesoscale and Microscale Meteorology Division of NCAR is currently maintaining and supporting a subset of the overall WRF code (Version 3) that includes:

- • WRF Software Framework (WSF)
- • Advanced Research WRF (ARW) dynamic solver, including one-way, two-way nesting and moving nest.
- • The WRF Preprocessing System (WPS)
- • WRF Data Assimilation (WRF-DA) system which currently supports 3DVAR 4DVAR, and hybrid data assimilation capabilities
- • Numerous physics packages contributed by WRF partners and the research community
- • Several graphics programs and conversion programs for other graphics tool

The WRF modeling system software is in the public domain and is freely available for community use (National Center for Atmospheric Research, 2012).

### 2.4.1 The WRF Modeling System Program Components

The following figure shows the flowchart for the WRF Modeling System Version 3

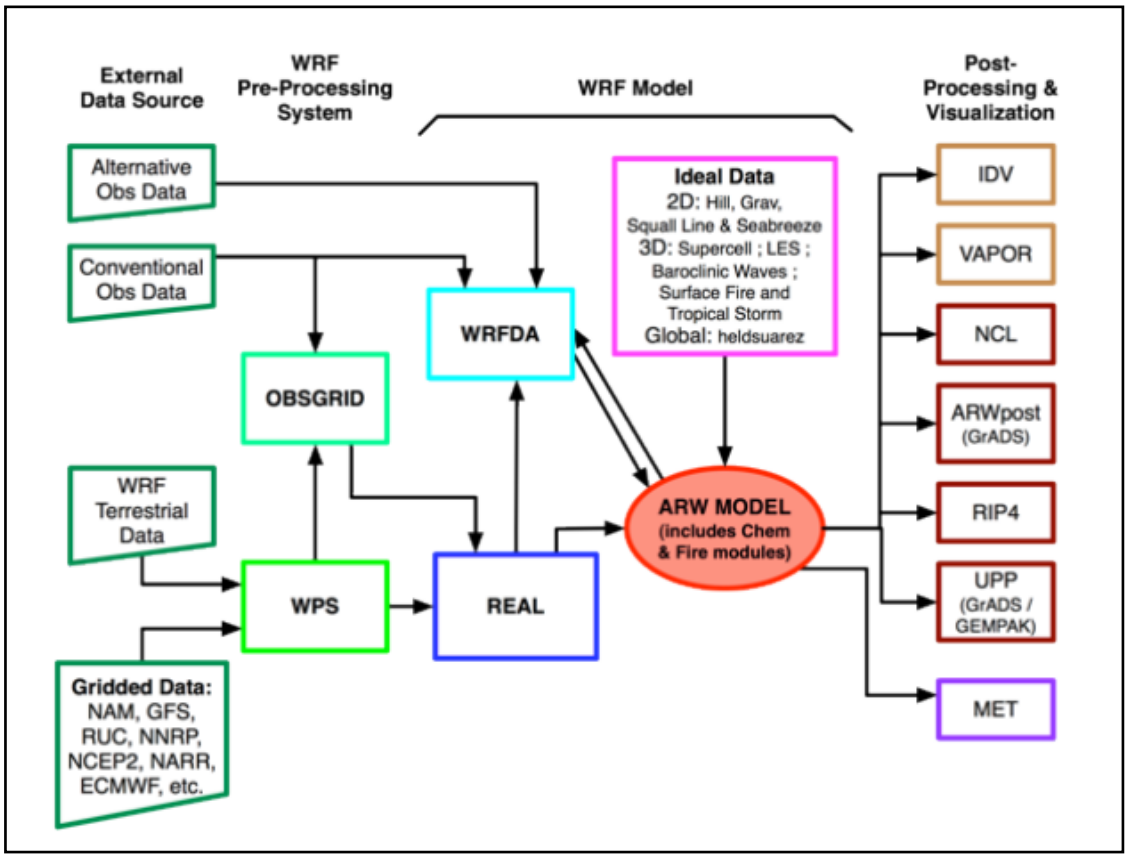



**Figure 2.1** WRF Modeling System Flow Chart
(National Center for Atmospheric Research, 2012)

As shown in the diagram, the WRF Modeling System consists of these major programs:

- The WRF Preprocessing System (WPS)
- WRF-Var
- ARW solver
- Post-processing & Visualization tool

### 2.4.2 WPS

This program is used primarily for real-data simulations. Its functions include 1) defining simulation domains; 2) interpolating terrestrial data (such as terrain, landuse, and soil types) to the simulation domain; and 3) degribbing and interpolating meteorological data from another model to this simulation domain. Its main features include:

• GRIB 1/2 meteorological data from various centers around the world

• USGS 24 category and MODIS 20 category land datasets

• Map projections for 1) polar stereographic, 2) Lambert-Conformal, 3) Mercator and 4) latitude-longitude

• Nesting

• User-interfaces to input other static data as well as met data

(National Center for Atmospheric Research, 2012)

### 2.4.3 WRF-DA

This program is optional, but can be used to ingest observations into the interpolated analyses created by WPS. It can also be used to update WRF model's initial conditions when the WRF model is run in cycling mode. Its main features are as follows:

• It is based on an incremental variational data assimilation technique, and has both 3DVar and 4D-Var capabilities

• It also includes the capability of hybrid data assimilation (Variational + Ensemble)

• The conjugate gradient method is utilized to minimize the cost function in the analysis control variable space

• Analysis is performed on an un-staggered Arakawa A-grid

• Analysis increments are interpolated to staggered Arakawa C-grid and it gets added to the background (first guess) to get the final analysis of the WRF-model grid

• Conventional observation data input may be supplied either in ASCII format via the “obsproc” utility or “PREPBUFR” format.

• Multiple satellite observation data input may be supplied in BUFR format

• Multiple radar data (reflectivity & radial velocity) input is supplied through ASCII format

• Multiple outer loop to address the nonlinearity

• Capability to compute adjoint sensitivity

• Horizontal component of the background (first guess) error is represented via a recursive filter (for regional) or power spectrum (for global). The vertical component is applied through projections on climatologically generated averaged eigenvectors and its corresponding Eigen values

• Horizontal and vertical background errors are non-separable. Each eigenvector has its own horizontal climatologically-determined length scale

• Preconditioning of the background part of the cost function is done via the control variable transform U defined as B= UUT

• It includes the "gen_be" utility to generate the climatological background error covariance estimate via the NMC-method or ensemble perturbations

• A utility program to update WRF boundary condition file after WRF-DA

(National Center for Atmospheric Research, 2012)

### 2.4.4 ARW Solver

This is the key component of the modeling system, which is composed of several initialization programs for idealized, and real-data simulations, and the numerical integration program. The key features of the WRF model include:

• Fully compressible nonhydrostatic equations with hydrostatic option

• Regional and global applications

• Complete Coriolis and curvature terms

• Two-way nesting with multiple nests and nest levels

• Concurrent one-way nesting with multiple nests and nest levels

• Offline one-way nesting with vertical nesting

• Moving nests (prescribed moves and vortex tracking)

• Mass-based terrain-following coordinate

• Vertical grid-spacing can vary with height

• Map-scale factors for these projections:

polar stereographic (conformal)

Lambert-conformal

Mercator (conformal)

Latitude and longitude, which can be rotated

• Arakawa C-grid staggering

• Runge-Kutta 2nd and 3rd order time integration options

• Scalar-conserving flux form for prognostic variables

• 2nd to 6th order advection options (horizontal and vertical)

• Monotonic transport and positive-definite advection option for moisture, scalar, tracer, and TKE

• Time-split small step for acoustic and gravity-wave modes:

small step horizontally explicit, vertically implicit

divergence damping option and vertical time off-centering

external-mode filtering option

• Upper boundary absorption and Rayleigh damping

• Lateral boundary conditions

idealized cases: periodic, symmetric, and open radiative

real cases: specified with relaxation zone

• Full physics options for land-surface, planetary boundary layer, atmospheric and surface radiation, microphysics and cumulus convection

• A single column ocean mixed layer model

• Grid analysis nudging using separate upper-air and surface data, and observation nudging

• Spectral nudging

• Digital filter initialization

• Adaptive time stepping

• Gravity wave drag

• A number of idealized examples

(National Center for Atmospheric Research, 2012)

## 2.5 Box Model

Box Model computes the air pollution concentration using general mass balance analysis principle. Figure 2.2 illustrates parameter, relevant to Box Model application. The assumption of box model for an application in air pollution analysis can be summarized as follows:

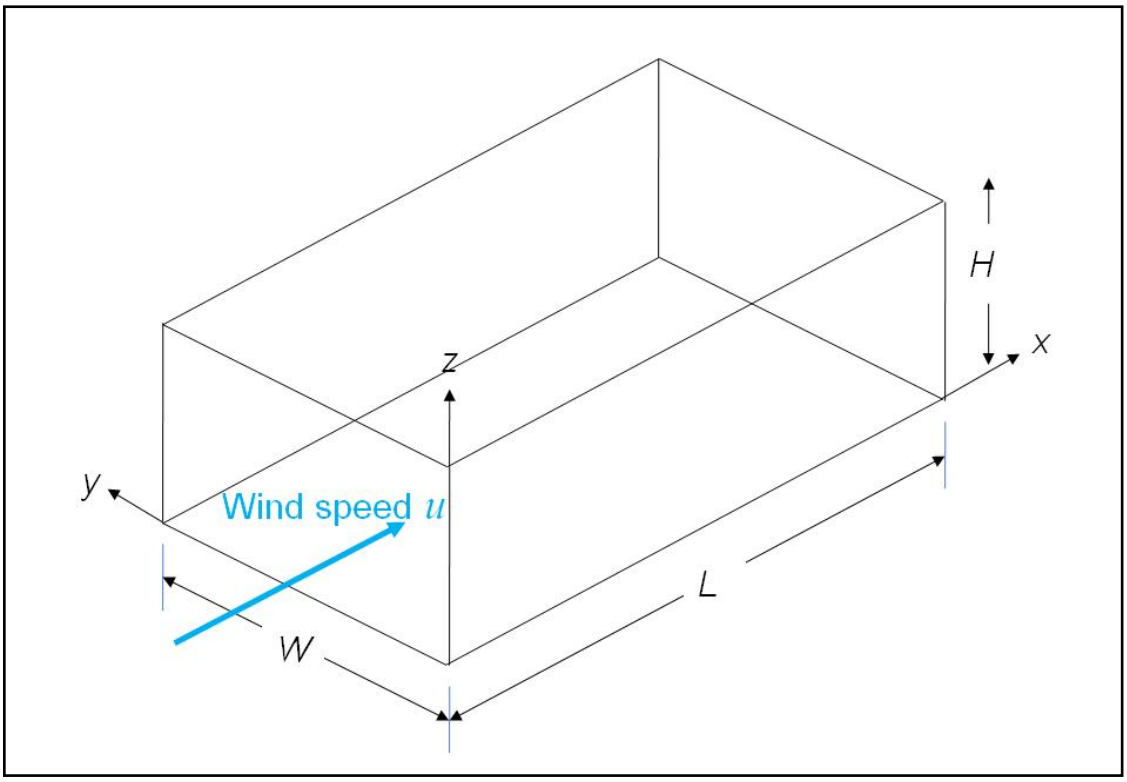



**Figure 2.2** Rectangular city, showing meaning of symbols used in the Box Model (Noel de nevers, 2000)

Accumulation rate
= all flow rates in – all flow rates out + creation rate – destruction rate …Equation (2.4)

2.5.1 The city is a rectangle with dimensions *W* and *L* and with one side parallel to the wind direction.

2.5.2 Atmospheric turbulence produces complete and total mixing of pollutants up to the mixing height *H* and no mixing above this height.

2.5.3 This turbulence is strong enough in the upwind direction that the pollutant concentration is uniform in the whole volume of air over the city and not higher at the downwind side than the upwind side. This assumption is quite contrary to what we observe in nature but permits a great simplification of the mathematics.

2.5.4 The wind blows in the *x* direction with velocity *u*. This velocity is constant and is independent of time, location, or elevation above the ground. This is also contrary to observation; wind speeds increase with elevation. Here we use the average *u* between that at the ground and that at *H*.

2.5.5 The concentration of pollutant in the air entering the city (at $x = 0$) is constant and is equal to *b* (*b* for "background" concentration. Generally, unit of concentrations are expressed in $g/m^3$ or $\mu g /m^3$.

2.5.6 The air pollutant emission rate of the city is *Q* (typically expressed in g/s). This is normally given as an emission rate per unit area, *q*, in $g/s \cdot m^2$. The relationship between these parameters can be expressed as following

$$Q = q\,A \qquad \text{…Equation (2.5)}$$

where *A* is the area of the city, which equals *W* times *L* in this case. This emission rate is constant and unchanging with time.

2.5.7 No pollutant leaves or enters through the top of the box, nor through the sides that are parallel to the wind direction.

2.5.8 The pollutant in question is sufficiently long-lived in the atmosphere that the destruction rate in Equation (2.4) is zero.

With these assumptions, all of the parameters in Equation (2.4) can be calculated. The air volume can be calculated by using *W, L,* and *H* data. Because all of the assumptions indicate that flows and emission rates are independents of time, we see that this is a steady-state situation in which nothing is changing with time. For any steady-state situation in any application of the general balance equation, Equation (2.4), the accumulation rate is zero, so the term to the left of the equal sign is zero.

The emission rate (*Q*) can be treated either as a creation rate or as a flow into the box through its lower face. Either gives exactly the same result; it is more common in the air pollution literature to treat it as a flow through the lower face.

Therefore the creation rate is set equal to zero. Thus, Equation (2.6) has been simplified to

$$\text{all flow rates in} - \text{all flow rates out} = 0 \quad \text{…Equation (2.6)}$$

There are two pollutant flow rates in. The flow rate of pollutant into the upwind side of the city is

$$\text{Flow rate in} = u\,W\,H\,b \quad \text{…Equation (2.7)}$$

The first three symbols constitute the volume of air that crosses the upstream boundary of the system per unit time; The $u\,W\,H$ has dimensions of volume/time. Multiplying it by a concentration (mass/volume), we obtain a mass flow rate (mass/time) is obtained.

The second flow rate in is that of pollutant emitted by the city into the lower boundary, or face, of the system,

$$\text{Flow rate in} = Q = q\,W\,L \quad \text{…Equation (2.8)}$$

According to the preceding assumptions, the concentration in the entire city is constant and is equal to $c$. The only way pollutant leaves the system is by flow out through the downwind face. The flow rate out is given by the equation

$$\text{Flow rate out} = u\,W\,H\,c \quad \text{…Equation (2.9)}$$

Substituting these expressions into Equation (2.4) and solving for $c$, then

$$c = b + \frac{q\,L}{u\,H} \quad \text{…Equation (2.10)}$$

which is the simple, fixed-Box Model. Chemical engineers will recognize that this is the same as the continuous-flow stirred-tank reactor (CSTR) model widely used in chemical engineering (Noel de nevers, 2000).

## 2.6 Screen View Model

Screen View™ is a user friendly interface for U.S. EPA screening model, SCREEN3 and contains many features to make modeling experience as easy as possible. Screen View is a Microsoft® Windows®-based application and runs in Windows Vista™, Windows 2000, and Windows XP.

Screen View contains all the available options of the U.S. EPA model, in addition to the following:

- Screen View has an integrated modeling environment : intuitive data input, model execution, and full featured post-processing (XY plotting).
- For each source, the data is input in two windows, making it easy to have a complete view of all the information.
- The metric and units can be switched, at any time, by clicking the unit button located beside each entry field.
- The program checks valid ranges for all entry fields, which will save time by preventing wrong entries.
- Before running project, Screen View displays a report of all options selected along with a list of any missing information.
- The SCREEN3 output file can be displayed and printed after completing a successful run.
- Model results can be displayed in graphical format.
- Context-sensitive “Help” provides clear explanations for each option or command and incorporates many sections of EPA’s most used documentation guides for better understand the modeling process(Jesse *et al*., 2007).

**The SCREEN3 Model**

The SCREEN3 model was developed to provide an easy-to-use method of obtaining pollutant concentration estimates. These estimates are based on the document "Screening Procedures for Estimating The Air Quality Impact of Stationary Sources" (EPA 1995).

SCREEN3, version 3.0 of the SCREEN model, can perform all the single source short-term calculations in the EPA screening procedures document, including:

- Estimating maximum ground-level concentrations and the distance to the maximum.
- Incorporating the effects of building downwash on the maximum concentrations for both the near wake and far wake regions.
- Estimating concentrations in the cavity recirculation zone.
- Estimating concentrations due to inversion break-up and shoreline fumigation.
- Determining plume rise for flare releases.
- Incorporate the effects of simple elevated terrain on maximum concentrations.
- Estimate 24-hour average concentrations due to plume impaction in complex terrain using the VALLEY model 24-hour screening procedure.
- Model simple area sources using a numerical integration approach.
- Be used to model the effects of simple volume sources using a virtual point source procedure.
- Calculate the maximum concentration at any number of user-specified distances in flat or elevated simple terrain, including distances out to 100 km for long-range transport.
- Examine a full range of meteorological conditions, including all stability classes and wind speeds to find maximum impacts.
- Include the effects of buoyancy-induced dispersion (BID).
- Explicitly calculates the effects of multiple reflections of the plume off the elevated inversion and off the ground when calculating concentrations under limited mixing conditions. (Jesse *et al*., 2007)

**The SCREEN3 model will not be able to do the following**:

- Explicitly determine maximum impacts from multiple sources, except for the procedure to handle multiple nearby stacks by merging emissions into a single "representative" stack (Jesse *et al*., 2007).

## 2.6 Gaussian Plume Idea

Most diffusion models use the Gaussian Plume Idea, which also is a material balance model. In it, one considers a point source such as a factory smokestack (which is not really a point but a small area that can be satisfactorily approximated as a point) and attempts to compute the downwind concentration resulting from this point source. The schematic representation and nomenclature are shown in Figure 2.3, where the origin of the coordinate system is placed at the base of the smokestack, with the x axis aligned in the downwind direction. The contaminated gas stream (normally called a *plume*) is shown rising from the smokestack and then leveling off to travel in the x direction and spreading in the y and z directions as it travels.

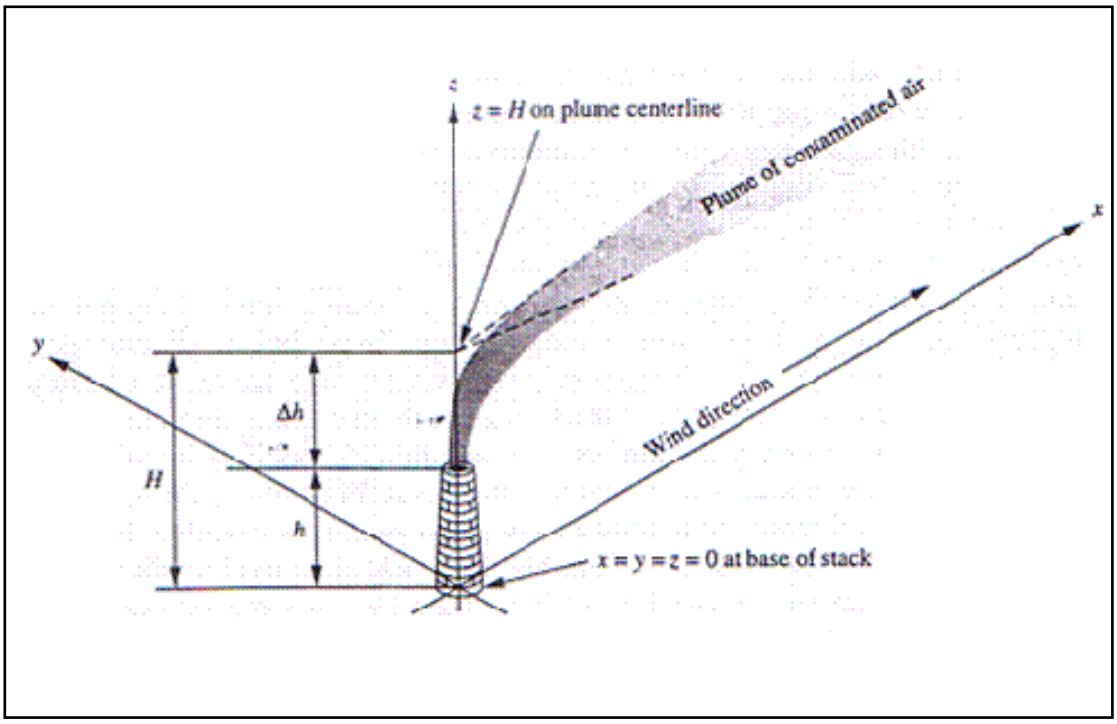
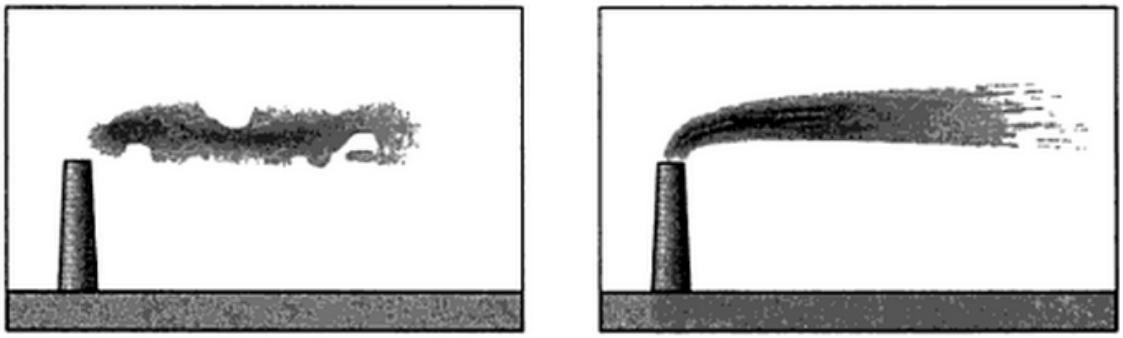



**Figure 2.3** Coordinate system and nomenclature for the Gaussian plume idea (Noel de nevers, 2000)

Such plumes normally rise a considerable distance above the smokestack because they are emitted at temperatures higher than atmospheric and with a vertical velocity. For Gaussian plume calculations the plume is assumed to be emitted from a

point with coordinates 0, 0, *H, where H is called* the *effective stack height*, which is the sum of the *physical stack height* (*h* in Figure 2.3) and the *plume rise* (△*h* in Figure 2.3) Physical stack height for any existing plant can be determined with ordinary measuring instruments. For the moment we will assume that we are dealing with a point source located at 0, 0, *H* that steadily emits a nonbuoyant pollutant at emission rate *Q* (normally in g/s). Let us assume the wind blows in the *x* direction with velocity *u* and that this velocity is independent of time, location, or elevation. The problem is to compute the concentration due to this source at any point (*x*, *y*, *z*) for $x > 0$.

If molecular diffusion alone were causing the plume to mix with the surrounding air, the plume would spread slowly and appear (if the pollutant is visible) as a thin streak moving straight down the sky. The actual cause of the spread of plumes is the large-scale turbulent mixing that exists in the atmosphere, which may be visualized by comparing a snapshot of a plume with a time exposure of the same plume (Figure 2.4). At any instant the plume will appear to have a twisting, snake-like shape as it moves down the sky. The twisting behavior is caused by the turbulent motion of the atmosphere that is superimposed on the plume's large-scale liner motion caused by the horizontal wind. This turbulent motion is random in nature, so that a snapshot taken a few minutes after the first would show the twists and turns in different places, but the overall from would be similar. However, time averages out these short-term variations of the plume, and thus a time exposure appears quite uniform and symmetrical. For this reason, if we placed a pollutant concentration meter at some fix point in the plume, we would see the concentration oscillate in an irregular fashion about some average value. The Gaussian plume approach tries to calculate only that average value without making any statement about instantaneous values. The results obtained by Gaussian plume calculations should be considered only as averages over periods of at least 10 minutes, and preferably one-half to one hour (Noel de nevers, 2000).



Snapshot Time exposure

**Figure 2.4** Comparison of snapshot and time exposure of a visible plume (Noel de nevers, 2000)

## 2.7 Mixing height

Mixing height is the maximum height that rapid vertical mixing takes place in the atmosphere. The more unstable the atmosphere, the higher the mixing height is as a rule (Auburn University, 2013). It acts as a lid on the height smoke can reach that show in Figure 2.5. The increasing mixing height related to the height of smoke.

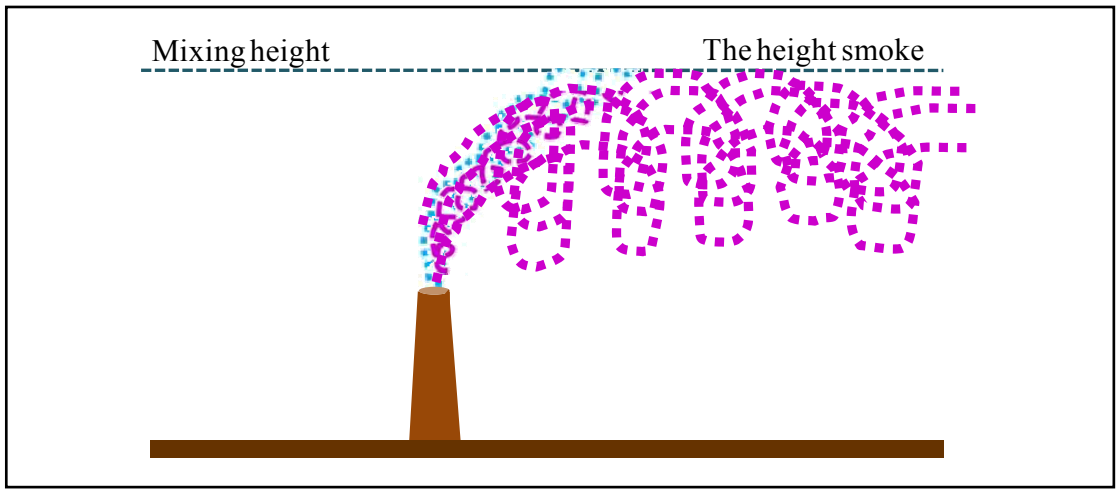



**Figure 2.5** The height smoke at the maximum height

## 2.8 Related research

### 2.8.1 Application of WRF in air pollution research

Ferroeo *et al*. (2011) studied meteorological parameters in particular, the mixing height derived from measurements and from calculations using the model studied in Milan, Italy. Results showed the vertical profile of the state meteorology that was not significantly different.

Chuang *et al*. (2011) studied an application of the WRF meteorological model to predict the concentrations of ozone and particulate matter with a diameter smaller than 2.5 micrometers (PM-2.5) in the urban areas of the east coast of the United States.

Carvalho *et al*. (2012) studied the performance of the Weather Research and Forecast (WRF) model in wind simulation. Results were evaluated under different numerical and physical options for an area of Portugal.

Papanastasiou et al. (2010) applied Weather Research and Forecast (WRF) model to study the wind field over the east coast of central Greece under typical summer conditions.

### 2.8.2 Application of Ventilation Coefficient (VC) in air pollution research

Ashrafi *et al.*, 2009 studied VC in Tehran, Iran. VC values obtained were calculated by the mixing height and wind velocity measurements with the highest value among the average in the last 10 year (approximately 84,371.08 $m^2/s$ in spring) and lowest in the fall.

Alappattu *et al.* (2009) evaluated VC in Kharagpur, India. Results showed a direct relationship to the area during the height of the Atmospheric Boundary Layer (ABL) with highest values in the range of 1,024-5,720 $m^2/s$ and found that aerosol concentrations measured in the area were higher during the lower VC.

Krishnan and Kunhikrishnan (2004) measured mixing height and wind speed at Gadanhi India during March 1999 to April 2000 by using L-band UHF wind profile. Data were used to calculate for ventilation coefficient. It was found that the highest ventilation coefficient was observed during monsoon season (June-

September), with the VC between the average of 12,491 $m^2$/s. The lowest VC were measured during winter season (December-February), with the average of 7,405 $m^2$/s,

Mahalakshmi *et al. (*2011) studied relationship between the VC and the concentration of intensive convection of air in atmosphere, such as black carbon, carbon monoxide and ozone in Hyderabad, India. Results from this study indicated that VC was highest in May and lowest in December, This was likely due to the potential for the spread of air pollution at the two different time periods.

### 2.8.3 Air assimilative capacity research

Goyal and Rao (2007) conducted a case study at the Kochi region, located in the Kerala State of India. A variety of emission and meteorological scenarios have been considered and critical emission loads have been estimated.

Goyal *et al.* (2006) studied dispersion models for line sources. The models were been used to predict the spatial and temporal distributions of three pollutants namely sulfur dioxide ($SO_2$), suspended particulate matter (SPM) and oxides of nitrogen ($NO_x$). The model's predictions indicated that winter was the most critical season having maximum pollution. It was observed that the model predicted values were higher in December i.e. in winter than in April i.e., summer.

Goyal and Rao (2007) applied the model, the Industrial Source Complex (ISC) dispersion model for point sources to predict the spatial and temporal distribution of $SO_2$ under three different industrial scenarios plant. The model predictions indicate that monsoon was the most critical season having maximum pollution, followed by summer and post-monsoon. Lowest pollution was observed in winter. The assimilative capacity in terms of the ventilation coefficient is very poor indicating high pollution potential in all the seasons.

Manju *et al.* (2002) studied the industrial source complex short-term model. The model was used to predict the spatial distribution of three pollutants namely $SO_2$, $NO_x$ and SPM. The model was validated using the data measured at site. Statistical evaluation of the model indicated satisfactory performance. Using the model predictions, isopleths were drawn. The northeastern part of Manali was identified as vulnerable to high levels of pollution necessitating mitigation measures to be initiated in the region.

# CHAPTER III
# METHODOLOGY

## 3.1 Research design

This research aimed to estimate atmospheric assimilation potential for Eastern and Southern Regions of Thailand by using ventilation coefficient data and air quality model. Meteorological characteristic in the study area in the year 2010 was selected in the analysis. Carrying capacity of sulfur dioxide and nitrogen dioxide were evaluated by using Box Model and Screen View analysis.

## 3.2 Data Collection

### 3.2.1 Study area

In this study, the study domain covered the Eastern and Southern Regions of Thailand. Eastern Region covers about 34,475 $km^2$ and the area of Southern Region is about 73,839 $km^2$. The geographical boundary of the study area is as shown in Figure 3.1. The Eastern Region consist of 7 provinces namely Chonburi, Rayong, Chanthaburi, Trat, Chachaengsao, Prachinburi, and Sa Kaeo. The Southern Region consist of 14 provinces namely NaKhon Si Thammarat, Songkhla, Surat Thani, Narathiwat, Pattani, Trang, Phatthalung, Yala, Chumphon, Krabi, Phuket, Satun, Phangnga, and Ranong. Spatial data on a district level from each province were collected and used in the analysis. These data were achieved from Geographic Information System (GIS) data, obtained from the Department of Provincial Administration, Ministry of Interior. The data used in the analysis were total area of the district and the length of district. The district was measured in the northeast-southwest direction. As presented in Figure 3.2, the northeast-southwest direction is the prevailing wind of Thailand. The length of districts was shown in Table 3.1-3.2.

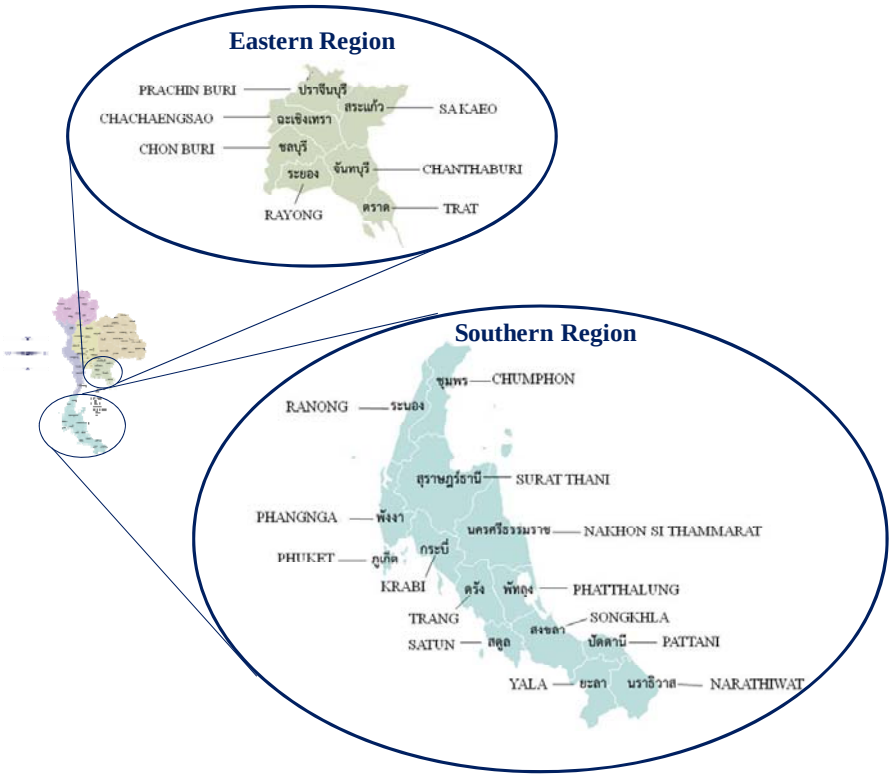



**Figure 3.1** The geographical boundary of the study area

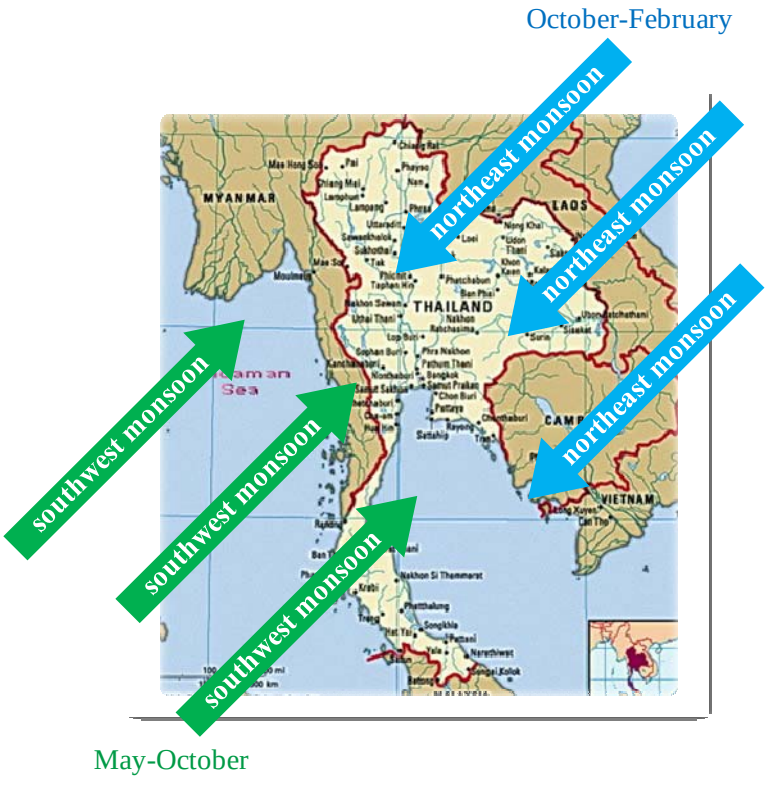



**Figure 3.2** The prevailing wind of Thailand

**Table 3.1** Geographical characteristic of Eastern Region (district level)

| Province | District | Length (m) | area ($m^2$) |
|---|---|---|---|
| CHON BURI | Mueang Chon Buri | 24833.28 | 255670000 |
| | Ban Bueng | 24642.49 | 593410000 |
| | Nong Yai | 23255.48 | 456000000 |
| | Bang Lamung | 26180.60 | 535780000 |
| | Phan Thong | 17403.08 | 167750000 |
| | Phanat Nikhom | 25103.52 | 479670000 |
| | Si Racha | 27878.47 | 623680000 |
| | Ko Si Chang | 1540.36 | 6450000 |
| | Sattahip | 19406.89 | 282100000 |
| | Bo Thong | 26389.34 | 832570000 |
| | Ko Chan | 19559.06 | 269210000 |
| RAYONG | Mueang Rayong | 29648.19 | 673970000 |
| | Ban Khai | 32923.33 | 474930000 |
| | Pluak Daeng | 25410.59 | 530000000 |
| | Khao Chamao | 18484.44 | 476000000 |
| | Nikhom Phatthana | 16364.01 | 236020000 |
| | Klaeng | 42949.64 | 734986000 |
| | Ban Chang | 17329.68 | 163250000 |
| | Wang Chan | 22543.58 | 373270000 |
| CHANTHABURI | Mueang Chanthaburi | 18099.51 | 282640000 |
| | Khlung | 45830.62 | 785150000 |
| | Tha Mai | 27346.47 | 625880000 |
| | Pong Nam Ron | 34078.18 | 1017250000 |
| | Makham | 28330.22 | 445090000 |
| | Laem Sing | 13317.64 | 170790000 |
| | Soi Dao | 31958.06 | 802490000 |
| | Kaeng Hang Maeo | 42932.38 | 1216750000 |
| | Na Yai Am | 18681.86 | 286110000 |
| | Khao Khitchakut | 29838.81 | 781020000 |
| TRAT | Mueang Trat | 45432.68 | 947230000 |
| | Khlong Yai | 6545.15 | 79190000 |
| | Khao Saming | 38500.89 | 650350000 |
| | Bo Rai | 19635.45 | 678350000 |
| | Laem Ngop | 14824.09 | 166210000 |
| | Ko Kut | 11756.96 | 129910000 |
| | Ko Chang | 14054.14 | 219250000 |
| CHACHAENGSAO | Mueang Chachoengsao | 19406.89 | 385090000 |
| | Bang Khla | 15711.38 | 235600000 |
| | Bang Nam Priao | 28646.32 | 497180000 |
| | Bang Pakong | 21420.34 | 260360000 |
| | Ban Pho | 16350.50 | 211240000 |
| | Phanom Sarakham | 26803.70 | 511250000 |
| | Ratchasan | 11708.32 | 144770000 |
| | Sanam Chai Khet | 44509.43 | 1066610000 |
| | Plaeng Yao | 13112.93 | 327900000 |
| | Tha Takiap | 36502.42 | 1422610000 |
| | Khlong Khuean | 10636.28 | 107170000 |
| PRACHIN BURI | Mueang Prachin Buri | 24448.82 | 473950000 |
| | Kabin Buri | 42366.73 | 1403810000 |
| | Na Di | 32148.82 | 1204150000 |
| | Ban Sang | 23485.54 | 373130000 |
| | Prachantakham | 32547.49 | 947340000 |
| | Si Maha Phot | 19443.90 | 481580000 |
| | Si Mahosot | 10395.24 | 141340000 |
| SA KAEO | Mueang Sa Kaeo | 59484.19 | 1394770000 |
| | Khlong Hat | 19639.23 | 483820000 |
| | Ta Phraya | 42735.99 | 969660000 |
| | Wang Nam Yen | 30608.81 | 431910000 |
| | Watthana Nakhon | 56791.75 | 1511440000 |
| | Aranyaprathet | 41582.74 | 735040000 |
| | Khok Sung | 17325.40 | 341140000 |
| | Khao Chakan | 39848.89 | 462780000 |
| | Wang Sombun | 32148.82 | 500730000 |

**Table 3.2** Geographical characteristic of Southern Region (district level)

| Province | District | Length (m) | area ($m^2$) |
|---|---|---|---|
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 29178.37 | 556712436 |
| | Phrom Khiri | 14591.99 | 246508674 |
| | Lan Saka | 18308.00 | 344669441 |
| | Chawang | 24316.99 | 433217522 |
| | Phipun | 22885.00 | 493879446 |
| | Chian Yai | 27749.53 | 321777265 |
| | Cha-uat | 39493.20 | 750548648 |
| | Tha Sala | 19740.38 | 417789870 |
| | Thung Song | 34042.63 | 909870207 |
| | Na Bon | 15447.37 | 207780293 |
| | Thung Yai | 27749.53 | 600739706 |
| | Pak Phanang | 28606.24 | 530627975 |
| | Ron Phibun | 26317.74 | 429409513 |
| | Sichon | 33187.71 | 687427595 |
| | Khanom | 21523.58 | 311353423 |
| | Hua Sai | 26033.25 | 437320328 |
| | Bang Khan | 24902.22 | 469700474 |
| | Tham Phannara | 16601.48 | 176439519 |
| | Chulabhorn | 16019.50 | 230508615 |
| | Phra Phrom | 14591.99 | 146991792 |
| | Nopphitam | 24036.06 | 721783971 |
| | Chang Klang | 22028.67 | 272755389 |
| | Chaloem Phra Kiat | 14875.25 | 180898199 |
| KRABI | Mueang Krabi | 33085.38 | 905157610 |
| | Khao Phanom | 29567.92 | 849786332 |
| | Ko Lanta | 14417.55 | 336125006 |
| | Khlong Thom | 32130.53 | 1117631753 |
| | Ao Luek | 32989.03 | 789794212 |
| | Plai Phraya | 24538.79 | 529119250 |
| | Lam Thap | 16895.56 | 281601585 |
| | Nuea Khlong | 27161.93 | 513976849 |
| PHANGNGA | Mueang Phangnga | 27656.43 | 653913757 |
| | Ko Yao | 27599.43 | 1041596656 |
| | Kapong | 31428.76 | 606501100 |
| | Takua Thung | 30812.36 | 652591881 |
| | Takua Pa | 33187.71 | 601079925 |
| | Khura Buri | 43747.44 | 1027238415 |
| | Thap Put | 21875.16 | 299279058 |
| | Thai Mueang | 26903.34 | 611350444 |
| PHUKET | Mueang Phuket | 20493.77 | 180589215 |
| | Kathu | 10809.17 | 79058345 |
| | Thalang | 20352.91 | 288893547 |
| SURAT THANI | Mueang Surat Thani | 14412.61 | 334559322 |
| | Kanchanadit | 34940.98 | 1075338044 |
| | Don Sak | 21534.92 | 363625172 |
| | Ko Samui | 24164.03 | 275488099 |
| | Ko Pha-ngan | 11466.74 | 122426999 |
| | Chaiya | 26406.35 | 657843454 |
| | Tha Chana | 28016.74 | 1005178807 |
| | Khiri Rat Nikhom | 24806.14 | 762944608 |
| | Ban Ta Khun | 37074.65 | 1454448501 |
| | Phanom | 43211.48 | 1219448277 |
| | Tha Chang | 24543.78 | 1091360993 |
| | Ban Na San | 35744.09 | 768578356 |
| | Ban Na Doem | 13071.87 | 186067783 |
| | Khian Sa | 33077.24 | 752198370 |
| | Wiang Sa | 32273.89 | 384568252 |
| | Phrasaeng | 18938.80 | 709470151 |
| | Phunphin | 42408.88 | 953668236 |
| | Chai Buri | 21605.74 | 466478549 |
| | Vibhavadi | 16545.07 | 496005960 |

**Table 3.2** Geographical characteristic of Southern Region (district level) (Cont.)

| Province | District | Length (m) | area ($m^2$) |
|---|---|---|---|
| RANONG | Mueang Ranong | 33867.39 | 743256492 |
| | La-un | 29479.02 | 553475152 |
| | Kapoe | 25126.90 | 517704053 |
| | Kra Buri | 29221.56 | 956563666 |
| | Suk Samran | 24079.92 | 453434170 |
| CHUMPHON | Mueang Chumphon | 29351.14 | 796960288 |
| | Tha Sae | 50388.44 | 1477725624 |
| | Pathio | 38875.89 | 761891850 |
| | Lang Suan | 35272.44 | 587192411 |
| | Lamae | 24974.58 | 368355279 |
| | Phato | 44926.29 | 876041733 |
| | Sawi | 41066.08 | 838827780 |
| | Thung Tako | 23300.14 | 289228470 |
| SONGKHLA | Mueang Songkhla | 12449.44 | 204253090 |
| | Sathing Phra | 9338.87 | 198657857 |
| | Chana | 29658.95 | 630040901 |
| | Na Thawi | 33508.13 | 778574948 |
| | Thepha | 32222.07 | 662420992 |
| | Saba Yoi | 43939.19 | 945875616 |
| | Ranot | 21240.43 | 441713321 |
| | Krasae Sin | 17941.84 | 308685333 |
| | Rattaphum | 39179.11 | 664954946 |
| | Sadao | 34785.19 | 1034229347 |
| | Hat Yai | 30213.19 | 792580232 |
| | Na Mom | 16295.15 | 141712299 |
| | Khuan Niang | 19040.32 | 248069769 |
| | Bang Klam | 14646.40 | 144775123 |
| | Singhanakhon | 12267.72 | 241871728 |
| | Khlong Hoi Khong | 24901.57 | 302866920 |
| SATUN | Mueang Satun | 31307.35 | 975108727 |
| | Khuan Don | 14485.49 | 220800383 |
| | Khuan Kalong | 19148.98 | 532077368 |
| | Tha Phae | 18742.81 | 224944700 |
| | La-ngu | 29350.19 | 396105362 |
| | Thung Wa | 33147.49 | 460969357 |
| | Manang | 18346.58 | 210068216 |
| TRANG | Mueang Trang | 28162.14 | 439934646 |
| | Kantang | 31023.74 | 647126959 |
| | Yan Ta Khao | 27976.22 | 443422222 |
| | Palian | 36909.29 | 813968547 |
| | Sikao | 21420.46 | 461650639 |
| | Huai Yot | 29366.10 | 773643544 |
| | Wang Wiset | 21522.67 | 501161124 |
| | Na Yong | 19711.49 | 246382871 |
| | Ratsada | 18504.66 | 219533097 |
| | Hat Samran | 12357.90 | 183229644 |
| PHATTHALUNG | Mueang Phatthalung | 31855.91 | 484537424 |
| | Kong Ra | 20322.70 | 304996394 |
| | Khao Chaison | 33504.13 | 335733822 |
| | Tamot | 24350.32 | 276700354 |
| | Khuan Khanun | 34606.47 | 540462626 |
| | Pak Phayun | 26363.51 | 483178312 |
| | Si Banphot | 19224.27 | 239987225 |
| | Pa Bon | 36799.53 | 485243568 |
| | Bang Kaeo | 19590.41 | 154992279 |
| | Pa Phayom | 20322.70 | 302133352 |
| | Srinagarindra | 22519.58 | 252526199 |
| PATTANI | Mueang Pattani | 11871.72 | 94243342 |
| | Khok Pho | 18454.46 | 302405628 |
| | Nong Chik | 13036.12 | 237522007 |
| | Panare | 12013.62 | 143759417 |
| | Mayo | 19187.34 | 202134488 |
| | Thung Yang Daeng | 20359.02 | 139234779 |
| | Sai Buri | 14793.59 | 203905171 |
| | Mai Kaen | 5272.70 | 58062771 |
| | Yaring | 18601.50 | 216278050 |
| | Yarang | 13036.12 | 218368884 |
| | Kapho | 8349.73 | 82734942 |
| | Mae Lan | 10692.87 | 78100158 |

**Table 3.2** Geographical characteristic of Southern Region (district level) (Cont.)

| Province | District | Length (m) | area ($m^2$) |
|---|---|---|---|
| YALA | Mueang Yala | 19333.24 | 319615581 |
| | Betong | 57627.73 | 1319175185 |
| | Bannang Sata | 27389.15 | 579718448 |
| | Than To | 26949.37 | 673783309 |
| | Yaha | 19040.32 | 469873034 |
| | Raman | 30907.02 | 484832540 |
| | Kabang | 33393.79 | 444183216 |
| | Krong Pinang | 15965.24 | 183783339 |
| NARATHIWAT | Mueang Narathiwat | 16843.99 | 315012785 |
| | Tak Bai | 18434.69 | 279669909 |
| | Bacho | 13477.87 | 182913526 |
| | Yi-ngo | 15672.33 | 185764216 |
| | Ra-ngae | 21823.62 | 440482070 |
| | Rueso | 34859.66 | 475693490 |
| | Si Sakhon | 25779.32 | 523397143 |
| | Waeng | 21090.81 | 282421250 |
| | Sukhirin | 28706.94 | 515935177 |
| | Su-ngai Kolok | 19921.25 | 136691475 |
| | Su-ngai Padi | 29442.54 | 382154367 |
| | Chanae | 37787.70 | 576851802 |
| | Cho-airong | 19187.34 | 194165713 |

### 3.2.2 Air pollutant concentration data

$SO_2$ and $NO_2$ ambient concentration measured in the year 2010-2012 from air quality monitoring station located in the Eastern and Southern Regions of Thailand were used in this study. These data were obtained from Pollution Control Department, Ministry of Natural Resources and Environment. The air quality monitoring stations located in the Eastern Region consisted of 9 stations namely:

- Laem Chabang Stadium, Chon buri Province
- Municipality Youth Center, Chon buri Province
- General Educational Extension Office, Chon buri Province
- Tasit, Rayong province
- Map Ta Phut health station, Rayong Province
- Telephone exchange, Rayong province
- Provincial Agricultural Extension Office, Rayong Province
- Field Crops Research Center, Rayong Province
- Government Complex, Rayong Province

The air quality monitoring stations located in the Southern Region consisted of 2 stations namely:

- Surat thani Province
- Songkhla Province

Data were analyzed for background concentration using ninety-five percentile of measured data. These value were as shown in table 3.3.

**Table 3.3** Background concentration (ninety-five percentile of measured pollutant data) for The Eastern and Southern Regions of Thailand

| Region | Pollutant | Number of Sample | Concentration at P value=0.95 (ug/$m^3$) |
|---|---|---|---|
| East | $SO_2$ | 168,916 | 26.07 |
| | $NO_2$ | 167,500 | 50.59 |
| South | $SO_2$ | 39,090 | 13.03 |
| | $NO_2$ | 43,348 | 29.98 |

### 3.2.3 Meteorological data

1) Ventilation coefficient for box model

Wind speed and mixing height data which were used to calculate for ventilation coefficient were derived from a project carried out by Thepanondh in the year 2013. Thepanondh (2013) predicted these data by using the WRF model. The spatial resolution of each grid cell was 50x50 $km^2$ covering the entire area of study domain as show in Figure 3.3-3.4. In total, there were 28 grid cells for the Eastern Region and 57 grid cells for the Southern Region.

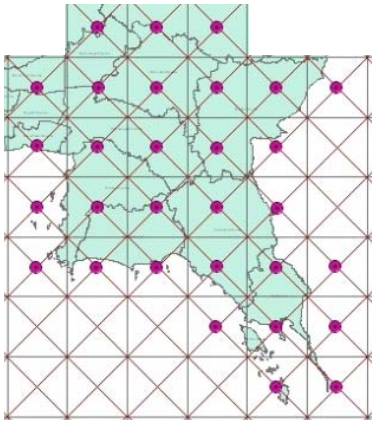


**Figure 3.3** WRF study domain of Eastern Region (Thepanondh, 2013)

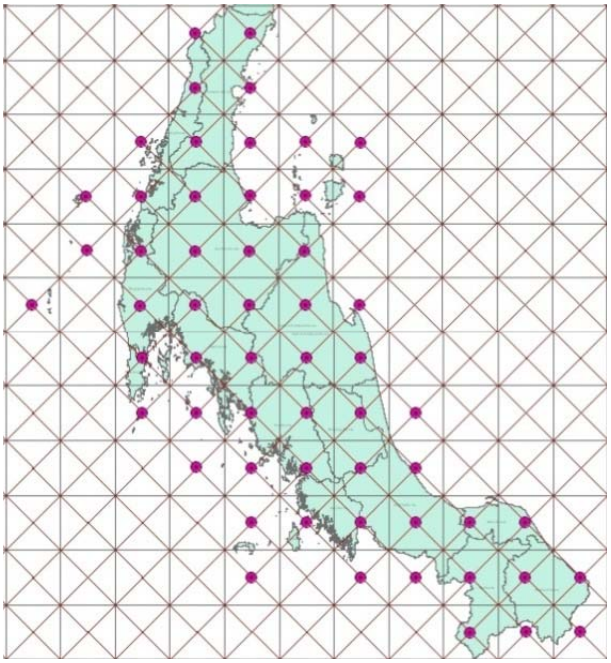


**Figure 3.4** WRF study domain of Southern Region (Thepanondh, 2013)

Wind speed and mixing height from WRF Model were used to calculate for ventilation coefficient by using following Equation (3.1)

$$VC\ (m^2/s) = \text{Wind speed (m/s)} \times \text{Mixing height (m)} \quad \text{… Equation (3.1)}$$

Spatial analysis of ventilation coefficient was carried out by using the GIS (Thepanondh, 2013). This data were further used to calculate for assimilative capacity of air pollution of the study area in this study.

2) Wind speed for screen view

Wind speed in the period 30 years which were obtained from Royal Thai Navy was used for screen view. Table 3.4-3.6 showed Mean wind speed from monitoring station in the gulf of Thailand and Andaman sea coast.

**Table 3.4** Mean wind speed of the gulf of Thailand (Eastern side)

(Royal Thai Navy, 2013)

| East gulf coast of Thailand | Period of 30 years | Mean wind speed (m/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Ko Si Chang, CHON BURI | B.E. 2514 - 2543 | 1.95 | 1.95 | 2.15 | 1.9 | 2 | 2.65 | 2.55 | 2.6 | 1.6 | 1.65 | 2.9 | 3.05 |
| Pattaya, CHON BURI | B.E. 2514 - 2543 | 2.05 | 2.15 | 2.4 | 2.05 | 2.05 | 3.1 | 2.85 | 3 | 1.95 | 1.95 | 2.85 | 3.25 |
| Sattahip, CHON BURI | B.E. 2511 - 2540 | 2.15 | 2.65 | 3 | 2.95 | 2.95 | 3.35 | 3.45 | 3.3 | 2.25 | 1.95 | 2.5 | 2.6 |
| Mueang, RAYONG | B.E. 2511 - 2540 | 1.4 | 2.1 | 2.3 | 2.05 | 2.5 | 3.8 | 3.6 | 3.85 | 2.05 | 1.3 | 1.35 | 1.45 |
| Mueang, CHANTHABURI | B.E. 2514 - 2543 | 0.85 | 0.6 | 0.6 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 | 0.35 | 0.55 | 1.35 | 1.5 |
| Khlong Yai, TRAT | B.E. 2511 - 2540 | 1.4 | 1.4 | 1.4 | 1.35 | 1.4 | 1.4 | 1.55 | 1.65 | 1.2 | 1.1 | 1.4 | 1.55 |
| Kabin Buri, PRACHIN BURI | B.E. 2514 - 2543 | 0.65 | 0.9 | 0.85 | 0.85 | 0.65 | 0.65 | 0.7 | 0.7 | 0.5 | 0.7 | 1.35 | 1.55 |
| Aranyaprathet, SA KAEO | B.E. 2514 - 2543 | 1.05 | 1.25 | 1.4 | 1.25 | 1 | 1.25 | 1.3 | 1.45 | 1 | 0.95 | 1.2 | 1.3 |

Note: B.E. = Buddhist Era

**Table 3.5** Mean wind speed of the gulf of Thailand (Western side)

(Royal Thai Navy, 2013)

| West gulf coast of Thailand | Period of 30 years | Mean wind speed (m/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Mueang, CHUMPHON | B.E. 2514 - 2543 | 1.4 | 1.35 | 1.4 | 1.25 | 1.25 | 1.45 | 1.45 | 1.5 | 1.25 | 0.9 | 1.35 | 1.75 |
| Ko Samui, SURAT THANI | B.E. 2511 - 2540 | 2.95 | 3.2 | 2.85 | 1.95 | 1.95 | 2.65 | 2.65 | 2.75 | 2.35 | 1.6 | 2.05 | 2.55 |
| Mueang, NAKHON SI THAMMARAT | B.E. 2514 - 2543 | 0.65 | 0.9 | 0.85 | 0.85 | 0.65 | 0.65 | 0.7 | 0.7 | 0.5 | 0.7 | 1.35 | 1.55 |
| Mueang, SONGKHLA | B.E. 2514 - 2543 | 3.95 | 3.7 | 3.25 | 2.5 | 2 | 2.05 | 2.2 | 2.35 | 2.15 | 1.85 | 2.45 | 3.6 |
| Hat Yai, SONGKHLA | B.E. 2514 - 2543 | 2.05 | 2.05 | 1.75 | 1.35 | 1.35 | 1.55 | 1.65 | 1.85 | 1.55 | 1.2 | 1.25 | 1.75 |
| PATTANI Airport | B.E. 2514 - 2543 | 2.35 | 2.35 | 2.15 | 1.8 | 1.5 | 1.5 | 1.6 | 1.75 | 1.7 | 1.35 | 1.4 | 1.95 |
| Mueang, NARATHIWAT | B.E. 2511 - 2540 | 1.85 | 1.95 | 1.75 | 1.5 | 1.25 | 1.1 | 1.15 | 1.15 | 1.2 | 1.15 | 1.3 | 1.95 |

Note: B.E. = Buddhist Era

**Table 3.6** Mean wind speed of Andaman sea coast

(Royal Thai Navy, 2013)

| Andaman sea coast | Period | Mean wind speed (m/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Mueang, RANONG | B.E. 2533 - 2542 | 0.4 | 0.45 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.65 | 0.4 | 0.3 | 0.35 | 0.6 |
| Takua Pa, PHANGNGA | B.E. 2514 - 2543 | 1 | 1 | 1 | 0.95 | 1.2 | 1.85 | 1.6 | 2.15 | 1.5 | 0.9 | 0.75 | 1.05 |
| Mueang, PHUKET | B.E. 2511 - 2540 | 1.55 | 1.45 | 1.35 | 1.05 | 1.05 | 1.35 | 1.3 | 1.75 | 1.35 | 1 | 1.15 | 1.65 |
| Ko Lanta, KRABI | B.E. 2511 - 2540 | 2.35 | 1.95 | 1.7 | 1.55 | 2.2 | 3 | 3 | 3.75 | 3.25 | 1.75 | 1.65 | 2.05 |
| TRANG Airport | B.E. 2514 - 2543 | 2.4 | 2.2 | 1.65 | 1.05 | 0.75 | 0.9 | 0.9 | 1 | 0.8 | 0.7 | 1.2 | 2.15 |
| Mueang, SATUN | B.E. 2514 - 2543 | 2.45 | 1.9 | 1.35 | 0.75 | 0.6 | 0.7 | 0.75 | 0.9 | 0.85 | 0.65 | 0.95 | 1.95 |

Note: B.E. = Buddhist Era

## 3.3 Box Model analysis

Box Model was used to estimate maximum emission load of area (Noel de nevers, 2000), by using this following Equation (3.2)

$$c = b + \frac{q\,L}{u\,H} \quad \text{…Equation (3.2)}$$

Where

$c$ = Pollutant concentration ($g/m^3$)

$b$ = Background pollutant concentration ($g/m^3$)

$q$ = Emission load ($g/s \cdot m^2$)

$L$ = Length of area (m)

$u$ = Wind speed (m/s)

$H$ = Mixing height (m)

- In this study, the pollutant concentration ($c$) was set as 1 hour ambient air quality standard. Therefore, sulfur dioxide concentration was set as 780 $ug/m^3$. As for nitrogen dioxide concentration, this value was set as 320 $ug/m^3$.
- Background concentration ($b$) of $SO_2$ and $NO_2$ were set as ninety-five percentile of the measured concentration of this parameter in the area. Data used in analysis were from 2010 to 2012.

- The ventilation coefficient which was calculated by multiplying wind speed and mixing height data (Thepanondh, 2013). This ventilation coefficient ($u$ and $H$) was used in the Box Model.
- The length of district ($L$) was measured in the northeast-southwest direction.

Therefore an emission load of pollutant could be calculated when pollutant concentration, background concentration, ventilation coefficient and the length of area were known.

## 3.4 Screen View Model (Version 3.5.0) configuration

Screen View Model in this study was downloaded from Lakes Environmental (Lakes Environmental, 2013). The model in Version 3.5.0 was used in order to predict pollutant concentration. In the study, configuration of Screen View Model consist of 3 parts namely Source Inputs, Meteorology, and Automated Distances as shown in Figure 3.6-3.8.

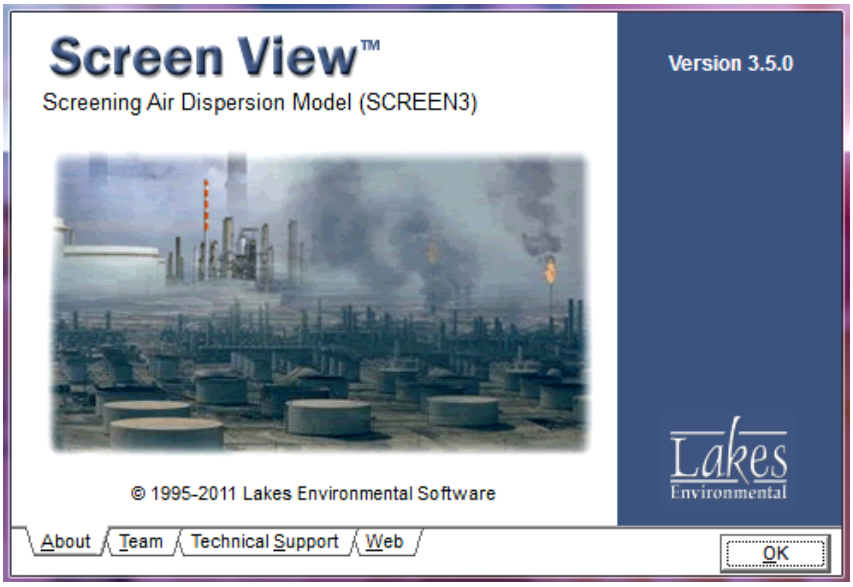



**Figure 3.5** Screen View Model Version 3.5.0 (Lakes Environmental, 2013)

### 3.4.1 Source Inputs

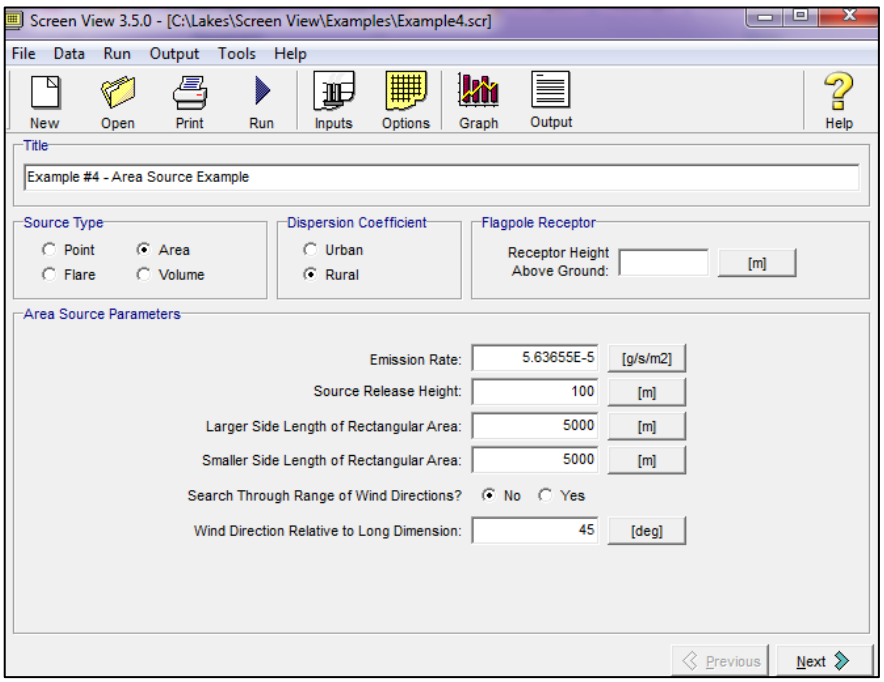



**Figure 3.6** Source Inputs in Screen View Model Version 3.5.0 (Lakes Environmental, 2013)

**Source Type**: Area Source

**Dispersion Coefficient**: Rural

**Area Source Parameters**:

**Emission Rate**: Enter the emission load of the pollutant

(In this research input 50%$q$ in g/s-m$^2$ unit from box model.)

**Source Release Height**:100 m

**Larger Side Length of Rectangular Area**: 5000 m

**Smaller Side Length of Rectangular Area**: 5000 m

**Search Through Range of Wind Directions?**: No

**Wind Direction Relative to Long Dimension**: 45 deg

### 3.4.2 Meteorology

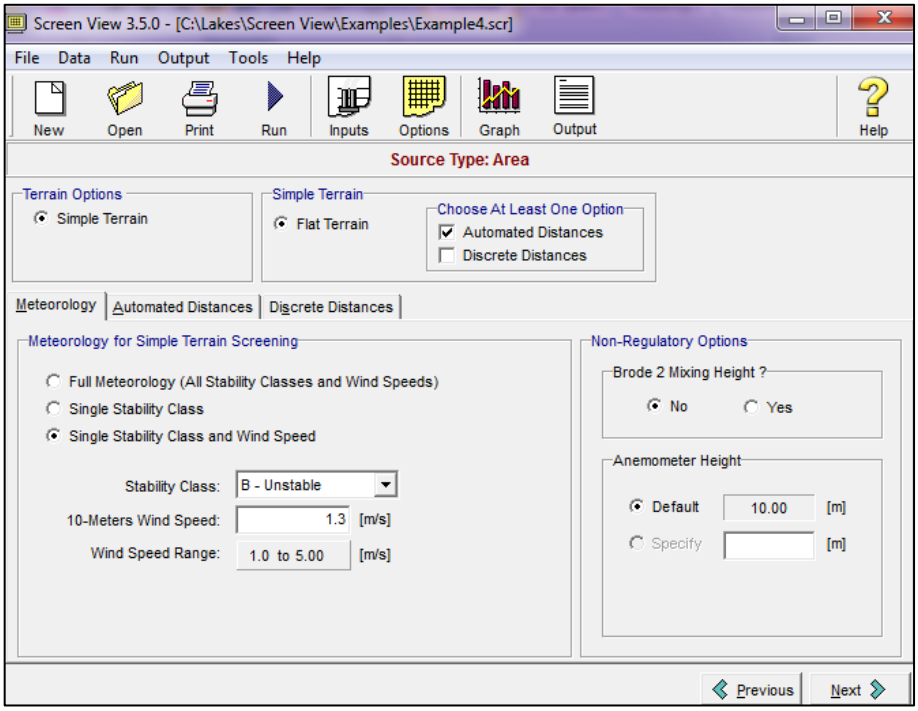



**Figure 3.7** Meteorology in Screen View Model Version 3.5.0
(Lakes Environmental, 2013)

**Meteorology for Simple Terrain Screening**: Single Stability Class and Wind Speed

**Stability Class**: B-Unstable

(B-Unstable is the main stability class of Thailand.)

**10-Meters Wind speed**: Enter wind speed from Meteorological Division, Hydrographic Department, Royal Thai Navy

(Wind speed of each district from the nearest station)

### 3.4.3 Automated Distances

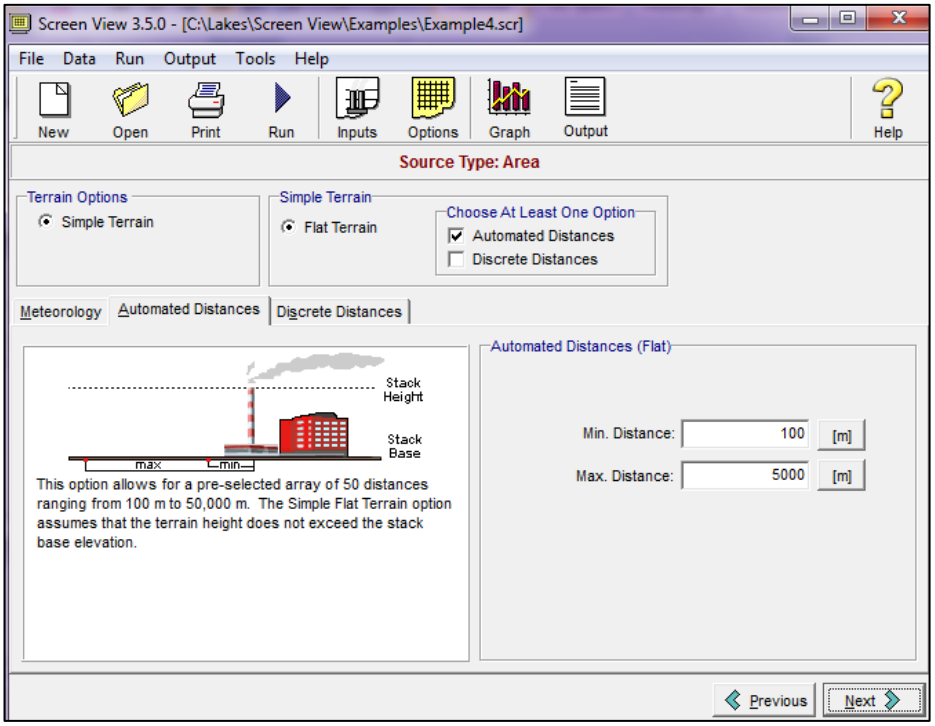



**Figure 3.8** Automated Distances in Screen View Model Version 3.5.0 (Lakes Environmental, 2013)

**Automated Distances (Flat)**: Min Distance 100 m
Max Distance 5000 m

## 3.5 Research procedures

3.5.1 Data Collection in district level for Eastern and Southern Regions of Thailand:

- Size and length of area
- Air pollutant concentration in ambient
- Ventilation coefficient for each month in the year 2010
- Mean wind speed in the period 30 years

3.5.2 Emission load ($q$) of $SO_2$ and $NO_2$ in district level for Eastern and Southern Regions of Thailand was calculated by using box model. The Box Model was set as following:

$c$ = Ambient quality standard of pollutant

$b$ = Ninety-five percentile of pollutant concentration in ambient

$q$ = Maximum emission load which does not excess ambient quality standard

$L$ = Length of district area

$u\,H$ = Wind speed multiply by Mixing height (VC) (Thepanondh, 2013)

Emission load of all districts from Box Model was presented for each month in the year 2010.

3.5.3 Emission load converted to fifty percent of emission load. Fifty percent of emission load was determined in order to support the uncertainty of data.

3.5.4 Fifty percent was verified by using Screen View as air pollutant dispersion principle. Verification of data was comparison with air pollutant concentration ($C$) and air quality standard. The $C$ value was obtained from Screen View by using fifty percent of emission load as emission input.

3.5.5 The air assimilative capacity of $SO_2$ and $NO_2$ for the Eastern and Southern regions of Thailand was concluded for their spatial and temporal behavior.

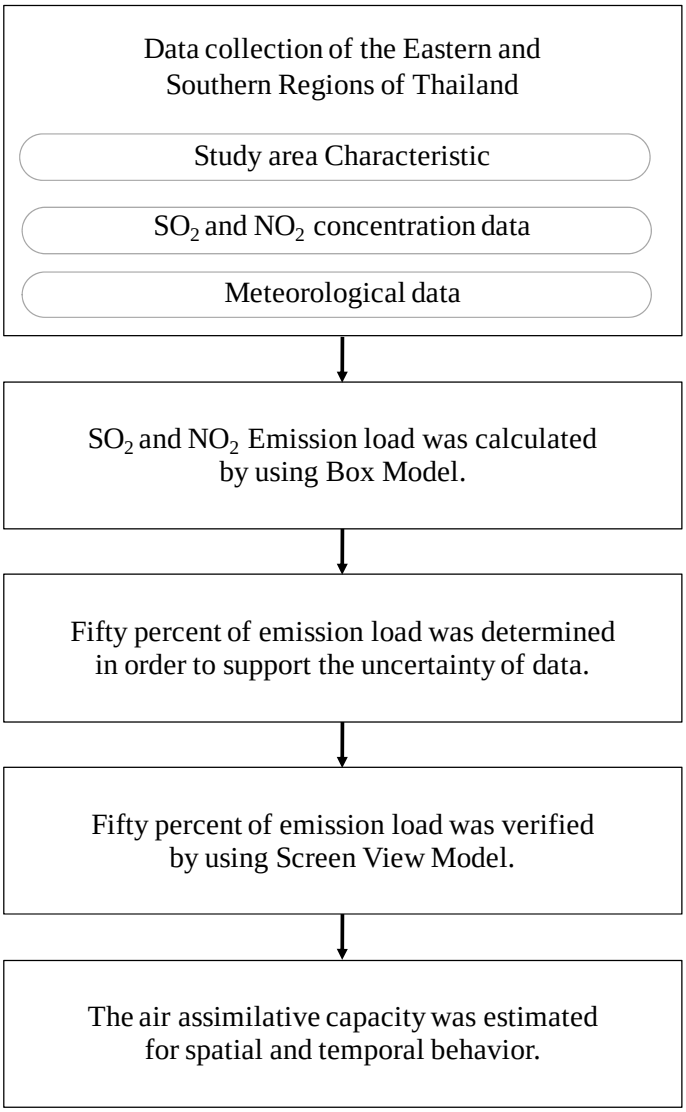



**Figure 3.9** Procedures of the study

# CHAPTER IV
# RESULTS AND DISCUSSION

Chapter IV report maximum and fifty percent of maximum emission load for $SO_2$ and $NO_2$ in the Eastern and Southern Regions of Thailand which were obtained from calculation by Box Model. It should be noted that the emission data used in the box model calculation was in term of $NO_2$ emission. However, in order to make it comply with the emission standard which is expressed as oxide of nitrogen ($NO_x$). This chapter therefore report fifty percent of maximum emission load for $NO_x$ as well. The result in this study presents the value of every district in the Eastern and Southern Regions for each month in the year 2010. The number of district in the Eastern and Southern Regions are 63 and 151 districts, respectively. Then, the highest and lowest of emission load in both regions were discussed. Finally, this chapter reports verification result of data which were obtained from calculation by Screen View.

## 4.1 Air assimilative capacity for the Eastern Region of Thailand

### 4.1.1 Maximum emission load

$SO_2$ and $NO_2$ maximum emission load for the Eastern Region of Thailand was determined as the maximum emission values which will not cause the ambient concentration exceed its standard. The maximum emission load was calculated by using Box Model.

The total values in term of g/s-$m^2$ and g/s unit for 63 districts for each month in the year 2010 were presented in Appendix A. The highest and lowest emission values obtained from the calculation were shown in Table 4.1.

**Table 4.1** The highest and lowest of maximum emission load in the Eastern Region of Thailand

| Pollutant | | | $SO_2$ | $NO_2$ |
|---|---|---|---|---|
| $q$ (g/s-$m^2$) | Highest | Value | $4.03 \times 10^{-3}$ | $1.44 \times 10^{-3}$ |
| | | Area | Ko Si Chang, CHON BURI | Ko Si Chang, CHON BURI |
| | | Time | November | November |
| | Lowest | Value | $1.39 \times 10^{-6}$ | $4.98 \times 10^{-7}$ |
| | | Area | Sanam Chai Khet, CHACHAENGSAO | Sanam Chai Khet, CHACHAENGSAO |
| | | Time | February | February |
| $q$ (g/s) | Highest | Value | 389,453.61 | 139,167.22 |
| | | Area | Tha Takiap, CHACHAENGSAO | Tha Takiap, CHACHAENGSAO |
| | | Time | November | November |
| | Lowest | Value | 616.06 | 220.14 |
| | | Area | Phan Thong, CHON BURI | Phan Thong, CHON BURI |
| | | Time | February | February |

For $SO_2$ in term of g/s-$m^2$ unit, it was found that the highest $SO_2$ emission load was $4.03 \times 10^{-3}$ g/s-$m^2$ and was occurred in Ko Si Chang District, Chonburi Province in November. The lowest $SO_2$ emission load was $1.39 \times 10^{-6}$ g/s-$m^2$ and was found in Sanam Chai Khet District, Chachaengsao Province in February.

For $SO_2$ in term of g/s unit, it was found that the highest $SO_2$ emission load was 389,453.61 g/s and was occurred in Tha Takiap District, Chachaengsao Province in November. The lowest $SO_2$ emission load was 616.06 g/s and was found in Phan Thong District, Chonburi Province in February.

For $NO_2$ in term of g/s-$m^2$ unit, it was found that the highest $NO_2$ emission load was $1.44 \times 10^{-3}$ g/s-$m^2$ and was occurred in Ko Si Chang District, Chonburi Province in November. The lowest $NO_2$ emission load was $4.98 \times 10^{-7}$ g/s-$m^2$ and was found in Sanam Chai Khet District, Chachaengsao Province in February.

For $NO_2$ in term of g/s unit, it was found that the highest $NO_2$ emission load was 139,167.22 g/s and was occurred in Tha Takiap District, Chachaengsao Province in November. The lowest $NO_2$ emission load was 220.14 g/s and was found in Phan Thong District, Chonburi Province in February.

### 4.1.2 Fifty percent (50%) of maximum emission load

Fifty percent of maximum emission load for the Eastern Region of Thailand was determined in order to support the uncertainty of data. These uncertainties of the analysis were such as variation of meteorological data and considering of downwind concentration of air pollution dispersion by means of air quality model. This appropriate percent of maximum emission load was estimated by calculating percent of emission data which will provide maximum concentration within the ambient air quality standard.

In the method, 100, 90, 80, 70, 60, and 50 percents of maximum emission load were put into Screen View to calculate the pollutant concentrations. Then, the percentile of data having pollutant concentrations not exceed the standard was estimated. These values were presented in Table 4.2. It was found that fifty percent of maximum emission load was the most appropriate value in the analysis.

**Table 4.2** Percentile of pollutant concentrations within the ambient air quality standard in the Eastern Region of Thailand

| % of emission load | $SO_2$ | | $NO_2$ | |
|---|---|---|---|---|
| | Number of data | Percentile | Number of data | Percentile |
| **100** | 756 | 65 | 756 | 69 |
| **90** | 756 | 68 | 756 | 71 |
| **80** | 756 | 71 | 756 | 75 |
| **70** | 756 | 75 | 756 | 78 |
| **60** | 756 | 78 | 756 | 81 |
| **50** | 756 | 82 | 756 | 85 |

The fifty percent of maximum emission load for the Eastern Region of Thailand in term of g/s-$m^2$ and g/s unit for 63 districts for each month in the year 2010 were presented in Appendix B. The highest and lowest emission values obtained from the calculation were shown in Table 4.3.

**Table 4.3** The highest and lowest of fifty percent of maximum emission load in the Eastern Region of Thailand

| Pollutant | | | $SO_2$ | $NO_2$ |
|---|---|---|---|---|
| $q$ (g/s-$m^2$) | Highest | Value | $2.02 \times 10^{-3}$ | $7.2 \times 10^{-4}$ |
| | | Area | Ko Si Chang, CHON BURI | Ko Si Chang, CHON BURI |
| | | Time | November | November |
| | Lowast | Value | $6.97 \times 10^{-7}$ | $2.49 \times 10^{-7}$ |
| | | Area | Sanam Chai Khet, CHACHAENGSAO | Sanam Chai Khet, CHACHAENGSAO |
| | | Time | February | February |
| $q$ (g/s) | Highest | Value | 194,726.80 | 69,583.61 |
| | | Area | Tha Takiap, CHACHAENGSAO | Tha Takiap, CHACHAENGSAO |
| | | Time | November | November |
| | Lowast | Value | 308.03 | 110.07 |
| | | Area | Phan Thong, CHON BURI | Phan Thong, CHON BURI |
| | | Time | February | February |

For $SO_2$ in term of g/s-$m^2$ unit, it was found that the highest $SO_2$ emission load was $2.02 \times 10^{-3}$ g/s-$m^2$ and was occurred in Ko Si Chang District, Chonburi Province in November. The lowest $SO_2$ emission load was $6.97 \times 10^{-7}$ g/s-$m^2$ and was found in Sanam Chai Khet District, Chachaengsao Province in February.

For $SO_2$ in term of g/s unit, it was found that the highest $SO_2$ emission load was 194,726.8 g/s and was occurred in Tha Takiap District, Chachaengsao Province in November. The lowest $SO_2$ emission load was 308.03 g/s and was found in Phan Thong District, Chonburi Province in February.

For $NO_2$ in term of g/s-$m^2$ unit, it was found that the highest $NO_2$ emission load was $7.2 \times 10^{-4}$ g/s-$m^2$ and was occurred in Ko Si Chang District, Chonburi Province in November. The lowest $NO_2$ emission load was $2.49 \times 10^{-7}$ g/s-$m^2$ and was found in Sanam Chai Khet District, Chachaengsao Province in February.

For $NO_2$ in term of g/s unit, it was found that the highest $NO_2$ emission load was 69,583.61 g/s and was occurred in Tha Takiap District, Chachaengsao Province in November. The lowest $NO_2$ emission load was 110.07 g/s and was found in Phan Thong District, Chonburi Province in February.

It should be noted that the emission data used in the box model calculation was in term of $NO_2$ emission. However, in order to make it comply with the emission standard which is expressed as oxide of nitrogen ($NO_x$), the value of $NO_2$ was converted to $NO_x$.

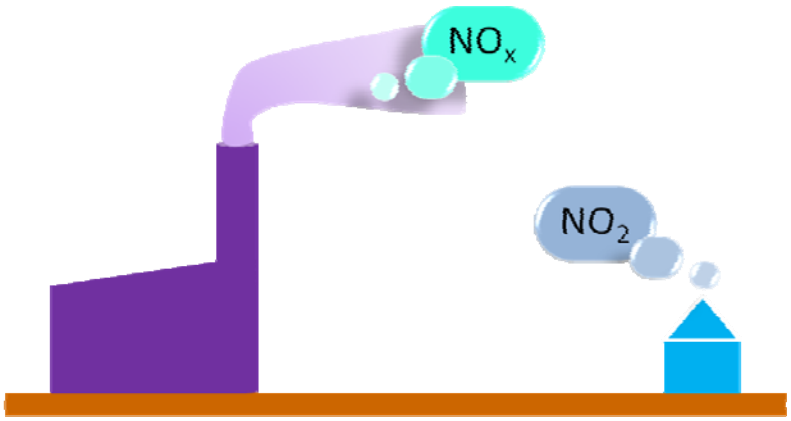



**Figure 4.1** $NO_x$ emission and $NO_2$ concentration

In this study, the $NO_x/NO_2$ ratio of 1.62 was used for the Eastern Region of Thailand. This ratio was calculated by using air quality monitoring data from Pollution Control Department, Ministry of Natural Resources and Environment. Tables 4.4 showed the frequency of $NO_x/NO_2$ ratio from the total data of 167,659 values. It was found that $NO_x/NO_2$ ratio between 1 and 2 had the highest frequency (about 70%). An average ratio of NOx/NO2 was calculated as 1.62.

**Table 4.4** Frequency distribution of $NO_x/NO_2$ ratio

| $NO_x/NO_2$ ratio | frequency (%) |
|---|---|
| 0-0.5 | 2.3 |
| 0.5-1 | 9.6 |
| 1-1.5 | 46 |
| 1.5-2 | 24.5 |
| 2-2.5 | 7.7 |
| 2.5-74 | 9.9 |

The fifty percent of $NO_x$ maximum emission load for the Eastern Region of Thailand in term of g/s-$m^2$ and g/s unit for 63 districts for each month in the year 2010 were presented in Appendix C. The highest and lowest emission values obtained from the calculation were shown in Table 4.5.

**Table 4.5** The highest and lowest fifty percent of $NO_x$ maximum emission load in the Eastern Region of Thailand

| **Pollutant** | | | **$NO_x$** |
|---|---|---|---|
| ***q* (g/s-$m^2$)** | **Highest** | Value | $1.17 \times 10^{-3}$ |
| | | Area | Ko Si Chang, CHON BURI |
| | | Time | November |
| | **Lowast** | Value | $4.04 \times 10^{-7}$ |
| | | Area | Sanam Chai Khet, CHACHAENGSAO |
| | | Time | February |
| ***q* (g/s)** | **Highest** | Value | 112,725.45 |
| | | Area | Tha Takiap, CHACHAENGSAO |
| | | Time | November |
| | **Lowast** | Value | 178.31 |
| | | Area | Phan Thong, CHON BURI |
| | | Time | February |

For $NO_x$ in term of g/s-$m^2$ unit, it was found that the highest $NO_x$ emission load was $1.17 \times 10^{-3}$ g/s-$m^2$ and was occurred in Ko Si Chang District, Chonburi Province in November. The lowest $NO_x$ emission load was $4.04 \times 10^{-7}$ g/s-$m^2$ and was found in Sanam Chai Khet District, Chachaengsao Province in February.

For $NO_x$ in term of g/s unit, it was found that the highest $NO_x$ emission load was 112,725.45 g/s and was occurred in Tha Takiap District, Chachaengsao Province in November. The lowest $NO_x$ emission load was 178.31 g/s and was found in Phan Thong District, Chonburi Province in February.

### 4.1.3 The highest and the lowest of emission load

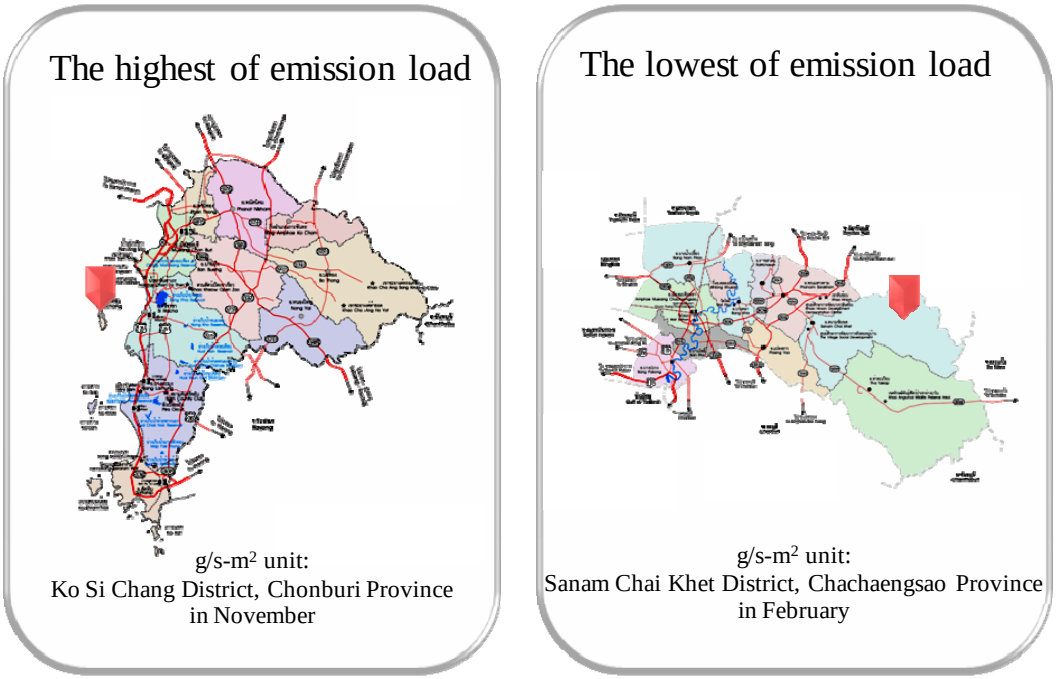



**Figure 4.2** The position of district at the highest and the lowest of emission load for the Eastern Region of Thailand (Adapted from: Tourism Authority of Thailand, 2013)

The result for the Eastern Region of Thailand shown that Ko Si Chang District, Chonburi Province in November was the place having the highest of emission load while Sanam Chai Khet District, Chachaengsao Province in February was the place having the lowest of emission load.

It was found that the closer area to the sea, the more emission load was achieved. Ko Si Chang District is an island in consequence of ability of air dispersion. On the other hand, Sanam Chai Khet District is quite far from sea side. Overall results indicated that Chonburi Province had higher potential of the air dispersion than Chachaengsao Province.

Temporal result indicated that the influence of the northeast monsoon in November was affected to potential for air pollutant assimilation. In February during transition of season, the potential of air pollutant assimilation is the lowest.

### 4.1.4 Verification of data

Fifty percent of emission load for the Eastern Region of Thailand was verified by using Screen View as air pollutant dispersion principle. Verification of data was conducted by comparison between air pollutant concentration (*C*) and air quality standard. The *C* value was obtained from Screen View by using fifty percent of emission load as emission input. The predicted *C* values were presented in Appendix D. Then, percentile of *C* values which did not exceed the standard was estimated.

**Table 4.6** Percentile of pollutant concentrations within the ambient air quality standard for the Eastern Region of Thailand

| Pollutant | Number of data | Percentile |
|---|---|---|
| $SO_2$ | 756 | 82 |
| $NO_2$ | 756 | 85 |

Eighty-two percentile of $SO_2$ predicted data were within the ambient air quality standard as shown in Table 4.6. As for $NO_2$, eighty-five percentile of data were within the ambient air quality standard.

## 4.2 Air assimilative capacity for the Southern Region of Thailand

### 4.2.1 Maximum emission load

Maximum emission load for the Southern Region of Thailand was determined as the maximum emission values which will not cause the ambient concentration exceed its standard. The maximum emission load was calculated by using Box Model.

The total values in term of g/s-$m^2$ and g/s unit for 151 districts for each month in the year 2010 were presented in Appendix E. The highest and lowest emission values obtained from the calculation were shown in Table 4.7.

**Table 4.7** The highest and lowest of maximum emission load in the Southern Region of Thailand

| **Pollutant** | | | **$SO_2$** | **$NO_2$** |
|---|---|---|---|---|
| ***q*** **(g/s-$m^2$)** | **Highest** | Value | $1.06 \times 10^{-4}$ | $4 \times 10^{-4}$ |
| | | Area | Mai Kaen, PATTANI | Mai Kaen, PATTANI |
| | | Time | March | March |
| | **Lowast** | Value | $2.95 \times 10^{-6}$ | $1.11 \times 10^{-6}$ |
| | | Area | Phanom, SURAT THANI | Phanom, SURAT THANI |
| | | Time | May | May |
| ***q*** **(g/s)** | **Highest** | Value | 298,892.91 | 113,023.40 |
| | | Area | Kra Buri, RANONG | Kra Buri, RANONG |
| | | Time | November | November |
| | **Lowast** | Value | 1,334.23 | 504.53 |
| | | Area | Thap Put, PHANGNGA | Thap Put, PHANGNGA |
| | | Time | May | May |

For $SO_2$ in term of g/s-$m^2$ unit, it was found that the highest $SO_2$ emission load was $1.06 \times 10^{-4}$ g/s-$m^2$ and occurred in Mai Kaen District, Pattani Province in March. The lowest $SO_2$ emission load was $2.95 \times 10^{-6}$ g/s-$m^2$ and found in Phanom District, Surat Thani Province in May.

For $SO_2$ in term of g/s unit, it was found that the highest $SO_2$ emission load was 298,892.91 g/s and occurred in Kra Buri District, Ranong Province in November. The lowest $SO_2$ emission load was 1,334.23 g/s and found in Thap Put District, Phangnga Province in May.

For $NO_2$ in term of g/s-$m^2$ unit, it was found that the highest $NO_2$ emission load was 4 x $10^{-4}$ g/s-$m^2$ and occurred in Mai Kaen District, Pattani Province in March. The lowest $NO_2$ emission load was 1.11 x $10^{-6}$ g/s-$m^2$ and found in Phanom District, Surat Thani Province in May.

For $NO_2$ in term of g/s unit, it was found that the highest $NO_2$ emission load was 113,023.4 g/s and occurred in Kra Buri District, Ranong Province in November. The lowest $NO_2$ emission load was 504.53 g/s and found in Thap Put District, Phangnga Province in May.

### 4.2.2 Fifty percent (50%) of maximum emission load

Fifty percent of maximum emission load for the Southern Region of Thailand was determined in order to support the uncertainty of data. These uncertainties of the analysis were such as variation of meteorological data and considering of downwind concentration of air pollution dispersion by means of air quality model. This appropriate percent of maximum emission load was similar to the Eastern Region. In the result, the fifty percent of maximum emission load for the Southern Region of Thailand in term of g/s-$m^2$ and g/s unit for 151 districts for each month in the year 2010 were presented in Appendix F. The highest and lowest emission values obtained from the calculation were shown in Table 4.8.

**Table 4.8** The highest and lowest of fifty percent of maximum emission load in the Southern Region of Thailand

| Pollutant | | | $SO_2$ | $NO_2$ |
|---|---|---|---|---|
| $q$ (g/s-m$^2$) | **Highest** | Value | $5.28 \times 10^{-4}$ | $2 \times 10^{-4}$ |
| | | Area | Mai Kaen, PATTANI | Mai Kaen, PATTANI |
| | | Time | March | March |
| | **Lowast** | Value | $1.47 \times 10^{-7}$ | $5.57 \times 10^{-7}$ |
| | | Area | Phanom, SURAT THANI | Phanom, SURAT THANI |
| | | Time | May | May |
| $q$ (g/s) | **Highest** | Value | 149,446.45 | 56,511.70 |
| | | Area | Kra Buri, RANONG | Kra Buri, RANONG |
| | | Time | November | November |
| | **Lowast** | Value | 667.12 | 252.26 |
| | | Area | Thap Put, PHANGNGA | Thap Put, PHANGNGA |
| | | Time | May | May |

For $SO_2$ in term of g/s-m$^2$ unit, it was found that the highest $SO_2$ emission load was $5.28 \times 10^{-4}$ g/s-m$^2$ and occurred in Mai Kaen District, Pattani Province in March. The lowest $SO_2$ emission load was $1.47 \times 10^{-7}$ g/s-m$^2$ and found in Phanom District, Surat Thani Province in May.

For $SO_2$ in term of g/s unit, it was found that the highest $SO_2$ emission load was 149,446.45 g/s and occurred in Kra Buri District, Ranong Province in November. The lowest $SO_2$ emission load was 667.12 g/s and found in Thap Put District, Phangnga Province in May.

For $NO_2$ in term of g/s-m$^2$ unit, it was found that the highest $NO_2$ emission load $2 \times 10^{-4}$ g/s-m$^2$ and occurred in Mai Kaen District, Pattani Province in March. The lowest $NO_2$ emission load was $5.57 \times 10^{-7}$ g/s-m$^2$ and found in Phanom District, Surat Thani Province in May.

For $NO_2$ in term of g/s unit, it was found that the highest $NO_2$ emission load was 56,511.7 g/s and occurred in Kra Buri District, Ranong Province in November. The lowest $NO_2$ emission load was 252.26 g/s and found in Thap Put District, Phangnga Province in May.

In case of the Southern region, it is similar to the Eastern Region. It should be noted that the emission data used in the box model calculation was in term of $NO_2$ emission. However, in order to make it comply with the emission standard which is expressed as oxide of nitrogen ($NO_x$), the value of $NO_2$ was converted to $NO_x$.

The $NO_x/NO_2$ ratio of 1.62 for the Eastern region was used for the Southern region. The ratio was calculated by using air quality monitoring data from Pollution Control Department, Ministry of Natural Resources and Environment.

The fifty percent of $NO_x$ maximum emission load for the Southern Region of Thailand in term of g/s-$m^2$ and g/s unit for 63 districts for each month in the year 2010 were presented in Appendix G. The highest and lowest emission values obtained from the calculation were shown in Table 4.9.

**Table 4.9** The highest and lowest of fifty percent of $NO_x$ maximum emission load in the Southern Region of Thailand

| **Pollutant** | | | **$NO_x$** |
|---|---|---|---|
| ***q* (g/s-$m^2$)** | **Highest** | Value | $3.23 \times 10^{-4}$ |
| | | Area | Mai Kaen, PATTANI |
| | | Time | March |
| | **Lowast** | Value | $9.02 \times 10^{-7}$ |
| | | Area | Phanom, SURAT THANI |
| | | Time | May |
| ***q* (g/s)** | **Highest** | Value | 91,548.95 |
| | | Area | Kra Buri, RANONG |
| | | Time | November |
| | **Lowast** | Value | 408.67 |
| | | Area | Thap Put, PHANGNGA |
| | | Time | May |

For $NO_x$ in term of g/s-$m^2$ unit, it was found that the highest $NO_x$ emission load was $3.23 \times 10^{-4}$ g/s-$m^2$ and occurred in Mai Kaen District, Pattani Province in March. The lowest $NO_2$ emission load was $9.02 \times 10^{-7}$ g/s-$m^2$ and found in Phanom District, Surat Thani Province in May.

For $NO_x$ in term of g/s unit, it was found that the highest $NO_x$ emission load was 91,548.95 g/s and occurred in Kra Buri District, Ranong Province in November. The lowest $NO_2$ emission load was 408.67 g/s and found in Thap Put District, Phangnga Province in May.

### 4.2.3 The highest and the lowest of emission load

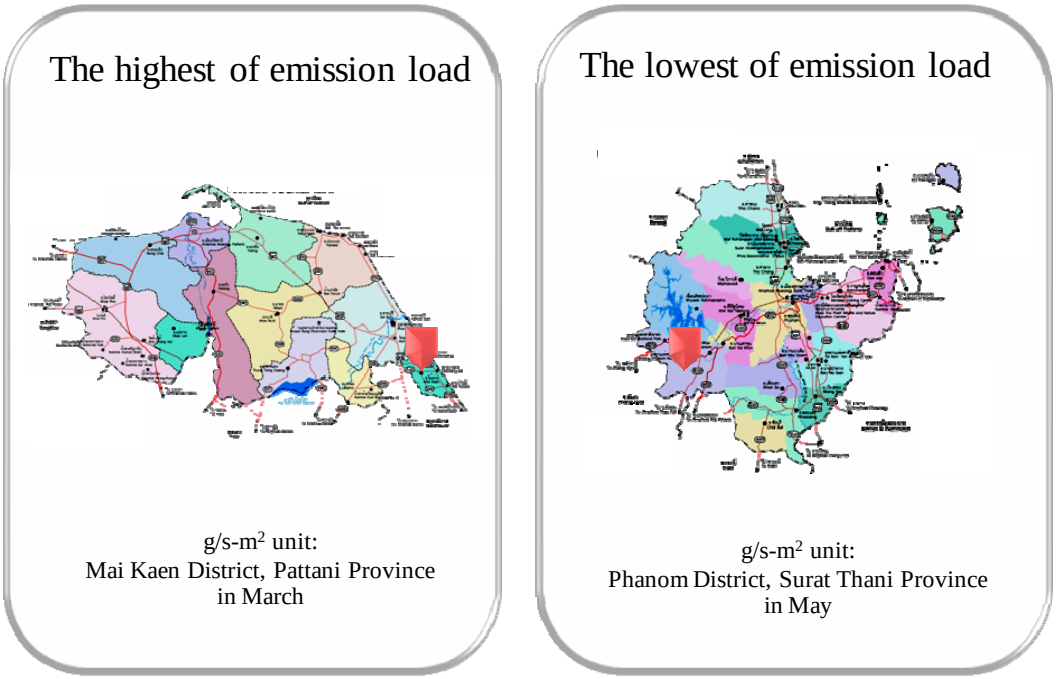



**Figure 4.3** The position of district at the highest and the lowest of emission load for the Southern Region of Thailand
(Adapted from: Tourism Authority of Thailand, 2013)

The result for the Southern Region of Thailand presented that Mai Kaen District, Pattani Province in March was the place having the highest of emission load while Phanom District, Surat Thani Province in May was the place having the lowest of emission load.

It was found that the closer area to the sea, the more emission load was achieved. As the position of district at the highest of emission load, Mai Kaen District was adjacent to the sea side in consequence of ability of air dilution. On the other hand, Surat Thani District is quite far from sea side which was the position of district

at the lowest of emission load. Overall results indicated that Pattani Province had higher potential of the air dispersion than Surat Thani Province.

In temporal overall, the result indicated that the influence of the northeast monsoon was affected to potential for air pollutant assimilation. In transition of season, the potential of air pollutant assimilation is the lowest in May.

### 4.2.4 Verification of data

Fifty percent of emission load for the Southern region of Thailand was verified by using Screen View as air pollutant dispersion principle. Verification of data was comparison with air pollutant concentration (*C*) and air quality standard. The *C* value was obtained from Screen View by using fifty percent of emission load as emission input. The predicted *C* values were presented in Appendix H. Then, percentile of *C* values which did not exceed the standard was estimated.

**Table 4.10** Percentile of pollutant concentrations within the ambient air quality standard for the Southern Region of Thailand

| Pollutant | Number of data | Percentile |
|---|---|---|
| $SO_2$ | 1,812 | 79 |
| $NO_2$ | 1,812 | 81 |

Seventy-nine percentile of $SO_2$ predicted data were within the ambient air quality standard as shown in Table 4.10. As for $NO_2$, eighty-one percentile of data were within the ambient air quality standard.

# CHAPTER V
# CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

The overall results and findings from this research were summarized in this chapter. Conclusions with respect to the purposes of the study were presented. The air assimilative capacity in terms of the emission load for the Eastern and Southern Regions of Thailand were estimated for their spatial and temporal behaviors. Air pollutants determined in this study were $SO_2$ and $NO_2$. These pollutants are mianly emitted from combustion process. Output data in this research was presented for all districts for each month in the year 2010. Data collection included study area, air pollutant concentration data and meteorological data. Carrying capacity of $SO_2$ and $NO_2$ were evaluated by using air quality models including Box Model and Screen View.

The Box Model, dispersion model for area source, was used to predict emission load for determination of assimilative capacity of air pollutant in the study domain. The maximum and fifty percent of maximum emission load for $SO_2$ and $NO_2$ were reported. The calculated and predicted values were presented in Appendix A-C and E-G.

The highest and lowest of emission load in both regions were discussed. For pollution management, emission load in g/s-$m^2$ unit was considered. In the Eastern Region, the result indicated that Ko Si Chang District, Chonburi Province in November was the place having the highest of emission load. Sanam Chai Khet District, Chachaengsao Province in February was the place having the lowest of emission load. In the Southern Region, the result indicated that Mai Kaen District, Pattani Province in March was the place having the highest of emission load. Phanom District, Surat Thani Province in May was the place having the lowest of emission load.

Screen View was applied to verify the assimilative capacity result by mean of air pollution dispersion theory. Verification of data was compared with air pollutant

concentration (*C*) and air quality standard. The *C* value was obtained from Screen View by using fifty percent of emission load as emission input. The total *C* values were presented in Appendix D and H. Percentile of *C* values which did not exceed the standard was estimated. These values were 82 and 85 percentile for $SO_2$ and $NO_2$ in the Eastern Region, respectively. In the Southern Region, the result indicated that percentile of $SO_2$ and $NO_2$ were 79 and 81, respectively.

Spatial analysis as illustrated in Figure 5.1 indicated that both regions are aligned with sea side. The study results indicated that the closer area to the sea, the higher potential of air pollution dispersion.




**Figure 5.1** The position of the Eastern and Southern Regions of Thailand

The result of temporal analysis indicated that the influence of the northeast monsoon resulting to high dilution ability of atmosphere. Therefore, the period of November to January had higher potential for air pollutant assimilation than other months. The result also showed that other periods of the year or during transition of

season, the potential of air pollutant assimilation was lower than during the monsoon season. Figure 5.2 show wind direction of the northeast monsoon.




**Figure 5.2** Wind direction of the northeast monsoon

In conclusion, the assimilative capacity of atmosphere depended on the potential of air pollutant dispersion which was directly proportional to the ventilation coefficient. Temporal variation of the potential of air pollutant dispersion mainly depended on prevailing wind of each area. Furthermore, the assimilation potential in terms of the emission load which was estimated could be used for the sources existing consideration in the region under different industrial growth scenarios. The approach presented in this research focus on future development planning to increase the assimilative capacity of the region so that more pollution sources can be accommodated. This method might provide guidelines to the environmental regulatory authorities as well as to the industries for environment friendly industrial development.

## 5.2 Recommendations

5.2.1 The data in district level should be used in application of the emission load for local management. The handle of ambient pollutant can be conducted by setting emission load obtained from this study as the maximum assimilation of the district.

5.2.2 This research demonstrates an approach to determine the potential of air assimilation. The major factor used in this analysis was meteorological characteristics. However, there are also other factors potentially affect the air assimilative capacity values such as terrain characteristic, land-use, etc. As for implementation and application for air pollution management in this study, it should be concerned that emission sources of air pollutants are not only from industrial source. Therefore, it is important to develop intensive emission inventory in couple with using the assimilative capacity values for an area-based management of air pollution in each respective area in the future.

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# APPENDICES

# APPENDIX A

# MAXIMUM $SO_2$ AND $NO_2$ EMISSION LOAD FOR THE EASTERN REGION OF THAILAND

**Table A-1** Maximum $SO_2$ emission load from box model for the Eastern Region of each month in 2010

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 6.47E-05 | 7.09E-06 | 2.1E-05 | 2.36E-05 | 2.64E-05 | 3.67E-05 | 3.49E-05 | 0.000106 | 7.65E-05 | 2.5E-05 | 0.000283 | 0.000108 | 16532.96 | 1812.52 | 5358.70 | 6025.77 | 6748.32 | 9375.02 | 8933.90 | 27026.88 | 19564.36 | 6397.53 | 72277.30 | 27509.37 |
| | Ban Bueng | 7E-05 | 3.77E-06 | 3E-05 | 2.15E-05 | 2.2E-05 | 3.37E-05 | 2.81E-05 | 0.000105 | 9.08E-05 | 2.47E-05 | 0.00028 | 0.000102 | 41544.97 | 2238.49 | 17784.75 | 12771.01 | 13050.47 | 19998.89 | 16691.94 | 62257.73 | 53901.42 | 14633.53 | 165968.39 | 60333.64 |
| | Nong Yai | 8.41E-05 | 2.1E-06 | 4.08E-05 | 2.06E-05 | 1.82E-05 | 3.55E-05 | 2.58E-05 | 9.54E-05 | 9.06E-05 | 2.39E-05 | 0.00035 | 0.000115 | 38355.38 | 957.35 | 18612.75 | 9415.79 | 8284.30 | 16190.95 | 11776.81 | 43499.67 | 41330.96 | 10896.11 | 159420.01 | 52429.66 |
| | Bang Lamung | 6.85E-05 | 5.55E-06 | 3.63E-05 | 1.62E-05 | 1.45E-05 | 5E-05 | 1.46E-05 | 6.34E-05 | 9.51E-05 | 1.62E-05 | 0.000373 | 0.000113 | 36691.91 | 2973.48 | 19427.61 | 8677.74 | 7767.12 | 26779.23 | 7808.01 | 33944.46 | 50958.35 | 8674.97 | 199825.10 | 60697.00 |
| | Phan Thong | 8.72E-05 | 3.67E-06 | 1E-05 | 1.56E-05 | 2.46E-05 | 4.48E-05 | 3.97E-05 | 0.000139 | 9.48E-05 | 2.48E-05 | 0.000459 | 0.000169 | 14620.47 | 616.06 | 1683.30 | 2623.65 | 4119.06 | 7507.76 | 6668.05 | 23270.85 | 15904.73 | 4159.65 | 77020.83 | 28395.83 |
| | Phanat Nikhom | 6.2E-05 | 1.6E-06 | 6.92E-06 | 9.45E-06 | 1.57E-05 | 3.08E-05 | 2.61E-05 | 9.22E-05 | 6.62E-05 | 1.62E-05 | 0.00033 | 0.00012 | 29730.68 | 768.66 | 3318.06 | 4533.68 | 7513.71 | 14764.43 | 12507.50 | 44237.82 | 31751.68 | 7786.03 | 158212.43 | 57412.13 |
| | Si Racha | 6.24E-05 | 6.02E-06 | 3.51E-05 | 2.82E-05 | 2.64E-05 | 3.42E-05 | 3.31E-05 | 0.000108 | 9.07E-05 | 2.81E-05 | 0.000208 | 8.14E-05 | 38937.10 | 3751.71 | 21915.29 | 17590.72 | 16485.33 | 21328.00 | 20662.44 | 67098.72 | 56580.95 | 17554.80 | 129904.75 | 50767.59 |
| | Ko Si Chang | 0.001278 | 0.000384 | 0.000735 | 0.001068 | 0.00113 | 0.001294 | 0.001355 | 0.002242 | 0.001528 | 0.000863 | 0.004034 | 0.001975 | 8242.91 | 2476.98 | 4739.48 | 6889.94 | 7291.47 | 8348.04 | 8739.76 | 14463.10 | 9858.49 | 5567.55 | 26019.75 | 12741.42 |
| | Sattahip | 9.01E-05 | 1.48E-05 | 7.23E-05 | 7.48E-05 | 6.23E-05 | 8.24E-05 | 0.000118 | 0.000192 | 0.000134 | 6.31E-05 | 0.000309 | 0.000138 | 25430.70 | 4178.26 | 20383.77 | 21111.68 | 17576.25 | 23239.41 | 33192.22 | 54054.58 | 37828.73 | 17796.85 | 87248.33 | 38967.50 |
| | Bo Thong | 7.94E-05 | 1.97E-06 | 3.2E-05 | 1.56E-05 | 1.53E-05 | 3.39E-05 | 2.01E-05 | 6.14E-05 | 6.65E-05 | 1.81E-05 | 0.000365 | 0.000116 | 66088.56 | 1644.20 | 26628.57 | 12973.74 | 12711.21 | 28237.70 | 16709.16 | 51141.59 | 55398.60 | 15093.77 | 304293.51 | 96717.47 |
| | Ko Chan | 9.45E-05 | 2.43E-06 | 2.67E-05 | 2.02E-05 | 2.22E-05 | 4.1E-05 | 2.86E-05 | 9.16E-05 | 9.58E-05 | 2.27E-05 | 0.00046 | 0.000151 | 25447.58 | 653.77 | 7198.12 | 5436.18 | 5964.19 | 11038.09 | 7705.33 | 24650.83 | 25799.99 | 6103.27 | 123955.12 | 40686.62 |
| RAYONG | Mueang Rayong | 5.73E-05 | 1.91E-06 | 3.7E-05 | 2.98E-05 | 1.38E-05 | 2.43E-05 | 4.38E-05 | 0.000115 | 8.05E-05 | 2.11E-05 | 0.000253 | 8.03E-05 | 38585.71 | 1285.17 | 24941.03 | 20071.63 | 9286.47 | 16382.65 | 29491.83 | 77309.90 | 54277.07 | 14241.48 | 170354.52 | 54133.62 |
| | Ban Khai | 5.45E-05 | 1.84E-06 | 3.31E-05 | 2.32E-05 | 1.34E-05 | 2.35E-05 | 3.3E-05 | 9.14E-05 | 7.06E-05 | 1.95E-05 | 0.000225 | 7.4E-05 | 25886.24 | 872.93 | 15722.68 | 11029.70 | 6383.05 | 11164.45 | 15654.81 | 43417.22 | 33532.07 | 9273.09 | 106943.61 | 35167.13 |
| | Pluak Daeng | 7.02E-05 | 2.48E-06 | 4.16E-05 | 2.52E-05 | 1.94E-05 | 2.98E-05 | 2.93E-05 | 0.000113 | 0.0001 | 2.62E-05 | 0.000249 | 8.67E-05 | 37185.39 | 1316.51 | 22030.67 | 13380.32 | 10282.34 | 15805.27 | 15521.52 | 60074.80 | 53119.29 | 13876.89 | 131822.47 | 45939.06 |
| | Khao Chamao | 0.000125 | 2.94E-06 | 5.83E-05 | 2E-05 | 1.83E-05 | 5.44E-05 | 2.79E-05 | 8.87E-05 | 8.25E-05 | 2.49E-05 | 0.000582 | 0.000177 | 59447.04 | 1397.28 | 27762.34 | 9512.28 | 8702.49 | 25879.69 | 13261.10 | 42223.42 | 39256.07 | 11842.79 | 277223.41 | 84206.68 |
| | Nikhom Phatthana | 0.000105 | 6.62E-06 | 7.03E-05 | 5.75E-05 | 3.81E-05 | 5.24E-05 | 8.53E-05 | 0.000203 | 0.000154 | 5.01E-05 | 0.000362 | 0.000137 | 24790.94 | 1562.47 | 16591.60 | 13564.70 | 8986.18 | 12373.99 | 20128.26 | 47918.37 | 36379.72 | 11820.18 | 85398.22 | 32238.24 |
| | Klaeng | 4.51E-05 | 1.44E-06 | 2.44E-05 | 1.45E-05 | 7.68E-06 | 2.02E-05 | 1.48E-05 | 6.61E-05 | 5.06E-05 | 9.49E-06 | 0.000232 | 6.51E-05 | 33118.33 | 1061.76 | 17934.69 | 10684.63 | 5644.15 | 14825.61 | 10878.16 | 48613.41 | 37181.76 | 6972.48 | 170804.62 | 47844.85 |
| | Ban Chang | 9.5E-05 | 7.8E-06 | 6.99E-05 | 6.83E-05 | 4.09E-05 | 5.32E-05 | 0.000114 | 0.000213 | 0.000143 | 5.43E-05 | 0.000324 | 0.000131 | 15515.01 | 1274.08 | 11418.31 | 11151.98 | 6683.05 | 8692.62 | 18669.04 | 34828.01 | 23270.28 | 8871.45 | 52872.90 | 21420.65 |
| | Wang Chan | 9.56E-05 | 2.14E-06 | 4.75E-05 | 2.04E-05 | 1.56E-05 | 4.09E-05 | 2.73E-05 | 8.7E-05 | 7.81E-05 | 2.21E-05 | 0.00044 | 0.000135 | 35692.19 | 800.66 | 17741.23 | 7602.26 | 5830.06 | 15262.41 | 10196.15 | 32487.96 | 29154.65 | 8237.95 | 164339.75 | 50481.48 |

**Table A-1** Maximum $SO_2$ emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHANTHABURI | Mueang Chanthaburi | 0.000149 | 6.11E-06 | 6.18E-05 | 1.56E-05 | 2.1E-05 | 6.4E-05 | 2.84E-05 | 0.000131 | 8.98E-05 | 1.66E-05 | 0.000546 | 0.000159 | 42110.51 | 1726.57 | 17463.10 | 4397.15 | 5940.36 | 18092.86 | 8013.14 | 36981.00 | 25391.36 | 4686.27 | 154457.47 | 44883.36 |
| | Khlung | 5.47E-05 | 3.26E-06 | 2.39E-05 | 1.06E-05 | 1.02E-05 | 2.84E-05 | 1.36E-05 | 4.2E-05 | 5.13E-05 | 9.22E-06 | 0.000206 | 6.14E-05 | 42949.35 | 2561.49 | 18765.02 | 8284.60 | 8031.38 | 22304.53 | 10706.14 | 32978.58 | 40313.45 | 7239.07 | 162130.79 | 48218.05 |
| | Tha Mai | 9.21E-05 | 3.88E-06 | 4.01E-05 | 1.33E-05 | 1.36E-05 | 4.1E-05 | 1.88E-05 | 8.27E-05 | 6.11E-05 | 1.29E-05 | 0.000371 | 0.000108 | 57651.52 | 2431.54 | 25125.54 | 8307.28 | 8540.05 | 25644.41 | 11758.33 | 51779.90 | 38259.89 | 8068.26 | 232321.24 | 67507.89 |
| | Pong Nam Ron | 7.16E-05 | 4.26E-06 | 2.79E-05 | 1.24E-05 | 1.11E-05 | 3.84E-05 | 1.12E-05 | 4.87E-05 | 7.31E-05 | 1.24E-05 | 0.000287 | 8.7E-05 | 72811.73 | 4337.83 | 28337.64 | 12659.28 | 11330.01 | 39064.07 | 11387.58 | 49515.25 | 74336.91 | 12654.38 | 291464.77 | 88534.98 |
| | Makham | 9.07E-05 | 4.4E-06 | 3.72E-05 | 1.26E-05 | 1.37E-05 | 4.28E-05 | 1.75E-05 | 6.95E-05 | 6.99E-05 | 1.27E-05 | 0.00035 | 0.000103 | 40372.80 | 1957.89 | 16564.07 | 5627.08 | 6090.87 | 19033.84 | 7787.50 | 30946.79 | 31117.71 | 5666.29 | 155589.13 | 45842.27 |
| | Laem Sing | 0.000194 | 1.11E-05 | 9.1E-05 | 3.8E-05 | 3.84E-05 | 9.85E-05 | 5.17E-05 | 0.000183 | 0.000145 | 3.12E-05 | 0.00071 | 0.000215 | 33196.60 | 1902.37 | 15539.48 | 6482.16 | 6558.00 | 16822.71 | 8826.21 | 31308.21 | 24812.89 | 5326.54 | 121248.96 | 36757.47 |
| | Soi Dao | 7.2E-05 | 3.89E-06 | 3.03E-05 | 1.61E-05 | 1.32E-05 | 3.6E-05 | 1.42E-05 | 5.17E-05 | 5.02E-05 | 1.65E-05 | 0.000313 | 9.74E-05 | 57766.44 | 3121.83 | 24340.74 | 12918.87 | 10568.10 | 28914.84 | 11410.33 | 41516.75 | 40277.10 | 13221.38 | 251544.22 | 78158.77 |
| | Kaeng Hang Maeo | 5.4E-05 | 2.13E-06 | 2.41E-05 | 1.03E-05 | 8.84E-06 | 2.47E-05 | 1.13E-05 | 3.62E-05 | 3.27E-05 | 1.12E-05 | 0.000247 | 7.49E-05 | 65656.53 | 2592.78 | 29306.20 | 12481.14 | 10757.60 | 29994.22 | 13714.95 | 44034.62 | 39816.73 | 13599.87 | 300202.91 | 91098.47 |
| | Na Yai Am | 0.000124 | 5.51E-06 | 5.95E-05 | 2.71E-05 | 2.11E-05 | 5.83E-05 | 3.1E-05 | 0.000132 | 9.93E-05 | 2.12E-05 | 0.000543 | 0.000157 | 35349.47 | 1576.58 | 17037.20 | 7753.66 | 6048.55 | 16666.22 | 8872.58 | 37865.42 | 28424.09 | 6059.58 | 155409.13 | 45032.35 |
| | Khao Khitchakut | 8.18E-05 | 4.1E-06 | 3.53E-05 | 1.29E-05 | 1.23E-05 | 3.87E-05 | 1.5E-05 | 5.6E-05 | 5.1E-05 | 1.49E-05 | 0.000356 | 0.000105 | 63920.75 | 3204.21 | 27583.01 | 10071.49 | 9602.50 | 30212.74 | 11718.95 | 43713.27 | 39826.88 | 11666.66 | 277730.45 | 82218.77 |
| TRAT | Mueang Trat | 5.3E-05 | 3.03E-06 | 2.29E-05 | 7.28E-06 | 6.87E-06 | 2.48E-05 | 9.55E-06 | 4.38E-05 | 5.57E-05 | 7.89E-06 | 0.000208 | 5.41E-05 | 50182.17 | 2874.48 | 21648.68 | 6899.94 | 6511.80 | 23531.47 | 9047.52 | 41514.37 | 52728.14 | 7471.79 | 197268.99 | 51265.67 |
| | Khlong Yai | 0.00041 | 5.78E-05 | 0.000168 | 7.46E-05 | 5.73E-05 | 0.000225 | 7.21E-05 | 0.000398 | 0.000338 | 5.74E-05 | 0.001162 | 0.000311 | 32481.76 | 4573.86 | 13279.93 | 5910.43 | 4538.71 | 17850.43 | 5713.32 | 31488.76 | 26734.73 | 4541.67 | 91988.23 | 24634.15 |
| | Khao Saming | 6.31E-05 | 3.69E-06 | 2.63E-05 | 1.17E-05 | 1.1E-05 | 3.22E-05 | 1.54E-05 | 4.29E-05 | 6.96E-05 | 1.05E-05 | 0.000244 | 6.97E-05 | 41028.81 | 2397.96 | 17115.94 | 7631.74 | 7125.49 | 20965.04 | 9995.61 | 27930.97 | 45263.66 | 6844.94 | 158891.48 | 45331.29 |
| | Bo Rai | 0.000123 | 5.7E-06 | 4.05E-05 | 1.64E-05 | 1.54E-05 | 5.67E-05 | 2.38E-05 | 5.81E-05 | 0.000148 | 1.6E-05 | 0.000481 | 0.000134 | 83436.93 | 3865.80 | 27456.34 | 11097.95 | 10423.48 | 38474.93 | 16146.09 | 39385.51 | 100422.96 | 10824.62 | 326153.16 | 90588.96 |
| | Laem Ngop | 0.000159 | 1.48E-05 | 8.74E-05 | 4.48E-05 | 3.96E-05 | 9.73E-05 | 5.01E-05 | 0.000163 | 0.000174 | 3.9E-05 | 0.000619 | 0.000175 | 26386.54 | 2452.68 | 14520.30 | 7450.16 | 6580.81 | 16171.20 | 8329.67 | 27142.09 | 28921.82 | 6489.87 | 102836.42 | 29136.45 |
| | Ko Kut | 0.000184 | 8.03E-05 | 0.000129 | 0.000145 | 0.000116 | 0.000248 | 0.000112 | 0.000279 | 0.000299 | 0.000125 | 0.000552 | 0.000134 | 23849.91 | 10428.06 | 16759.02 | 18843.02 | 15120.63 | 32280.28 | 14549.82 | 36183.77 | 38799.93 | 16270.76 | 71703.26 | 17394.57 |
| | Ko Chang | 0.000166 | 2.3E-05 | 0.0001 | 6.55E-05 | 5.51E-05 | 0.000123 | 6.66E-05 | 0.000185 | 0.000193 | 5.31E-05 | 0.000608 | 0.000181 | 36505.10 | 5045.54 | 21957.28 | 14359.51 | 12090.70 | 27076.87 | 14596.75 | 40626.84 | 42229.94 | 11649.97 | 133270.81 | 39621.22 |
| CHACHAENGSAO | Mueang Chachoengsao | 7.9E-05 | 4.62E-06 | 1.47E-05 | 1.74E-05 | 2.29E-05 | 3.57E-05 | 3.04E-05 | 0.000125 | 7.97E-05 | 2.24E-05 | 0.00043 | 0.000139 | 30429.52 | 1778.56 | 5676.55 | 6708.19 | 8822.83 | 13728.96 | 11705.60 | 48322.98 | 30690.13 | 8614.22 | 165415.07 | 53356.35 |
| | Bang Khla | 0.000102 | 4.05E-06 | 1.92E-05 | 2.19E-05 | 3.02E-05 | 4.81E-05 | 3.82E-05 | 0.00016 | 0.000102 | 2.83E-05 | 0.000574 | 0.000176 | 24110.26 | 953.96 | 4522.67 | 5153.50 | 7115.09 | 11324.22 | 8998.28 | 37701.13 | 24115.68 | 6671.20 | 135188.60 | 41393.98 |
| | Bang Nam Priao | 5.69E-05 | 2.88E-06 | 1.36E-05 | 1.42E-05 | 1.82E-05 | 2.55E-05 | 1.97E-05 | 9.36E-05 | 5.38E-05 | 1.64E-05 | 0.000328 | 9.09E-05 | 28286.80 | 1434.15 | 6777.64 | 7072.10 | 9034.67 | 12682.02 | 9816.22 | 46517.71 | 26724.70 | 8156.78 | 162975.94 | 45207.63 |
| | Bang Pakong | 6.87E-05 | 6.33E-06 | 1.35E-05 | 1.79E-05 | 2.24E-05 | 3.36E-05 | 3.19E-05 | 0.000114 | 7.27E-05 | 2.21E-05 | 0.000347 | 0.000125 | 17885.60 | 1647.00 | 3510.08 | 4665.68 | 5839.40 | 8744.37 | 8299.03 | 29739.26 | 18934.87 | 5752.62 | 90278.87 | 32498.05 |
| | Ban Pho | 9.22E-05 | 3.73E-06 | 1.03E-05 | 1.57E-05 | 2.47E-05 | 4.48E-05 | 3.91E-05 | 0.000146 | 9.71E-05 | 2.5E-05 | 0.000498 | 0.000177 | 19469.98 | 786.94 | 2184.78 | 3313.99 | 5212.13 | 9463.80 | 8255.90 | 30768.93 | 20519.60 | 5290.85 | 105299.52 | 37335.42 |
| | Phanom Sarakham | 6.62E-05 | 2.39E-06 | 1.62E-05 | 1.58E-05 | 1.83E-05 | 2.99E-05 | 2.11E-05 | 7.5E-05 | 6.36E-05 | 1.68E-05 | 0.000349 | 0.000107 | 33867.64 | 1223.64 | 8293.29 | 8074.71 | 9332.27 | 15264.19 | 10806.36 | 38345.25 | 32526.53 | 8608.95 | 178591.24 | 54716.15 |
| | Ratchasan | 0.000142 | 5.97E-06 | 3.11E-05 | 3.31E-05 | 4.3E-05 | 6.52E-05 | 4.99E-05 | 0.000214 | 0.000139 | 3.92E-05 | 0.000797 | 0.000233 | 20514.57 | 864.98 | 4505.98 | 4798.19 | 6224.68 | 9433.16 | 7220.60 | 30974.01 | 20052.19 | 5670.81 | 115353.98 | 33724.32 |
| | Sanam Chai Khet | 4.5E-05 | 1.39E-06 | 1.45E-05 | 1.23E-05 | 1.1E-05 | 1.9E-05 | 1.14E-05 | 2.77E-05 | 3.88E-05 | 1.03E-05 | 0.000219 | 6.79E-05 | 47982.95 | 1487.62 | 15426.78 | 13071.36 | 11757.80 | 20219.82 | 12113.14 | 29549.60 | 41417.24 | 11022.00 | 233099.91 | 72417.98 |
| | Plaeng Yao | 0.00013 | 3.57E-06 | 2.58E-05 | 2.53E-05 | 3.25E-05 | 5.96E-05 | 4.54E-05 | 0.000154 | 0.000135 | 3.2E-05 | 0.000675 | 0.000226 | 42786.35 | 1171.28 | 8460.35 | 8291.41 | 10666.85 | 19527.42 | 14898.01 | 50359.09 | 44175.79 | 10494.23 | 221456.79 | 74188.70 |
| | Tha Takiap | 5.8E-05 | 1.86E-06 | 2.15E-05 | 1.51E-05 | 1.27E-05 | 2.45E-05 | 1.34E-05 | 3.14E-05 | 4.5E-05 | 1.3E-05 | 0.000274 | 8.54E-05 | 82561.73 | 2648.09 | 30642.62 | 21487.06 | 18021.40 | 34796.78 | 19079.65 | 44730.57 | 64014.03 | 18504.28 | 389453.61 | 121495.34 |
| | Khlong Khuean | 0.000152 | 6.7E-06 | 3.19E-05 | 3.49E-05 | 4.66E-05 | 7.03E-05 | 5.5E-05 | 0.000242 | 0.000149 | 4.28E-05 | 0.000866 | 0.000254 | 16332.68 | 717.94 | 3418.66 | 3745.11 | 4991.82 | 7533.25 | 5899.00 | 25973.81 | 15922.62 | 4587.79 | 92783.95 | 27179.60 |

**Table A-1** Maximum $SO_2$ emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PRACHIN BURI | Mueang Prachin Buri | 7.4E-05 | 4.76E-06 | 2.2E-05 | 2.09E-05 | 2.4E-05 | 3.48E-05 | 2.4E-05 | 0.000101 | 6.79E-05 | 2.14E-05 | 0.000399 | 0.000115 | 35090.18 | 2254.24 | 10447.90 | 9895.75 | 11351.98 | 16513.33 | 11390.19 | 48056.97 | 32200.75 | 10146.15 | 189258.65 | 54362.42 |
| | Kabin Buri | 4.65E-05 | 2.68E-06 | 1.79E-05 | 1.5E-05 | 1.39E-05 | 2.38E-05 | 1.31E-05 | 3.67E-05 | 2.97E-05 | 1.39E-05 | 0.000219 | 6.7E-05 | 65259.37 | 3764.43 | 25081.21 | 21122.45 | 19513.93 | 33445.20 | 18337.44 | 51525.41 | 41682.03 | 19504.64 | 307237.38 | 94105.27 |
| | Na Di | 6.21E-05 | 6.26E-06 | 2.42E-05 | 2.13E-05 | 1.99E-05 | 3.56E-05 | 1.82E-05 | 5.26E-05 | 4.22E-05 | 2.02E-05 | 0.000286 | 8.79E-05 | 74769.98 | 7534.24 | 29158.59 | 25633.56 | 23943.66 | 42872.79 | 21924.87 | 63387.75 | 50864.66 | 24293.54 | 344067.80 | 105880.16 |
| | Ban Sang | 7.21E-05 | 3.41E-06 | 1.92E-05 | 1.92E-05 | 2.44E-05 | 3.39E-05 | 2.46E-05 | 0.00012 | 6.8E-05 | 2.14E-05 | 0.000421 | 0.000109 | 26895.46 | 1271.76 | 7146.32 | 7152.32 | 9116.92 | 12666.69 | 9176.49 | 44617.31 | 25380.94 | 7998.77 | 157020.85 | 40806.21 |
| | Prachantakham | 6.14E-05 | 6.26E-06 | 2.18E-05 | 1.93E-05 | 1.94E-05 | 3.25E-05 | 1.8E-05 | 5.79E-05 | 5.51E-05 | 1.81E-05 | 0.000292 | 9E-05 | 58186.59 | 5933.19 | 20647.32 | 18256.72 | 18415.44 | 30743.17 | 17067.46 | 54831.32 | 52201.31 | 17163.40 | 276751.52 | 85305.68 |
| | Si Maha Phot | 9.56E-05 | 4.66E-06 | 2.79E-05 | 2.57E-05 | 2.8E-05 | 4.49E-05 | 2.88E-05 | 9.94E-05 | 8.5E-05 | 2.55E-05 | 0.000493 | 0.000146 | 46017.81 | 2244.47 | 13427.33 | 12398.27 | 13494.96 | 21606.46 | 13876.81 | 47857.86 | 40926.03 | 12271.65 | 237340.76 | 70420.76 |
| | Si Mahosot | 0.000171 | 8.25E-06 | 4.49E-05 | 4.41E-05 | 5.23E-05 | 7.94E-05 | 5.54E-05 | 0.000223 | 0.000162 | 4.66E-05 | 0.000931 | 0.000268 | 24150.71 | 1165.38 | 6348.18 | 6232.73 | 7390.79 | 11228.63 | 7825.36 | 31448.94 | 22867.20 | 6593.01 | 131551.86 | 37833.51 |
| SA KAEO | Mueang Sa Kaeo | 3.27E-05 | 2.73E-06 | 1.39E-05 | 1.22E-05 | 1.06E-05 | 1.96E-05 | 9.88E-06 | 2.78E-05 | 1.25E-05 | 1.19E-05 | 0.000149 | 4.52E-05 | 45626.68 | 3811.55 | 19432.87 | 17077.15 | 14785.43 | 27376.11 | 13776.13 | 38758.78 | 17395.20 | 16562.35 | 208278.36 | 63111.61 |
| | Khlong Hat | 0.000103 | 6.77E-06 | 4.37E-05 | 3.83E-05 | 2.66E-05 | 5.2E-05 | 2.89E-05 | 9.01E-05 | 5.04E-05 | 3.48E-05 | 0.000467 | 0.000153 | 50022.00 | 3273.82 | 21165.85 | 18518.30 | 12873.50 | 25160.61 | 14006.31 | 43616.23 | 24394.27 | 16817.60 | 226047.26 | 73889.16 |
| | Ta Phraya | 4.37E-05 | 1.52E-05 | 2.01E-05 | 3E-05 | 1.52E-05 | 4.23E-05 | 1.53E-05 | 5.25E-05 | 2.84E-05 | 2.42E-05 | 0.000209 | 6.09E-05 | 42397.22 | 14784.94 | 19491.31 | 29134.67 | 14699.53 | 41063.60 | 14815.82 | 50950.22 | 27525.99 | 23471.27 | 202689.63 | 59054.52 |
| | Wang Nam Yen | 6.43E-05 | 3.25E-06 | 3.13E-05 | 2.79E-05 | 1.81E-05 | 3.24E-05 | 1.81E-05 | 4.73E-05 | 2.36E-05 | 2.23E-05 | 0.000286 | 9.99E-05 | 27770.29 | 1404.19 | 13510.83 | 12071.87 | 7823.05 | 14010.73 | 7815.40 | 20439.54 | 10207.51 | 9621.15 | 123343.23 | 43166.35 |
| | Watthana Nakhon | 3.32E-05 | 9.25E-06 | 1.45E-05 | 2.15E-05 | 1.1E-05 | 2.77E-05 | 1.14E-05 | 3.76E-05 | 9.89E-06 | 1.79E-05 | 0.000156 | 4.7E-05 | 50121.93 | 13987.77 | 21980.70 | 32436.73 | 16611.33 | 41916.99 | 17298.90 | 56904.87 | 14954.70 | 27122.94 | 235989.37 | 71046.22 |
| | Aranyaprathet | 4.64E-05 | 9.17E-06 | 1.77E-05 | 2.42E-05 | 1.36E-05 | 3.1E-05 | 1.58E-05 | 5.41E-05 | 2.07E-05 | 2.18E-05 | 0.000221 | 6.71E-05 | 34127.67 | 6739.98 | 13038.91 | 17767.03 | 10011.11 | 22787.54 | 11648.74 | 39776.68 | 15221.46 | 16016.41 | 162580.26 | 49357.66 |
| | Khok Sung | 0.000107 | 4.34E-05 | 4.76E-05 | 8.53E-05 | 3.68E-05 | 0.000108 | 3.95E-05 | 0.000139 | 3.66E-05 | 6.84E-05 | 0.000512 | 0.000172 | 36337.20 | 14799.54 | 16236.74 | 29087.78 | 12551.32 | 36775.57 | 13465.25 | 47499.91 | 12471.81 | 23331.18 | 174803.10 | 58688.46 |
| | Khao Chakan | 4.97E-05 | 2.88E-06 | 2.25E-05 | 2E-05 | 1.4E-05 | 2.55E-05 | 1.4E-05 | 3.71E-05 | 2.12E-05 | 1.67E-05 | 0.000225 | 6.53E-05 | 22987.16 | 1331.10 | 10390.10 | 9254.40 | 6498.16 | 11782.87 | 6463.42 | 17148.26 | 9826.06 | 7751.24 | 103923.78 | 30232.40 |
| | Wang Sombun | 6.43E-05 | 3.08E-06 | 2.94E-05 | 2.29E-05 | 1.58E-05 | 3.14E-05 | 1.65E-05 | 4.68E-05 | 3.07E-05 | 1.96E-05 | 0.000287 | 9.62E-05 | 32180.44 | 1540.44 | 14710.85 | 11475.20 | 7923.98 | 15699.01 | 8251.27 | 23422.92 | 15388.18 | 9805.65 | 143653.83 | 48149.76 |

**Table A-2** Maximum $NO_2$ emission load from box model for the Eastern Region of each month in 2010

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 2.31E-05 | 2.53E-06 | 7.49E-06 | 8.42E-06 | 9.43E-06 | 1.31E-05 | 1.25E-05 | 3.78E-05 | 2.73E-05 | 8.94E-06 | 0.000101 | 3.84E-05 | 5907.88 | 647.69 | 1914.88 | 2153.25 | 2411.44 | 3350.07 | 3192.44 | 9657.78 | 6991.12 | 2286.09 | 25827.55 | 9830.19 |
| | Ban Bueng | 2.5E-05 | 1.35E-06 | 1.07E-05 | 7.69E-06 | 7.86E-06 | 1.2E-05 | 1.01E-05 | 3.75E-05 | 3.25E-05 | 8.81E-06 | 9.99E-05 | 3.63E-05 | 14845.67 | 799.90 | 6355.20 | 4563.59 | 4663.45 | 7146.40 | 5964.69 | 22247.16 | 19261.12 | 5229.14 | 59307.09 | 21559.60 |
| | Nong Yai | 3.01E-05 | 7.5E-07 | 1.46E-05 | 7.38E-06 | 6.49E-06 | 1.27E-05 | 9.23E-06 | 3.41E-05 | 3.24E-05 | 8.54E-06 | 0.000125 | 4.11E-05 | 13705.90 | 342.10 | 6651.07 | 3364.63 | 2960.31 | 5785.67 | 4208.32 | 15544.16 | 14769.19 | 3893.61 | 56967.09 | 18735.20 |
| | Bang Lamung | 2.45E-05 | 1.98E-06 | 1.3E-05 | 5.79E-06 | 5.18E-06 | 1.79E-05 | 5.21E-06 | 2.26E-05 | 3.4E-05 | 5.79E-06 | 0.000133 | 4.05E-05 | 13111.47 | 1062.54 | 6942.25 | 3100.90 | 2775.50 | 9569.28 | 2790.11 | 12129.70 | 18209.44 | 3099.91 | 71405.44 | 21689.44 |
| | Phan Thong | 3.11E-05 | 1.31E-06 | 3.59E-06 | 5.59E-06 | 8.77E-06 | 1.6E-05 | 1.42E-05 | 4.96E-05 | 3.39E-05 | 8.86E-06 | 0.000164 | 6.05E-05 | 5224.47 | 220.14 | 601.51 | 937.53 | 1471.90 | 2682.82 | 2382.76 | 8315.60 | 5683.39 | 1486.41 | 27522.60 | 10146.96 |
| | Phanat Nikhom | 2.21E-05 | 5.73E-07 | 2.47E-06 | 3.38E-06 | 5.6E-06 | 1.1E-05 | 9.32E-06 | 3.3E-05 | 2.37E-05 | 5.8E-06 | 0.000118 | 4.28E-05 | 10623.95 | 274.67 | 1185.67 | 1620.07 | 2684.95 | 5275.92 | 4469.43 | 15807.93 | 11346.14 | 2782.26 | 56535.58 | 20515.63 |
| | Si Racha | 2.23E-05 | 2.15E-06 | 1.26E-05 | 1.01E-05 | 9.45E-06 | 1.22E-05 | 1.18E-05 | 3.84E-05 | 3.24E-05 | 1.01E-05 | 7.44E-05 | 2.91E-05 | 13913.77 | 1340.64 | 7831.20 | 6285.86 | 5890.86 | 7621.34 | 7383.51 | 23977.03 | 20218.62 | 6273.03 | 46420.12 | 18141.27 |
| | Ko Si Chang | 0.000457 | 0.000137 | 0.000263 | 0.000382 | 0.000404 | 0.000462 | 0.000484 | 0.000801 | 0.000546 | 0.000308 | 0.001442 | 0.000706 | 2945.52 | 885.12 | 1693.60 | 2462.05 | 2605.53 | 2983.09 | 3123.06 | 5168.24 | 3522.83 | 1989.51 | 9297.89 | 4553.02 |
| | Sattahip | 3.22E-05 | 5.29E-06 | 2.58E-05 | 2.67E-05 | 2.23E-05 | 2.94E-05 | 4.2E-05 | 6.85E-05 | 4.79E-05 | 2.25E-05 | 0.000111 | 4.94E-05 | 9087.40 | 1493.06 | 7283.93 | 7544.04 | 6280.69 | 8304.36 | 11860.90 | 19315.85 | 13517.70 | 6359.52 | 31177.29 | 13924.63 |
| | Bo Thong | 2.84E-05 | 7.06E-07 | 1.14E-05 | 5.57E-06 | 5.46E-06 | 1.21E-05 | 7.17E-06 | 2.2E-05 | 2.38E-05 | 6.48E-06 | 0.000131 | 4.15E-05 | 23616.06 | 587.54 | 9515.44 | 4636.03 | 4542.22 | 10090.45 | 5970.84 | 18274.92 | 19796.12 | 5393.60 | 108736.14 | 34560.99 |
| | Ko Chan | 3.38E-05 | 8.68E-07 | 9.55E-06 | 7.22E-06 | 7.92E-06 | 1.47E-05 | 1.02E-05 | 3.27E-05 | 3.42E-05 | 8.1E-06 | 0.000165 | 5.4E-05 | 9093.43 | 233.62 | 2572.17 | 1942.56 | 2131.24 | 3944.35 | 2753.42 | 8808.72 | 9219.36 | 2180.94 | 44294.08 | 14538.94 |
| RAYONG | Mueang Rayong | 2.05E-05 | 6.81E-07 | 1.32E-05 | 1.06E-05 | 4.92E-06 | 8.69E-06 | 1.56E-05 | 4.1E-05 | 2.88E-05 | 7.55E-06 | 9.03E-05 | 2.87E-05 | 13788.21 | 459.24 | 8912.42 | 7172.39 | 3318.42 | 5854.17 | 10538.60 | 27625.89 | 19395.35 | 5089.04 | 60874.43 | 19344.09 |
| | Ban Khai | 1.95E-05 | 6.57E-07 | 1.18E-05 | 8.3E-06 | 4.8E-06 | 8.4E-06 | 1.18E-05 | 3.27E-05 | 2.52E-05 | 6.98E-06 | 8.05E-05 | 2.65E-05 | 9250.18 | 311.93 | 5618.34 | 3941.35 | 2280.92 | 3989.50 | 5594.09 | 15514.69 | 11982.34 | 3313.64 | 38215.19 | 12566.61 |
| | Pluak Daeng | 2.51E-05 | 8.88E-07 | 1.49E-05 | 9.02E-06 | 6.93E-06 | 1.07E-05 | 1.05E-05 | 4.05E-05 | 3.58E-05 | 9.36E-06 | 8.89E-05 | 3.1E-05 | 13287.81 | 470.44 | 7872.43 | 4781.32 | 3674.29 | 5647.85 | 5546.46 | 21467.11 | 18981.63 | 4958.76 | 47105.40 | 16415.85 |
| | Khao Chamao | 4.46E-05 | 1.05E-06 | 2.08E-05 | 7.14E-06 | 6.53E-06 | 1.94E-05 | 9.96E-06 | 3.17E-05 | 2.95E-05 | 8.89E-06 | 0.000208 | 6.32E-05 | 21242.78 | 499.31 | 9920.58 | 3399.12 | 3109.75 | 9247.84 | 4738.72 | 15088.10 | 14027.75 | 4231.90 | 99062.92 | 30090.39 |
| | Nikhom Phatthana | 3.75E-05 | 2.37E-06 | 2.51E-05 | 2.05E-05 | 1.36E-05 | 1.87E-05 | 3.05E-05 | 7.25E-05 | 5.51E-05 | 1.79E-05 | 0.000129 | 4.88E-05 | 8858.79 | 558.33 | 5928.84 | 4847.21 | 3211.12 | 4421.72 | 7192.63 | 17123.13 | 12999.92 | 4223.82 | 30516.17 | 11520.00 |
| | Klaeng | 1.61E-05 | 5.16E-07 | 8.72E-06 | 5.19E-06 | 2.74E-06 | 7.21E-06 | 5.29E-06 | 2.36E-05 | 1.81E-05 | 3.39E-06 | 8.3E-05 | 2.33E-05 | 11834.49 | 379.41 | 6408.78 | 3818.04 | 2016.88 | 5297.78 | 3887.20 | 17371.50 | 13286.52 | 2491.54 | 61035.27 | 17096.86 |
| | Ban Chang | 3.4E-05 | 2.79E-06 | 2.5E-05 | 2.44E-05 | 1.46E-05 | 1.9E-05 | 4.09E-05 | 7.62E-05 | 5.09E-05 | 1.94E-05 | 0.000116 | 4.69E-05 | 5544.13 | 455.28 | 4080.22 | 3985.04 | 2388.12 | 3106.22 | 6671.19 | 12445.43 | 8315.39 | 3170.12 | 18893.59 | 7654.45 |
| | Wang Chan | 3.42E-05 | 7.66E-07 | 1.7E-05 | 7.28E-06 | 5.58E-06 | 1.46E-05 | 9.76E-06 | 3.11E-05 | 2.79E-05 | 7.89E-06 | 0.000157 | 4.83E-05 | 12754.23 | 286.11 | 6339.65 | 2716.59 | 2083.31 | 5453.87 | 3643.49 | 11609.24 | 10418.11 | 2943.75 | 58725.11 | 18039.04 |
| CHANTHABURI | Mueang Chanthaburi | 5.32E-05 | 2.18E-06 | 2.21E-05 | 5.56E-06 | 7.51E-06 | 2.29E-05 | 1.01E-05 | 4.68E-05 | 3.21E-05 | 5.92E-06 | 0.000195 | 5.67E-05 | 15047.76 | 616.97 | 6240.26 | 1571.28 | 2122.73 | 6465.30 | 2863.41 | 13214.78 | 9073.34 | 1674.59 | 55193.78 | 16038.60 |
| | Khlung | 1.95E-05 | 1.17E-06 | 8.54E-06 | 3.77E-06 | 3.66E-06 | 1.02E-05 | 4.87E-06 | 1.5E-05 | 1.83E-05 | 3.29E-06 | 7.38E-05 | 2.19E-05 | 15347.51 | 915.32 | 6705.49 | 2960.42 | 2869.93 | 7970.29 | 3825.73 | 11784.55 | 14405.59 | 2586.81 | 57935.77 | 17230.22 |
| | Tha Mai | 3.29E-05 | 1.39E-06 | 1.43E-05 | 4.74E-06 | 4.88E-06 | 1.46E-05 | 6.71E-06 | 2.96E-05 | 2.18E-05 | 4.61E-06 | 0.000133 | 3.85E-05 | 20601.17 | 868.89 | 8978.35 | 2968.52 | 3051.70 | 9163.76 | 4201.72 | 18503.01 | 13671.78 | 2883.11 | 83017.59 | 24123.25 |
| | Pong Nam Ron | 2.56E-05 | 1.52E-06 | 9.95E-06 | 4.45E-06 | 3.98E-06 | 1.37E-05 | 4E-06 | 1.74E-05 | 2.61E-05 | 4.45E-06 | 0.000102 | 3.11E-05 | 26018.52 | 1550.08 | 10126.16 | 4523.66 | 4048.66 | 13959.14 | 4069.24 | 17693.76 | 26563.53 | 4521.91 | 104151.93 | 31637.06 |
| | Makham | 3.24E-05 | 1.57E-06 | 1.33E-05 | 4.52E-06 | 4.89E-06 | 1.53E-05 | 6.25E-06 | 2.48E-05 | 2.5E-05 | 4.55E-06 | 0.000125 | 3.68E-05 | 14426.80 | 699.63 | 5919.00 | 2010.78 | 2176.51 | 6801.54 | 2782.78 | 11058.51 | 11119.59 | 2024.79 | 55598.17 | 16381.26 |
| | Laem Sing | 6.95E-05 | 3.98E-06 | 3.25E-05 | 1.36E-05 | 1.37E-05 | 3.52E-05 | 1.85E-05 | 6.55E-05 | 5.19E-05 | 1.11E-05 | 0.000254 | 7.69E-05 | 11862.46 | 679.79 | 5552.87 | 2316.33 | 2343.43 | 6011.42 | 3153.95 | 11187.67 | 8866.63 | 1903.38 | 43327.06 | 13134.90 |
| | Soi Dao | 2.57E-05 | 1.39E-06 | 1.08E-05 | 5.75E-06 | 4.71E-06 | 1.29E-05 | 5.08E-06 | 1.85E-05 | 1.79E-05 | 5.89E-06 | 0.000112 | 3.48E-05 | 20642.24 | 1115.55 | 8697.91 | 4616.43 | 3776.40 | 10332.42 | 4077.37 | 14835.58 | 14392.61 | 4724.52 | 89886.73 | 27929.23 |
| | Kaeng Hang Maeo | 1.93E-05 | 7.61E-07 | 8.61E-06 | 3.67E-06 | 3.16E-06 | 8.81E-06 | 4.03E-06 | 1.29E-05 | 1.17E-05 | 3.99E-06 | 8.82E-05 | 2.68E-05 | 23461.68 | 926.50 | 10472.27 | 4460.01 | 3844.12 | 10718.13 | 4900.90 | 15735.32 | 14228.10 | 4859.77 | 107274.41 | 32553.10 |
| | Na Yai Am | 4.42E-05 | 1.97E-06 | 2.13E-05 | 9.68E-06 | 7.55E-06 | 2.08E-05 | 1.11E-05 | 4.73E-05 | 3.55E-05 | 7.57E-06 | 0.000194 | 5.62E-05 | 12631.77 | 563.38 | 6088.07 | 2770.69 | 2161.39 | 5955.50 | 3170.52 | 13530.82 | 10157.05 | 2165.33 | 55533.85 | 16091.84 |
| | Khao Khitchakut | 2.92E-05 | 1.47E-06 | 1.26E-05 | 4.61E-06 | 4.39E-06 | 1.38E-05 | 5.36E-06 | 2E-05 | 1.82E-05 | 5.34E-06 | 0.000127 | 3.76E-05 | 22841.42 | 1144.99 | 9856.50 | 3598.94 | 3431.35 | 10796.21 | 4187.65 | 15620.49 | 14231.73 | 4168.96 | 99244.11 | 29380.03 |

**Table A-2** Maximum $NO_2$ emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| TRAT | Mueang Trat | 1.89E-05 | 1.08E-06 | 8.17E-06 | 2.6E-06 | 2.46E-06 | 8.88E-06 | 3.41E-06 | 1.57E-05 | 1.99E-05 | 2.82E-06 | 7.44E-05 | 1.93E-05 | 17932.08 | 1027.16 | 7735.93 | 2465.62 | 2326.92 | 8408.73 | 3233.04 | 14834.73 | 18841.86 | 2669.97 | 70492.03 | 18319.26 |
| | Khlong Yai | 0.000147 | 2.06E-05 | 5.99E-05 | 2.67E-05 | 2.05E-05 | 8.05E-05 | 2.58E-05 | 0.000142 | 0.000121 | 2.05E-05 | 0.000415 | 0.000111 | 11607.02 | 1634.42 | 4745.45 | 2112.03 | 1621.86 | 6378.67 | 2041.59 | 11252.18 | 9553.38 | 1622.92 | 32871.04 | 8802.76 |
| | Khao Saming | 2.25E-05 | 1.32E-06 | 9.4E-06 | 4.19E-06 | 3.92E-06 | 1.15E-05 | 5.49E-06 | 1.53E-05 | 2.49E-05 | 3.76E-06 | 8.73E-05 | 2.49E-05 | 14661.22 | 856.89 | 6116.20 | 2727.13 | 2546.22 | 7491.64 | 3571.83 | 9980.84 | 16174.50 | 2445.97 | 56778.23 | 16198.67 |
| | Bo Rai | 4.4E-05 | 2.04E-06 | 1.45E-05 | 5.85E-06 | 5.49E-06 | 2.03E-05 | 8.51E-06 | 2.07E-05 | 5.29E-05 | 5.7E-06 | 0.000172 | 4.77E-05 | 29815.32 | 1381.40 | 9811.24 | 3965.74 | 3724.72 | 13748.62 | 5769.64 | 14074.00 | 35885.11 | 3868.07 | 116547.47 | 32371.03 |
| | Laem Ngop | 5.67E-05 | 5.27E-06 | 3.12E-05 | 1.6E-05 | 1.41E-05 | 3.48E-05 | 1.79E-05 | 5.84E-05 | 6.22E-05 | 1.4E-05 | 0.000221 | 6.26E-05 | 9428.96 | 876.44 | 5188.68 | 2662.24 | 2351.58 | 5778.61 | 2976.52 | 9698.95 | 10334.92 | 2319.09 | 36747.53 | 10411.61 |
| | Ko Kut | 6.56E-05 | 2.87E-05 | 4.61E-05 | 5.18E-05 | 4.16E-05 | 8.88E-05 | 4E-05 | 9.95E-05 | 0.000107 | 4.48E-05 | 0.000197 | 4.78E-05 | 8522.52 | 3726.36 | 5988.66 | 6733.36 | 5403.20 | 11535.02 | 5199.23 | 12929.90 | 13864.75 | 5814.19 | 25622.42 | 6215.77 |
| | Ko Chang | 5.95E-05 | 8.22E-06 | 3.58E-05 | 2.34E-05 | 1.97E-05 | 4.41E-05 | 2.38E-05 | 6.62E-05 | 6.88E-05 | 1.9E-05 | 0.000217 | 6.46E-05 | 13044.72 | 1802.97 | 7846.21 | 5131.22 | 4320.49 | 9675.64 | 5216.00 | 14517.58 | 15090.43 | 4163.00 | 47622.95 | 14158.23 |
| CHACHAENGSAO | Mueang Chachoengsao | 2.82E-05 | 1.65E-06 | 5.27E-06 | 6.22E-06 | 8.19E-06 | 1.27E-05 | 1.09E-05 | 4.48E-05 | 2.85E-05 | 7.99E-06 | 0.000153 | 4.95E-05 | 10873.67 | 635.55 | 2028.46 | 2397.10 | 3152.75 | 4905.90 | 4182.88 | 17267.72 | 10966.80 | 3078.20 | 59109.37 | 19066.34 |
| | Bang Khla | 3.66E-05 | 1.45E-06 | 6.86E-06 | 7.82E-06 | 1.08E-05 | 1.72E-05 | 1.36E-05 | 5.72E-05 | 3.66E-05 | 1.01E-05 | 0.000205 | 6.28E-05 | 8615.55 | 340.89 | 1616.13 | 1841.55 | 2542.50 | 4046.59 | 3215.44 | 13472.11 | 8617.49 | 2383.88 | 48308.25 | 14791.71 |
| | Bang Nam Priao | 2.03E-05 | 1.03E-06 | 4.87E-06 | 5.08E-06 | 6.49E-06 | 9.11E-06 | 7.06E-06 | 3.34E-05 | 1.92E-05 | 5.86E-06 | 0.000117 | 3.25E-05 | 10107.99 | 512.48 | 2421.92 | 2527.14 | 3228.45 | 4531.79 | 3507.72 | 16622.62 | 9549.80 | 2914.74 | 58237.77 | 16154.48 |
| | Bang Pakong | 2.45E-05 | 2.26E-06 | 4.82E-06 | 6.4E-06 | 8.01E-06 | 1.2E-05 | 1.14E-05 | 4.08E-05 | 2.6E-05 | 7.9E-06 | 0.000124 | 4.46E-05 | 6391.23 | 588.54 | 1254.29 | 1667.23 | 2086.65 | 3124.71 | 2965.57 | 10627.02 | 6766.18 | 2055.64 | 32260.22 | 11612.84 |
| | Ban Pho | 3.29E-05 | 1.33E-06 | 3.7E-06 | 5.61E-06 | 8.82E-06 | 1.6E-05 | 1.4E-05 | 5.2E-05 | 3.47E-05 | 8.95E-06 | 0.000178 | 6.32E-05 | 6957.40 | 281.20 | 780.71 | 1184.22 | 1862.50 | 3381.79 | 2950.16 | 10994.96 | 7332.47 | 1890.63 | 37627.69 | 13341.43 |
| | Phanom Sarakham | 2.37E-05 | 8.55E-07 | 5.8E-06 | 5.64E-06 | 6.52E-06 | 1.07E-05 | 7.55E-06 | 2.68E-05 | 2.27E-05 | 6.02E-06 | 0.000125 | 3.82E-05 | 12102.25 | 437.25 | 2963.52 | 2885.41 | 3334.79 | 5454.50 | 3861.54 | 13702.28 | 11623.02 | 3076.32 | 63817.74 | 19552.25 |
| | Ratchasan | 5.06E-05 | 2.14E-06 | 1.11E-05 | 1.18E-05 | 1.54E-05 | 2.33E-05 | 1.78E-05 | 7.65E-05 | 4.95E-05 | 1.4E-05 | 0.000285 | 8.32E-05 | 7330.67 | 309.09 | 1610.16 | 1714.58 | 2224.32 | 3370.84 | 2580.21 | 11068.24 | 7165.44 | 2026.41 | 41220.55 | 12051.04 |
| | Sanam Chai Khet | 1.61E-05 | 4.98E-07 | 5.17E-06 | 4.38E-06 | 3.94E-06 | 6.77E-06 | 4.06E-06 | 9.9E-06 | 1.39E-05 | 3.69E-06 | 7.81E-05 | 2.43E-05 | 17146.21 | 531.59 | 5512.60 | 4670.91 | 4201.53 | 7225.34 | 4328.50 | 10559.24 | 14800.02 | 3938.60 | 83295.85 | 25877.82 |
| | Plaeng Yao | 4.66E-05 | 1.28E-06 | 9.22E-06 | 9.04E-06 | 1.16E-05 | 2.13E-05 | 1.62E-05 | 5.49E-05 | 4.81E-05 | 1.14E-05 | 0.000241 | 8.08E-05 | 15289.26 | 418.54 | 3023.22 | 2962.85 | 3811.69 | 6977.92 | 5323.65 | 17995.30 | 15785.76 | 3750.01 | 79135.30 | 26510.56 |
| | Tha Takiap | 2.07E-05 | 6.65E-07 | 7.7E-06 | 5.4E-06 | 4.53E-06 | 8.74E-06 | 4.79E-06 | 1.12E-05 | 1.61E-05 | 4.65E-06 | 9.78E-05 | 3.05E-05 | 29502.58 | 946.27 | 10949.82 | 7678.18 | 6439.76 | 12434.27 | 6817.92 | 15984.01 | 22874.75 | 6612.31 | 139167.22 | 43415.10 |
| | Khlong Khuean | 5.45E-05 | 2.39E-06 | 1.14E-05 | 1.25E-05 | 1.66E-05 | 2.51E-05 | 1.97E-05 | 8.66E-05 | 5.31E-05 | 1.53E-05 | 0.000309 | 9.06E-05 | 5836.31 | 256.55 | 1221.62 | 1338.28 | 1783.78 | 2691.93 | 2107.95 | 9281.47 | 5689.78 | 1639.40 | 33155.39 | 9712.35 |
| PRACHIN BURI | Mueang Prachin Buri | 2.65E-05 | 1.7E-06 | 7.88E-06 | 7.46E-06 | 8.56E-06 | 1.25E-05 | 8.59E-06 | 3.62E-05 | 2.43E-05 | 7.65E-06 | 0.000143 | 4.1E-05 | 12539.11 | 805.53 | 3733.45 | 3536.14 | 4056.51 | 5900.87 | 4070.17 | 17172.66 | 11506.60 | 3625.62 | 67629.62 | 19425.85 |
| | Kabin Buri | 1.66E-05 | 9.58E-07 | 6.38E-06 | 5.38E-06 | 4.97E-06 | 8.51E-06 | 4.67E-06 | 1.31E-05 | 1.06E-05 | 4.96E-06 | 7.82E-05 | 2.4E-05 | 23319.76 | 1345.18 | 8962.51 | 7547.89 | 6973.10 | 11951.30 | 6552.69 | 18412.07 | 14894.64 | 6969.78 | 109788.10 | 33627.54 |
| | Na Di | 2.22E-05 | 2.24E-06 | 8.65E-06 | 7.61E-06 | 7.11E-06 | 1.27E-05 | 6.51E-06 | 1.88E-05 | 1.51E-05 | 7.21E-06 | 0.000102 | 3.14E-05 | 26718.28 | 2692.28 | 10419.52 | 9159.89 | 8556.02 | 15320.15 | 7834.63 | 22650.96 | 18175.96 | 8681.05 | 122949.08 | 37835.18 |
| | Ban Sang | 2.58E-05 | 1.22E-06 | 6.84E-06 | 6.85E-06 | 8.73E-06 | 1.21E-05 | 8.79E-06 | 4.27E-05 | 2.43E-05 | 7.66E-06 | 0.00015 | 3.91E-05 | 9610.82 | 454.45 | 2553.66 | 2555.81 | 3257.84 | 4526.31 | 3279.12 | 15943.53 | 9069.62 | 2858.28 | 56109.78 | 14581.68 |
| | Prachantakham | 2.19E-05 | 2.24E-06 | 7.79E-06 | 6.89E-06 | 6.95E-06 | 1.16E-05 | 6.44E-06 | 2.07E-05 | 1.97E-05 | 6.47E-06 | 0.000104 | 3.22E-05 | 20792.38 | 2120.16 | 7378.11 | 6523.85 | 6580.57 | 10985.75 | 6098.88 | 19593.41 | 18653.60 | 6133.16 | 98894.30 | 30483.10 |
| | Si Maha Phot | 3.41E-05 | 1.67E-06 | 9.96E-06 | 9.2E-06 | 1E-05 | 1.6E-05 | 1.03E-05 | 3.55E-05 | 3.04E-05 | 9.11E-06 | 0.000176 | 5.23E-05 | 16443.99 | 802.04 | 4798.12 | 4430.39 | 4822.28 | 7720.85 | 4958.73 | 17101.51 | 14624.49 | 4385.15 | 84811.27 | 25164.13 |
| | Si Mahosot | 6.11E-05 | 2.95E-06 | 1.6E-05 | 1.58E-05 | 1.87E-05 | 2.84E-05 | 1.98E-05 | 7.95E-05 | 5.78E-05 | 1.67E-05 | 0.000333 | 9.57E-05 | 8630.01 | 416.44 | 2268.46 | 2227.20 | 2641.02 | 4012.44 | 2796.31 | 11237.96 | 8171.36 | 2355.94 | 47008.70 | 13519.41 |

**Table A-2** Maximum $NO_2$ emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SA KAEO | Mueang Sa Kaeo | 1.17E-05 | 9.77E-07 | 4.98E-06 | 4.38E-06 | 3.79E-06 | 7.01E-06 | 3.53E-06 | 9.93E-06 | 4.46E-06 | 4.24E-06 | 5.34E-05 | 1.62E-05 | 16304.22 | 1362.02 | 6944.13 | 6102.34 | 5283.42 | 9782.57 | 4922.76 | 13850.05 | 6215.99 | 5918.39 | 74426.12 | 22552.28 |
| | Khlong Hat | 3.69E-05 | 2.42E-06 | 1.56E-05 | 1.37E-05 | 9.51E-06 | 1.86E-05 | 1.03E-05 | 3.22E-05 | 1.8E-05 | 1.24E-05 | 0.000167 | 5.46E-05 | 17874.84 | 1169.86 | 7563.40 | 6617.32 | 4600.21 | 8990.88 | 5005.01 | 15585.81 | 8717.04 | 6009.59 | 80775.65 | 26403.53 |
| | Ta Phraya | 1.56E-05 | 5.45E-06 | 7.18E-06 | 1.07E-05 | 5.42E-06 | 1.51E-05 | 5.46E-06 | 1.88E-05 | 1.01E-05 | 8.65E-06 | 7.47E-05 | 2.18E-05 | 15150.21 | 5283.25 | 6965.02 | 10410.97 | 5252.73 | 14673.66 | 5294.28 | 18206.53 | 9836.13 | 8387.22 | 72429.05 | 21102.52 |
| | Wang Nam Yen | 2.3E-05 | 1.16E-06 | 1.12E-05 | 9.99E-06 | 6.47E-06 | 1.16E-05 | 6.47E-06 | 1.69E-05 | 8.45E-06 | 7.96E-06 | 0.000102 | 3.57E-05 | 9923.42 | 501.77 | 4827.96 | 4313.76 | 2795.48 | 5006.59 | 2792.75 | 7303.86 | 3647.55 | 3438.02 | 44075.43 | 15425.05 |
| | Watthana Nakhon | 1.18E-05 | 3.31E-06 | 5.2E-06 | 7.67E-06 | 3.93E-06 | 9.91E-06 | 4.09E-06 | 1.35E-05 | 3.54E-06 | 6.41E-06 | 5.58E-05 | 1.68E-05 | 17910.56 | 4998.38 | 7854.58 | 11590.93 | 5935.89 | 14978.60 | 6181.58 | 20334.37 | 5343.91 | 9692.10 | 84328.37 | 25387.63 |
| | Aranyaprathet | 1.66E-05 | 3.28E-06 | 6.34E-06 | 8.64E-06 | 4.87E-06 | 1.11E-05 | 5.66E-06 | 1.93E-05 | 7.4E-06 | 7.79E-06 | 7.9E-05 | 2.4E-05 | 12195.17 | 2408.46 | 4659.32 | 6348.87 | 3577.36 | 8142.89 | 4162.56 | 14213.79 | 5439.23 | 5723.30 | 58096.38 | 17637.45 |
| | Khok Sung | 3.81E-05 | 1.55E-05 | 1.7E-05 | 3.05E-05 | 1.31E-05 | 3.85E-05 | 1.41E-05 | 4.98E-05 | 1.31E-05 | 2.44E-05 | 0.000183 | 6.15E-05 | 12984.72 | 5288.46 | 5802.03 | 10394.22 | 4485.08 | 13141.37 | 4811.67 | 16973.60 | 4456.67 | 8337.16 | 62464.08 | 20971.71 |
| | Khao Chakan | 1.77E-05 | 1.03E-06 | 8.02E-06 | 7.15E-06 | 5.02E-06 | 9.1E-06 | 4.99E-06 | 1.32E-05 | 7.59E-06 | 5.99E-06 | 8.02E-05 | 2.33E-05 | 8214.22 | 475.65 | 3712.80 | 3306.97 | 2322.05 | 4210.49 | 2309.64 | 6127.75 | 3511.24 | 2769.83 | 37136.09 | 10803.23 |
| | Wang Sombun | 2.3E-05 | 1.1E-06 | 1.05E-05 | 8.19E-06 | 5.65E-06 | 1.12E-05 | 5.89E-06 | 1.67E-05 | 1.1E-05 | 7E-06 | 0.000103 | 3.44E-05 | 11499.35 | 550.46 | 5256.77 | 4100.54 | 2831.55 | 5609.88 | 2948.51 | 8369.94 | 5498.81 | 3503.95 | 51333.21 | 17205.82 |

# APPENDIX B

# FIFTY PERCENT OF $SO_2$ AND $NO_2$ MAXIMUM EMISSION LOAD FOR THE EASTERN REGION OF THAILAND

**Table B-1** Fifty percent of $SO_2$ maximum emission load from box model for the Eastern Region of each month in 2010

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 3.23E-05 | 3.54E-06 | 1.05E-05 | 1.18E-05 | 1.32E-05 | 1.83E-05 | 1.75E-05 | 5.29E-05 | 3.83E-05 | 1.25E-05 | 0.000141 | 5.38E-05 | 8266.48 | 906.26 | 2679.35 | 3012.88 | 3374.16 | 4687.51 | 4466.95 | 13513.44 | 9782.18 | 3198.77 | 36138.65 | 13754.69 |
| | Ban Bueng | 3.5E-05 | 1.89E-06 | 1.5E-05 | 1.08E-05 | 1.1E-05 | 1.69E-05 | 1.41E-05 | 5.25E-05 | 4.54E-05 | 1.23E-05 | 0.00014 | 5.08E-05 | 20772.49 | 1119.24 | 8892.38 | 6385.50 | 6525.23 | 9999.45 | 8345.97 | 31128.86 | 26950.71 | 7316.77 | 82984.19 | 30166.82 |
| | Nong Yai | 4.21E-05 | 1.05E-06 | 2.04E-05 | 1.03E-05 | 9.08E-06 | 1.78E-05 | 1.29E-05 | 4.77E-05 | 4.53E-05 | 1.19E-05 | 0.000175 | 5.75E-05 | 19177.69 | 478.68 | 9306.37 | 4707.89 | 4142.15 | 8095.48 | 5888.40 | 21749.84 | 20665.48 | 5448.06 | 79710.00 | 26214.83 |
| | Bang Lamung | 3.42E-05 | 2.77E-06 | 1.81E-05 | 8.1E-06 | 7.25E-06 | 2.5E-05 | 7.29E-06 | 3.17E-05 | 4.76E-05 | 8.1E-06 | 0.000186 | 5.66E-05 | 18345.95 | 1486.74 | 9713.80 | 4338.87 | 3883.56 | 13389.61 | 3904.01 | 16972.23 | 25479.18 | 4337.48 | 99912.55 | 30348.50 |
| | Phan Thong | 4.36E-05 | 1.84E-06 | 5.02E-06 | 7.82E-06 | 1.23E-05 | 2.24E-05 | 1.99E-05 | 6.94E-05 | 4.74E-05 | 1.24E-05 | 0.00023 | 8.46E-05 | 7310.23 | 308.03 | 841.65 | 1311.82 | 2059.53 | 3753.88 | 3334.02 | 11635.43 | 7952.37 | 2079.83 | 38510.41 | 14197.92 |
| | Phanat Nikhom | 3.1E-05 | 8.01E-07 | 3.46E-06 | 4.73E-06 | 7.83E-06 | 1.54E-05 | 1.3E-05 | 4.61E-05 | 3.31E-05 | 8.12E-06 | 0.000165 | 5.98E-05 | 14865.34 | 384.33 | 1659.03 | 2266.84 | 3756.86 | 7382.21 | 6253.75 | 22118.91 | 15875.84 | 3893.01 | 79106.22 | 28706.07 |
| | Si Racha | 3.12E-05 | 3.01E-06 | 1.76E-05 | 1.41E-05 | 1.32E-05 | 1.71E-05 | 1.66E-05 | 5.38E-05 | 4.54E-05 | 1.41E-05 | 0.000104 | 4.07E-05 | 19468.55 | 1875.86 | 10957.64 | 8795.36 | 8242.66 | 10664.00 | 10331.22 | 33549.36 | 28290.48 | 8777.40 | 64952.38 | 25383.79 |
| | Ko Si Chang | 0.000639 | 0.000192 | 0.000367 | 0.000534 | 0.000565 | 0.000647 | 0.000678 | 0.001121 | 0.000764 | 0.000432 | 0.002017 | 0.000988 | 4121.46 | 1238.49 | 2369.74 | 3444.97 | 3645.74 | 4174.02 | 4369.88 | 7231.55 | 4929.24 | 2783.77 | 13009.88 | 6370.71 |
| | Sattahip | 4.51E-05 | 7.41E-06 | 3.61E-05 | 3.74E-05 | 3.12E-05 | 4.12E-05 | 5.88E-05 | 9.58E-05 | 6.7E-05 | 3.15E-05 | 0.000155 | 6.91E-05 | 12715.35 | 2089.13 | 10191.89 | 10555.84 | 8788.12 | 11619.70 | 16596.11 | 27027.29 | 18914.36 | 8898.43 | 43624.17 | 19483.75 |
| | Bo Thong | 3.97E-05 | 9.87E-07 | 1.6E-05 | 7.79E-06 | 7.63E-06 | 1.7E-05 | 1E-05 | 3.07E-05 | 3.33E-05 | 9.06E-06 | 0.000183 | 5.81E-05 | 33044.28 | 822.10 | 13314.28 | 6486.87 | 6355.60 | 14118.85 | 8354.58 | 25570.80 | 27699.30 | 7546.89 | 152146.76 | 48358.74 |
| | Ko Chan | 4.73E-05 | 1.21E-06 | 1.34E-05 | 1.01E-05 | 1.11E-05 | 2.05E-05 | 1.43E-05 | 4.58E-05 | 4.79E-05 | 1.13E-05 | 0.00023 | 7.56E-05 | 12723.79 | 326.88 | 3599.06 | 2718.09 | 2982.09 | 5519.04 | 3852.66 | 12325.41 | 12899.99 | 3051.64 | 61977.56 | 20343.31 |

**Table B-1** Fifty percent of $SO_2$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| RAYONG | Mueang Rayong | 2.86E-05 | 9.53E-07 | 1.85E-05 | 1.49E-05 | 6.89E-06 | 1.22E-05 | 2.19E-05 | 5.74E-05 | 4.03E-05 | 1.06E-05 | 0.000126 | 4.02E-05 | 19292.86 | 642.59 | 12470.52 | 10035.82 | 4643.23 | 8191.32 | 14745.91 | 38654.95 | 27138.54 | 7120.74 | 85177.26 | 27066.81 |
| | Ban Khai | 2.73E-05 | 9.19E-07 | 1.66E-05 | 1.16E-05 | 6.72E-06 | 1.18E-05 | 1.65E-05 | 4.57E-05 | 3.53E-05 | 9.76E-06 | 0.000113 | 3.7E-05 | 12943.12 | 436.46 | 7861.34 | 5514.85 | 3191.52 | 5582.23 | 7827.41 | 21708.61 | 16766.04 | 4636.55 | 53471.80 | 17583.56 |
| | Pluak Daeng | 3.51E-05 | 1.24E-06 | 2.08E-05 | 1.26E-05 | 9.7E-06 | 1.49E-05 | 1.46E-05 | 5.67E-05 | 5.01E-05 | 1.31E-05 | 0.000124 | 4.33E-05 | 18592.69 | 658.25 | 11015.33 | 6690.16 | 5141.17 | 7902.63 | 7760.76 | 30037.40 | 26559.64 | 6938.44 | 65911.24 | 22969.53 |
| | Khao Chamao | 6.24E-05 | 1.47E-06 | 2.92E-05 | 9.99E-06 | 9.14E-06 | 2.72E-05 | 1.39E-05 | 4.44E-05 | 4.12E-05 | 1.24E-05 | 0.000291 | 8.85E-05 | 29723.52 | 698.64 | 13881.17 | 4756.14 | 4351.25 | 12939.84 | 6630.55 | 21111.71 | 19628.04 | 5921.40 | 138611.71 | 42103.34 |
| | Nikhom Phatthana | 5.25E-05 | 3.31E-06 | 3.51E-05 | 2.87E-05 | 1.9E-05 | 2.62E-05 | 4.26E-05 | 0.000102 | 7.71E-05 | 2.5E-05 | 0.000181 | 6.83E-05 | 12395.47 | 781.23 | 8295.80 | 6782.35 | 4493.09 | 6187.00 | 10064.13 | 23959.19 | 18189.86 | 5910.09 | 42699.11 | 16119.12 |
| | Klaeng | 2.25E-05 | 7.22E-07 | 1.22E-05 | 7.27E-06 | 3.84E-06 | 1.01E-05 | 7.4E-06 | 3.31E-05 | 2.53E-05 | 4.74E-06 | 0.000116 | 3.25E-05 | 16559.16 | 530.88 | 8967.35 | 5342.31 | 2822.07 | 7412.81 | 5439.08 | 24306.71 | 18590.88 | 3486.24 | 85402.31 | 23922.43 |
| | Ban Chang | 4.75E-05 | 3.9E-06 | 3.5E-05 | 3.42E-05 | 2.05E-05 | 2.66E-05 | 5.72E-05 | 0.000107 | 7.13E-05 | 2.72E-05 | 0.000162 | 6.56E-05 | 7757.51 | 637.04 | 5709.15 | 5575.99 | 3341.52 | 4346.31 | 9334.52 | 17414.00 | 11635.14 | 4435.73 | 26436.45 | 10710.32 |
| | Wang Chan | 4.78E-05 | 1.07E-06 | 2.38E-05 | 1.02E-05 | 7.81E-06 | 2.04E-05 | 1.37E-05 | 4.35E-05 | 3.91E-05 | 1.1E-05 | 0.00022 | 6.76E-05 | 17846.09 | 400.33 | 8870.62 | 3801.13 | 2915.03 | 7631.21 | 5098.08 | 16243.98 | 14577.32 | 4118.97 | 82169.88 | 25240.74 |
| CHANTHABURI | Mueang Chanthaburi | 7.45E-05 | 3.05E-06 | 3.09E-05 | 7.78E-06 | 1.05E-05 | 3.2E-05 | 1.42E-05 | 6.54E-05 | 4.49E-05 | 8.29E-06 | 0.000273 | 7.94E-05 | 21055.25 | 863.28 | 8731.55 | 2198.58 | 2970.18 | 9046.43 | 4006.57 | 18490.50 | 12695.68 | 2343.13 | 77228.74 | 22441.68 |
| | Khlung | 2.74E-05 | 1.63E-06 | 1.19E-05 | 5.28E-06 | 5.11E-06 | 1.42E-05 | 6.82E-06 | 2.1E-05 | 2.57E-05 | 4.61E-06 | 0.000103 | 3.07E-05 | 21474.67 | 1280.75 | 9382.51 | 4142.30 | 4015.69 | 11152.26 | 5353.07 | 16489.29 | 20156.72 | 3619.54 | 81065.40 | 24109.02 |
| | Tha Mai | 4.61E-05 | 1.94E-06 | 2.01E-05 | 6.64E-06 | 6.82E-06 | 2.05E-05 | 9.39E-06 | 4.14E-05 | 3.06E-05 | 6.45E-06 | 0.000186 | 5.39E-05 | 28825.76 | 1215.77 | 12562.77 | 4153.64 | 4270.03 | 12822.20 | 5879.17 | 25889.95 | 19129.95 | 4034.13 | 116160.62 | 33753.94 |
| | Pong Nam Ron | 3.58E-05 | 2.13E-06 | 1.39E-05 | 6.22E-06 | 5.57E-06 | 1.92E-05 | 5.6E-06 | 2.43E-05 | 3.65E-05 | 6.22E-06 | 0.000143 | 4.35E-05 | 36405.86 | 2168.92 | 14168.82 | 6329.64 | 5665.01 | 19532.03 | 5693.79 | 24757.63 | 37168.45 | 6327.19 | 145732.39 | 44267.49 |
| | Makham | 4.54E-05 | 2.2E-06 | 1.86E-05 | 6.32E-06 | 6.84E-06 | 2.14E-05 | 8.75E-06 | 3.48E-05 | 3.5E-05 | 6.37E-06 | 0.000175 | 5.15E-05 | 20186.40 | 978.95 | 8282.03 | 2813.54 | 3045.43 | 9516.92 | 3893.75 | 15473.39 | 15558.85 | 2833.14 | 77794.57 | 22921.14 |
| | Laem Sing | 9.72E-05 | 5.57E-06 | 4.55E-05 | 1.9E-05 | 1.92E-05 | 4.92E-05 | 2.58E-05 | 9.17E-05 | 7.26E-05 | 1.56E-05 | 0.000355 | 0.000108 | 16598.30 | 951.18 | 7769.74 | 3241.08 | 3279.00 | 8411.35 | 4413.10 | 15654.10 | 12406.45 | 2663.27 | 60624.48 | 18378.74 |
| | Soi Dao | 3.6E-05 | 1.95E-06 | 1.52E-05 | 8.05E-06 | 6.58E-06 | 1.8E-05 | 7.11E-06 | 2.59E-05 | 2.51E-05 | 8.24E-06 | 0.000157 | 4.87E-05 | 28883.22 | 1560.91 | 12170.37 | 6459.44 | 5284.05 | 14457.42 | 5705.17 | 20758.38 | 20138.55 | 6610.69 | 125772.11 | 39079.38 |
| | Kaeng Hang Maeo | 2.7E-05 | 1.07E-06 | 1.2E-05 | 5.13E-06 | 4.42E-06 | 1.23E-05 | 5.64E-06 | 1.81E-05 | 1.64E-05 | 5.59E-06 | 0.000123 | 3.74E-05 | 32828.26 | 1296.39 | 14653.10 | 6240.57 | 5378.80 | 14997.11 | 6857.48 | 22017.31 | 19908.37 | 6799.93 | 150101.46 | 45549.23 |
| | Na Yai Am | 6.18E-05 | 2.76E-06 | 2.98E-05 | 1.36E-05 | 1.06E-05 | 2.91E-05 | 1.55E-05 | 6.62E-05 | 4.97E-05 | 1.06E-05 | 0.000272 | 7.87E-05 | 17674.73 | 788.29 | 8518.60 | 3876.83 | 3024.28 | 8333.11 | 4436.29 | 18932.71 | 14212.04 | 3029.79 | 77704.57 | 22516.17 |
| | Khao Khitchakut | 4.09E-05 | 2.05E-06 | 1.77E-05 | 6.45E-06 | 6.15E-06 | 1.93E-05 | 7.5E-06 | 2.8E-05 | 2.55E-05 | 7.47E-06 | 0.000178 | 5.26E-05 | 31960.37 | 1602.10 | 13791.50 | 5035.75 | 4801.25 | 15106.37 | 5859.48 | 21856.63 | 19913.44 | 5833.33 | 138865.22 | 41109.39 |
| TRAT | Mueang Trat | 2.65E-05 | 1.52E-06 | 1.14E-05 | 3.64E-06 | 3.44E-06 | 1.24E-05 | 4.78E-06 | 2.19E-05 | 2.78E-05 | 3.94E-06 | 0.000104 | 2.71E-05 | 25091.09 | 1437.24 | 10824.34 | 3449.97 | 3255.90 | 11765.73 | 4523.76 | 20757.19 | 26364.07 | 3735.90 | 98634.49 | 25632.83 |
| | Khlong Yai | 0.000205 | 2.89E-05 | 8.38E-05 | 3.73E-05 | 2.87E-05 | 0.000113 | 3.61E-05 | 0.000199 | 0.000169 | 2.87E-05 | 0.000581 | 0.000156 | 16240.88 | 2286.93 | 6639.97 | 2955.21 | 2269.36 | 8925.21 | 2856.66 | 15744.38 | 13367.36 | 2270.84 | 45994.11 | 12317.08 |
| | Khao Saming | 3.15E-05 | 1.84E-06 | 1.32E-05 | 5.87E-06 | 5.48E-06 | 1.61E-05 | 7.68E-06 | 2.15E-05 | 3.48E-05 | 5.26E-06 | 0.000122 | 3.49E-05 | 20514.40 | 1198.98 | 8557.97 | 3815.87 | 3562.75 | 10482.52 | 4997.81 | 13965.49 | 22631.83 | 3422.47 | 79445.74 | 22665.64 |
| | Bo Rai | 6.15E-05 | 2.85E-06 | 2.02E-05 | 8.18E-06 | 7.68E-06 | 2.84E-05 | 1.19E-05 | 2.9E-05 | 7.4E-05 | 7.98E-06 | 0.00024 | 6.68E-05 | 41718.46 | 1932.90 | 13728.17 | 5548.97 | 5211.74 | 19237.47 | 8073.05 | 19692.75 | 50211.48 | 5412.31 | 163076.58 | 45294.48 |
| | Laem Ngop | 7.94E-05 | 7.38E-06 | 4.37E-05 | 2.24E-05 | 1.98E-05 | 4.86E-05 | 2.51E-05 | 8.16E-05 | 8.7E-05 | 1.95E-05 | 0.000309 | 8.76E-05 | 13193.27 | 1226.34 | 7260.15 | 3725.08 | 3290.40 | 8085.60 | 4164.84 | 13571.05 | 14460.91 | 3244.93 | 51418.21 | 14568.23 |
| | Ko Kut | 9.18E-05 | 4.01E-05 | 6.45E-05 | 7.25E-05 | 5.82E-05 | 0.000124 | 5.6E-05 | 0.000139 | 0.000149 | 6.26E-05 | 0.000276 | 6.69E-05 | 11924.95 | 5214.03 | 8379.51 | 9421.51 | 7560.32 | 16140.14 | 7274.91 | 18091.89 | 19399.96 | 8135.38 | 35851.63 | 8697.28 |
| | Ko Chang | 8.32E-05 | 1.15E-05 | 5.01E-05 | 3.27E-05 | 2.76E-05 | 6.17E-05 | 3.33E-05 | 9.26E-05 | 9.63E-05 | 2.66E-05 | 0.000304 | 9.04E-05 | 18252.55 | 2522.77 | 10978.64 | 7179.76 | 6045.35 | 13538.44 | 7298.37 | 20313.42 | 21114.97 | 5824.98 | 66635.40 | 19810.61 |

**Table B-1** Fifty percent of $SO_2$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHACHAENGSAO | Mueang Chachoengsao | 3.95E-05 | 2.31E-06 | 7.37E-06 | 8.71E-06 | 1.15E-05 | 1.78E-05 | 1.52E-05 | 6.27E-05 | 3.98E-05 | 1.12E-05 | 0.000215 | 6.93E-05 | 15214.76 | 889.28 | 2838.27 | 3354.09 | 4411.42 | 6864.48 | 5852.80 | 24161.49 | 15345.06 | 4307.11 | 82707.53 | 26678.17 |
| | Bang Khla | 5.12E-05 | 2.02E-06 | 9.6E-06 | 1.09E-05 | 1.51E-05 | 2.4E-05 | 1.91E-05 | 8E-05 | 5.12E-05 | 1.42E-05 | 0.000287 | 8.78E-05 | 12055.13 | 476.98 | 2261.33 | 2576.75 | 3557.55 | 5662.11 | 4499.14 | 18850.57 | 12057.84 | 3335.60 | 67594.30 | 20696.99 |
| | Bang Nam Priao | 2.84E-05 | 1.44E-06 | 6.82E-06 | 7.11E-06 | 9.09E-06 | 1.28E-05 | 9.87E-06 | 4.68E-05 | 2.69E-05 | 8.2E-06 | 0.000164 | 4.55E-05 | 14143.40 | 717.08 | 3388.82 | 3536.05 | 4517.33 | 6341.01 | 4908.11 | 23258.85 | 13362.35 | 4078.39 | 81487.97 | 22603.82 |
| | Bang Pakong | 3.43E-05 | 3.16E-06 | 6.74E-06 | 8.96E-06 | 1.12E-05 | 1.68E-05 | 1.59E-05 | 5.71E-05 | 3.64E-05 | 1.1E-05 | 0.000173 | 6.24E-05 | 8942.80 | 823.50 | 1755.04 | 2332.84 | 2919.70 | 4372.18 | 4149.51 | 14869.63 | 9467.43 | 2876.31 | 45139.44 | 16249.02 |
| | Ban Pho | 4.61E-05 | 1.86E-06 | 5.17E-06 | 7.84E-06 | 1.23E-05 | 2.24E-05 | 1.95E-05 | 7.28E-05 | 4.86E-05 | 1.25E-05 | 0.000249 | 8.84E-05 | 9734.99 | 393.47 | 1092.39 | 1657.00 | 2606.07 | 4731.90 | 4127.95 | 15384.47 | 10259.80 | 2645.42 | 52649.76 | 18667.71 |
| | Phanom Sarakham | 3.31E-05 | 1.2E-06 | 8.11E-06 | 7.9E-06 | 9.13E-06 | 1.49E-05 | 1.06E-05 | 3.75E-05 | 3.18E-05 | 8.42E-06 | 0.000175 | 5.35E-05 | 16933.82 | 611.82 | 4146.64 | 4037.35 | 4666.13 | 7632.09 | 5403.18 | 19172.63 | 16263.26 | 4304.48 | 89295.62 | 27358.08 |
| | Ratchasan | 7.09E-05 | 2.99E-06 | 1.56E-05 | 1.66E-05 | 2.15E-05 | 3.26E-05 | 2.49E-05 | 0.000107 | 6.93E-05 | 1.96E-05 | 0.000398 | 0.000116 | 10257.29 | 432.49 | 2252.99 | 2399.09 | 3112.34 | 4716.58 | 3610.30 | 15487.00 | 10026.10 | 2835.41 | 57676.99 | 16862.16 |
| | Sanam Chai Khet | 2.25E-05 | 6.97E-07 | 7.23E-06 | 6.13E-06 | 5.51E-06 | 9.48E-06 | 5.68E-06 | 1.39E-05 | 1.94E-05 | 5.17E-06 | 0.000109 | 3.39E-05 | 23991.48 | 743.81 | 7713.39 | 6535.68 | 5878.90 | 10109.91 | 6056.57 | 14774.80 | 20708.62 | 5511.00 | 116549.96 | 36208.99 |
| | Plaeng Yao | 6.52E-05 | 1.79E-06 | 1.29E-05 | 1.26E-05 | 1.63E-05 | 2.98E-05 | 2.27E-05 | 7.68E-05 | 6.74E-05 | 1.6E-05 | 0.000338 | 0.000113 | 21393.17 | 585.64 | 4230.17 | 4145.70 | 5333.42 | 9763.71 | 7449.01 | 25179.55 | 22087.90 | 5247.12 | 110728.40 | 37094.35 |
| | Tha Takiap | 2.9E-05 | 9.31E-07 | 1.08E-05 | 7.55E-06 | 6.33E-06 | 1.22E-05 | 6.71E-06 | 1.57E-05 | 2.25E-05 | 6.5E-06 | 0.000137 | 4.27E-05 | 41280.87 | 1324.05 | 15321.31 | 10743.53 | 9010.70 | 17398.39 | 9539.83 | 22365.29 | 32007.01 | 9252.14 | 194726.80 | 60747.67 |
| | Khlong Khuean | 7.62E-05 | 3.35E-06 | 1.59E-05 | 1.75E-05 | 2.33E-05 | 3.51E-05 | 2.75E-05 | 0.000121 | 7.43E-05 | 2.14E-05 | 0.000433 | 0.000127 | 8166.34 | 358.97 | 1709.33 | 1872.55 | 2495.91 | 3766.62 | 2949.50 | 12986.90 | 7961.31 | 2293.90 | 46391.97 | 13589.80 |
| PRACHIN BURI | Mueang Prachin Buri | 3.7E-05 | 2.38E-06 | 1.1E-05 | 1.04E-05 | 1.2E-05 | 1.74E-05 | 1.2E-05 | 5.07E-05 | 3.4E-05 | 1.07E-05 | 0.0002 | 5.74E-05 | 17545.09 | 1127.12 | 5223.95 | 4947.87 | 5675.99 | 8256.66 | 5695.09 | 24028.48 | 16100.37 | 5073.08 | 94629.32 | 27181.21 |
| | Kabin Buri | 2.32E-05 | 1.34E-06 | 8.93E-06 | 7.52E-06 | 6.95E-06 | 1.19E-05 | 6.53E-06 | 1.84E-05 | 1.48E-05 | 6.95E-06 | 0.000109 | 3.35E-05 | 32629.69 | 1882.22 | 12540.61 | 10561.23 | 9756.97 | 16722.60 | 9168.72 | 25762.70 | 20841.02 | 9752.32 | 153618.69 | 47052.63 |
| | Na Di | 3.1E-05 | 3.13E-06 | 1.21E-05 | 1.06E-05 | 9.94E-06 | 1.78E-05 | 9.1E-06 | 2.63E-05 | 2.11E-05 | 1.01E-05 | 0.000143 | 4.4E-05 | 37384.99 | 3767.12 | 14579.29 | 12816.78 | 11971.83 | 21436.39 | 10962.43 | 31693.87 | 25432.33 | 12146.77 | 172033.90 | 52940.08 |
| | Ban Sang | 3.6E-05 | 1.7E-06 | 9.58E-06 | 9.58E-06 | 1.22E-05 | 1.7E-05 | 1.23E-05 | 5.98E-05 | 3.4E-05 | 1.07E-05 | 0.00021 | 5.47E-05 | 13447.73 | 635.88 | 3573.16 | 3576.16 | 4558.46 | 6333.35 | 4588.24 | 22308.65 | 12690.47 | 3999.38 | 78510.43 | 20403.10 |
| | Prachantakham | 3.07E-05 | 3.13E-06 | 1.09E-05 | 9.64E-06 | 9.72E-06 | 1.62E-05 | 9.01E-06 | 2.89E-05 | 2.76E-05 | 9.06E-06 | 0.000146 | 4.5E-05 | 29093.30 | 2966.59 | 10323.66 | 9128.36 | 9207.72 | 15371.59 | 8533.73 | 27415.66 | 26100.66 | 8581.70 | 138375.76 | 42652.84 |
| | Si Maha Phot | 4.78E-05 | 2.33E-06 | 1.39E-05 | 1.29E-05 | 1.4E-05 | 2.24E-05 | 1.44E-05 | 4.97E-05 | 4.25E-05 | 1.27E-05 | 0.000246 | 7.31E-05 | 23008.91 | 1122.23 | 6713.66 | 6199.13 | 6747.48 | 10803.23 | 6938.40 | 23928.93 | 20463.01 | 6135.82 | 118670.38 | 35210.38 |
| | Si Mahosot | 8.54E-05 | 4.12E-06 | 2.25E-05 | 2.2E-05 | 2.61E-05 | 3.97E-05 | 2.77E-05 | 0.000111 | 8.09E-05 | 2.33E-05 | 0.000465 | 0.000134 | 12075.36 | 582.69 | 3174.09 | 3116.37 | 3695.39 | 5614.32 | 3912.68 | 15724.47 | 11433.60 | 3296.51 | 65775.93 | 18916.76 |
| SA KAEO | Mueang Sa Kaeo | 1.64E-05 | 1.37E-06 | 6.97E-06 | 6.12E-06 | 5.3E-06 | 9.81E-06 | 4.94E-06 | 1.39E-05 | 6.24E-06 | 5.94E-06 | 7.47E-05 | 2.26E-05 | 22813.34 | 1905.77 | 9716.43 | 8538.58 | 7392.72 | 13688.06 | 6888.06 | 19379.39 | 8697.60 | 8281.18 | 104139.18 | 31555.80 |
| | Khlong Hat | 5.17E-05 | 3.38E-06 | 2.19E-05 | 1.91E-05 | 1.33E-05 | 2.6E-05 | 1.45E-05 | 4.51E-05 | 2.52E-05 | 1.74E-05 | 0.000234 | 7.64E-05 | 25011.00 | 1636.91 | 10582.92 | 9259.15 | 6436.75 | 12580.30 | 7003.16 | 21808.11 | 12197.14 | 8408.80 | 113023.63 | 36944.58 |
| | Ta Phraya | 2.19E-05 | 7.62E-06 | 1.01E-05 | 1.5E-05 | 7.58E-06 | 2.12E-05 | 7.64E-06 | 2.63E-05 | 1.42E-05 | 1.21E-05 | 0.000105 | 3.05E-05 | 21198.61 | 7392.47 | 9745.65 | 14567.33 | 7349.77 | 20531.80 | 7407.91 | 25475.11 | 13762.99 | 11735.64 | 101344.82 | 29527.26 |
| | Wang Nam Yen | 3.21E-05 | 1.63E-06 | 1.56E-05 | 1.4E-05 | 9.06E-06 | 1.62E-05 | 9.05E-06 | 2.37E-05 | 1.18E-05 | 1.11E-05 | 0.000143 | 5E-05 | 13885.14 | 702.10 | 6755.41 | 6035.94 | 3911.52 | 7005.36 | 3907.70 | 10219.77 | 5103.75 | 4810.57 | 61671.61 | 21583.18 |
| | Watthana Nakhon | 1.66E-05 | 4.63E-06 | 7.27E-06 | 1.07E-05 | 5.5E-06 | 1.39E-05 | 5.72E-06 | 1.88E-05 | 4.95E-06 | 8.97E-06 | 7.81E-05 | 2.35E-05 | 25060.97 | 6993.88 | 10990.35 | 16218.36 | 8305.67 | 20958.50 | 8649.45 | 28452.44 | 7477.35 | 13561.47 | 117994.69 | 35523.11 |
| | Aranyaprathet | 2.32E-05 | 4.58E-06 | 8.87E-06 | 1.21E-05 | 6.81E-06 | 1.55E-05 | 7.92E-06 | 2.71E-05 | 1.04E-05 | 1.09E-05 | 0.000111 | 3.36E-05 | 17063.84 | 3369.99 | 6519.46 | 8883.52 | 5005.55 | 11393.77 | 5824.37 | 19888.34 | 7610.73 | 8008.20 | 81290.13 | 24678.83 |
| | Khok Sung | 5.33E-05 | 2.17E-05 | 2.38E-05 | 4.26E-05 | 1.84E-05 | 5.39E-05 | 1.97E-05 | 6.96E-05 | 1.83E-05 | 3.42E-05 | 0.000256 | 8.6E-05 | 18168.60 | 7399.77 | 8118.37 | 14543.89 | 6275.66 | 18387.79 | 6732.63 | 23749.96 | 6235.90 | 11665.59 | 87401.55 | 29344.23 |
| | Khao Chakan | 2.48E-05 | 1.44E-06 | 1.12E-05 | 1E-05 | 7.02E-06 | 1.27E-05 | 6.98E-06 | 1.85E-05 | 1.06E-05 | 8.37E-06 | 0.000112 | 3.27E-05 | 11493.58 | 665.55 | 5195.05 | 4627.20 | 3249.08 | 5891.43 | 3231.71 | 8574.13 | 4913.03 | 3875.62 | 51961.89 | 15116.20 |
| | Wang Sombun | 3.21E-05 | 1.54E-06 | 1.47E-05 | 1.15E-05 | 7.91E-06 | 1.57E-05 | 8.24E-06 | 2.34E-05 | 1.54E-05 | 9.79E-06 | 0.000143 | 4.81E-05 | 16090.22 | 770.22 | 7355.43 | 5737.60 | 3961.99 | 7849.50 | 4125.64 | 11711.46 | 7694.09 | 4902.82 | 71826.92 | 24074.88 |

**Table B-2** Fifty percent of $NO_2$ maximum emission load from box model for the Eastern Region of each month in 2010

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 1.16E-05 | 1.27E-06 | 3.74E-06 | 4.21E-06 | 4.72E-06 | 6.55E-06 | 6.24E-06 | 1.89E-05 | 1.37E-05 | 4.47E-06 | 5.05E-05 | 1.92E-05 | 2953.94 | 323.84 | 957.44 | 1076.62 | 1205.72 | 1675.03 | 1596.22 | 4828.89 | 3495.56 | 1143.05 | 12913.77 | 4915.09 |
| | Ban Bueng | 1.25E-05 | 6.74E-07 | 5.35E-06 | 3.85E-06 | 3.93E-06 | 6.02E-06 | 5.03E-06 | 1.87E-05 | 1.62E-05 | 4.41E-06 | 5E-05 | 1.82E-05 | 7422.83 | 399.95 | 3177.60 | 2281.79 | 2331.73 | 3573.20 | 2982.35 | 11123.58 | 9630.56 | 2614.57 | 29653.54 | 10779.80 |
| | Nong Yai | 1.5E-05 | 3.75E-07 | 7.29E-06 | 3.69E-06 | 3.25E-06 | 6.34E-06 | 4.61E-06 | 1.7E-05 | 1.62E-05 | 4.27E-06 | 6.25E-05 | 2.05E-05 | 6852.95 | 171.05 | 3325.54 | 1682.32 | 1480.15 | 2892.83 | 2104.16 | 7772.08 | 7384.60 | 1946.81 | 28483.55 | 9367.60 |
| | Bang Lamung | 1.22E-05 | 9.92E-07 | 6.48E-06 | 2.89E-06 | 2.59E-06 | 8.93E-06 | 2.6E-06 | 1.13E-05 | 1.7E-05 | 2.89E-06 | 6.66E-05 | 2.02E-05 | 6555.74 | 531.27 | 3471.13 | 1550.45 | 1387.75 | 4784.64 | 1395.06 | 6064.85 | 9104.72 | 1549.95 | 35702.72 | 10844.72 |
| | Phan Thong | 1.56E-05 | 6.56E-07 | 1.79E-06 | 2.79E-06 | 4.39E-06 | 8E-06 | 7.1E-06 | 2.48E-05 | 1.69E-05 | 4.43E-06 | 8.2E-05 | 3.02E-05 | 2612.24 | 110.07 | 300.75 | 468.77 | 735.95 | 1341.41 | 1191.38 | 4157.80 | 2841.70 | 743.20 | 13761.30 | 5073.48 |
| | Phanat Nikhom | 1.11E-05 | 2.86E-07 | 1.24E-06 | 1.69E-06 | 2.8E-06 | 5.5E-06 | 4.66E-06 | 1.65E-05 | 1.18E-05 | 2.9E-06 | 5.89E-05 | 2.14E-05 | 5311.98 | 137.34 | 592.84 | 810.03 | 1342.47 | 2637.96 | 2234.71 | 7903.96 | 5673.07 | 1391.13 | 28267.79 | 10257.82 |
| | Si Racha | 1.12E-05 | 1.07E-06 | 6.28E-06 | 5.04E-06 | 4.72E-06 | 6.11E-06 | 5.92E-06 | 1.92E-05 | 1.62E-05 | 5.03E-06 | 3.72E-05 | 1.45E-05 | 6956.89 | 670.32 | 3915.60 | 3142.93 | 2945.43 | 3810.67 | 3691.76 | 11988.52 | 10109.31 | 3136.51 | 23210.06 | 9070.64 |
| | Ko Si Chang | 0.000228 | 6.86E-05 | 0.000131 | 0.000191 | 0.000202 | 0.000231 | 0.000242 | 0.000401 | 0.000273 | 0.000154 | 0.000721 | 0.000353 | 1472.76 | 442.56 | 846.80 | 1231.02 | 1302.77 | 1491.54 | 1561.53 | 2584.12 | 1761.41 | 994.75 | 4648.94 | 2276.51 |
| | Sattahip | 1.61E-05 | 2.65E-06 | 1.29E-05 | 1.34E-05 | 1.11E-05 | 1.47E-05 | 2.1E-05 | 3.42E-05 | 2.4E-05 | 1.13E-05 | 5.53E-05 | 2.47E-05 | 4543.70 | 746.53 | 3641.97 | 3772.02 | 3140.34 | 4152.18 | 5930.45 | 9657.92 | 6758.85 | 3179.76 | 15588.65 | 6962.32 |
| | Bo Thong | 1.42E-05 | 3.53E-07 | 5.71E-06 | 2.78E-06 | 2.73E-06 | 6.06E-06 | 3.59E-06 | 1.1E-05 | 1.19E-05 | 3.24E-06 | 6.53E-05 | 2.08E-05 | 11808.03 | 293.77 | 4757.72 | 2318.02 | 2271.11 | 5045.22 | 2985.42 | 9137.46 | 9898.06 | 2696.80 | 54368.07 | 17280.50 |
| | Ko Chan | 1.69E-05 | 4.34E-07 | 4.78E-06 | 3.61E-06 | 3.96E-06 | 7.33E-06 | 5.11E-06 | 1.64E-05 | 1.71E-05 | 4.05E-06 | 8.23E-05 | 2.7E-05 | 4546.72 | 116.81 | 1286.09 | 971.28 | 1065.62 | 1972.17 | 1376.71 | 4404.36 | 4609.68 | 1090.47 | 22147.04 | 7269.47 |
| RAYONG | Mueang Rayong | 1.02E-05 | 3.41E-07 | 6.61E-06 | 5.32E-06 | 2.46E-06 | 4.34E-06 | 7.82E-06 | 2.05E-05 | 1.44E-05 | 3.78E-06 | 4.52E-05 | 1.44E-05 | 6894.10 | 229.62 | 4456.21 | 3586.19 | 1659.21 | 2927.08 | 5269.30 | 13812.95 | 9697.68 | 2544.52 | 30437.21 | 9672.05 |
| | Ban Khai | 9.74E-06 | 3.28E-07 | 5.91E-06 | 4.15E-06 | 2.4E-06 | 4.2E-06 | 5.89E-06 | 1.63E-05 | 1.26E-05 | 3.49E-06 | 4.02E-05 | 1.32E-05 | 4625.09 | 155.97 | 2809.17 | 1970.68 | 1140.46 | 1994.75 | 2797.04 | 7757.35 | 5991.17 | 1656.82 | 19107.60 | 6283.30 |
| | Pluak Daeng | 1.25E-05 | 4.44E-07 | 7.43E-06 | 4.51E-06 | 3.47E-06 | 5.33E-06 | 5.23E-06 | 2.03E-05 | 1.79E-05 | 4.68E-06 | 4.44E-05 | 1.55E-05 | 6643.91 | 235.22 | 3936.22 | 2390.66 | 1837.14 | 2823.92 | 2773.23 | 10733.55 | 9490.81 | 2479.38 | 23552.70 | 8207.92 |
| | Khao Chamao | 2.23E-05 | 5.24E-07 | 1.04E-05 | 3.57E-06 | 3.27E-06 | 9.71E-06 | 4.98E-06 | 1.58E-05 | 1.47E-05 | 4.45E-06 | 0.000104 | 3.16E-05 | 10621.39 | 249.65 | 4960.29 | 1699.56 | 1554.87 | 4623.92 | 2369.36 | 7544.05 | 7013.88 | 2115.95 | 49531.46 | 15045.19 |
| | Nikhom Phatthana | 1.88E-05 | 1.18E-06 | 1.26E-05 | 1.03E-05 | 6.8E-06 | 9.37E-06 | 1.52E-05 | 3.63E-05 | 2.75E-05 | 8.95E-06 | 6.46E-05 | 2.44E-05 | 4429.39 | 279.17 | 2964.42 | 2423.60 | 1605.56 | 2210.86 | 3596.31 | 8561.57 | 6499.96 | 2111.91 | 15258.09 | 5760.00 |
| | Klaeng | 8.05E-06 | 2.58E-07 | 4.36E-06 | 2.6E-06 | 1.37E-06 | 3.6E-06 | 2.64E-06 | 1.18E-05 | 9.04E-06 | 1.69E-06 | 4.15E-05 | 1.16E-05 | 5917.25 | 189.70 | 3204.39 | 1909.02 | 1008.44 | 2648.89 | 1943.60 | 8685.75 | 6643.26 | 1245.77 | 30517.63 | 8548.43 |
| | Ban Chang | 1.7E-05 | 1.39E-06 | 1.25E-05 | 1.22E-05 | 7.31E-06 | 9.51E-06 | 2.04E-05 | 3.81E-05 | 2.55E-05 | 9.71E-06 | 5.79E-05 | 2.34E-05 | 2772.06 | 227.64 | 2040.11 | 1992.52 | 1194.06 | 1553.11 | 3335.59 | 6222.71 | 4157.70 | 1585.06 | 9446.79 | 3827.22 |
| | Wang Chan | 1.71E-05 | 3.83E-07 | 8.49E-06 | 3.64E-06 | 2.79E-06 | 7.31E-06 | 4.88E-06 | 1.56E-05 | 1.4E-05 | 3.94E-06 | 7.87E-05 | 2.42E-05 | 6377.12 | 143.05 | 3169.82 | 1358.29 | 1041.66 | 2726.93 | 1821.74 | 5804.62 | 5209.06 | 1471.87 | 29362.56 | 9019.52 |
| CHANTHABURI | Mueang Chanthaburi | 2.66E-05 | 1.09E-06 | 1.1E-05 | 2.78E-06 | 3.76E-06 | 1.14E-05 | 5.07E-06 | 2.34E-05 | 1.61E-05 | 2.96E-06 | 9.76E-05 | 2.84E-05 | 7523.88 | 308.49 | 3120.13 | 785.64 | 1061.36 | 3232.65 | 1431.71 | 6607.39 | 4536.67 | 837.29 | 27596.89 | 8019.30 |
| | Khlung | 9.77E-06 | 5.83E-07 | 4.27E-06 | 1.89E-06 | 1.83E-06 | 5.08E-06 | 2.44E-06 | 7.5E-06 | 9.17E-06 | 1.65E-06 | 3.69E-05 | 1.1E-05 | 7673.75 | 457.66 | 3352.74 | 1480.21 | 1434.97 | 3985.15 | 1912.87 | 5892.28 | 7202.80 | 1293.40 | 28967.88 | 8615.11 |
| | Tha Mai | 1.65E-05 | 6.94E-07 | 7.17E-06 | 2.37E-06 | 2.44E-06 | 7.32E-06 | 3.36E-06 | 1.48E-05 | 1.09E-05 | 2.3E-06 | 6.63E-05 | 1.93E-05 | 10300.59 | 434.44 | 4489.18 | 1484.26 | 1525.85 | 4581.88 | 2100.86 | 9251.51 | 6835.89 | 1441.55 | 41508.80 | 12061.62 |
| | Pong Nam Ron | 1.28E-05 | 7.62E-07 | 4.98E-06 | 2.22E-06 | 1.99E-06 | 6.86E-06 | 2E-06 | 8.7E-06 | 1.31E-05 | 2.22E-06 | 5.12E-05 | 1.56E-05 | 13009.26 | 775.04 | 5063.08 | 2261.83 | 2024.33 | 6979.57 | 2034.62 | 8846.88 | 13281.76 | 2260.96 | 52075.96 | 15818.53 |
| | Makham | 1.62E-05 | 7.86E-07 | 6.65E-06 | 2.26E-06 | 2.45E-06 | 7.64E-06 | 3.13E-06 | 1.24E-05 | 1.25E-05 | 2.27E-06 | 6.25E-05 | 1.84E-05 | 7213.40 | 349.82 | 2959.50 | 1005.39 | 1088.25 | 3400.77 | 1391.39 | 5529.26 | 5559.80 | 1012.39 | 27799.09 | 8190.63 |
| | Laem Sing | 3.47E-05 | 1.99E-06 | 1.63E-05 | 6.78E-06 | 6.86E-06 | 1.76E-05 | 9.23E-06 | 3.28E-05 | 2.6E-05 | 5.57E-06 | 0.000127 | 3.85E-05 | 5931.23 | 339.90 | 2776.44 | 1158.17 | 1171.72 | 3005.71 | 1576.98 | 5593.83 | 4433.32 | 951.69 | 21663.53 | 6567.45 |
| | Soi Dao | 1.29E-05 | 6.95E-07 | 5.42E-06 | 2.88E-06 | 2.35E-06 | 6.44E-06 | 2.54E-06 | 9.24E-06 | 8.97E-06 | 2.94E-06 | 5.6E-05 | 1.74E-05 | 10321.12 | 557.78 | 4348.96 | 2308.21 | 1888.20 | 5166.21 | 2038.68 | 7417.79 | 7196.30 | 2362.26 | 44943.37 | 13964.61 |
| | Kaeng Hang Maeo | 9.64E-06 | 3.81E-07 | 4.3E-06 | 1.83E-06 | 1.58E-06 | 4.4E-06 | 2.01E-06 | 6.47E-06 | 5.85E-06 | 2E-06 | 4.41E-05 | 1.34E-05 | 11730.84 | 463.25 | 5236.13 | 2230.00 | 1922.06 | 5359.06 | 2450.45 | 7867.66 | 7114.05 | 2429.89 | 53637.21 | 16276.55 |
| | Na Yai Am | 2.21E-05 | 9.85E-07 | 1.06E-05 | 4.84E-06 | 3.78E-06 | 1.04E-05 | 5.54E-06 | 2.36E-05 | 1.78E-05 | 3.78E-06 | 9.7E-05 | 2.81E-05 | 6315.88 | 281.69 | 3044.03 | 1385.34 | 1080.69 | 2977.75 | 1585.26 | 6765.41 | 5078.53 | 1082.66 | 27766.92 | 8045.92 |
| | Khao Khitchakut | 1.46E-05 | 7.33E-07 | 6.31E-06 | 2.3E-06 | 2.2E-06 | 6.91E-06 | 2.68E-06 | 1E-05 | 9.11E-06 | 2.67E-06 | 6.35E-05 | 1.88E-05 | 11420.71 | 572.50 | 4928.25 | 1799.47 | 1715.68 | 5398.11 | 2093.82 | 7810.24 | 7115.86 | 2084.48 | 49622.05 | 14690.01 |

**Table B-2** Fifty percent of $NO_2$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| TRAT | Mueang Trat | 9.47E-06 | 5.42E-07 | 4.08E-06 | 1.3E-06 | 1.23E-06 | 4.44E-06 | 1.71E-06 | 7.83E-06 | 9.95E-06 | 1.41E-06 | 3.72E-05 | 9.67E-06 | 8966.04 | 513.58 | 3867.97 | 1232.81 | 1163.46 | 4204.36 | 1616.52 | 7417.37 | 9420.93 | 1334.98 | 35246.02 | 9159.63 |
| | Khlong Yai | 7.33E-05 | 1.03E-05 | 3E-05 | 1.33E-05 | 1.02E-05 | 4.03E-05 | 1.29E-05 | 7.1E-05 | 6.03E-05 | 1.02E-05 | 0.000208 | 5.56E-05 | 5803.51 | 817.21 | 2372.72 | 1056.02 | 810.93 | 3189.33 | 1020.80 | 5626.09 | 4776.69 | 811.46 | 16435.52 | 4401.38 |
| | Khao Saming | 1.13E-05 | 6.59E-07 | 4.7E-06 | 2.1E-06 | 1.96E-06 | 5.76E-06 | 2.75E-06 | 7.67E-06 | 1.24E-05 | 1.88E-06 | 4.37E-05 | 1.25E-05 | 7330.61 | 428.44 | 3058.10 | 1363.56 | 1273.11 | 3745.82 | 1785.91 | 4990.42 | 8087.25 | 1222.98 | 28389.11 | 8099.33 |
| | Bo Rai | 2.2E-05 | 1.02E-06 | 7.23E-06 | 2.92E-06 | 2.75E-06 | 1.01E-05 | 4.25E-06 | 1.04E-05 | 2.65E-05 | 2.85E-06 | 8.59E-05 | 2.39E-05 | 14907.66 | 690.70 | 4905.62 | 1982.87 | 1862.36 | 6874.31 | 2884.82 | 7037.00 | 17942.55 | 1934.03 | 58273.73 | 16185.51 |
| | Laem Ngop | 2.84E-05 | 2.64E-06 | 1.56E-05 | 8.01E-06 | 7.07E-06 | 1.74E-05 | 8.95E-06 | 2.92E-05 | 3.11E-05 | 6.98E-06 | 0.000111 | 3.13E-05 | 4714.48 | 438.22 | 2594.34 | 1331.12 | 1175.79 | 2889.31 | 1488.26 | 4849.47 | 5167.46 | 1159.54 | 18373.77 | 5205.80 |
| | Ko Kut | 3.28E-05 | 1.43E-05 | 2.3E-05 | 2.59E-05 | 2.08E-05 | 4.44E-05 | 2E-05 | 4.98E-05 | 5.34E-05 | 2.24E-05 | 9.86E-05 | 2.39E-05 | 4261.26 | 1863.18 | 2994.33 | 3366.68 | 2701.60 | 5767.51 | 2599.61 | 6464.95 | 6932.38 | 2907.09 | 12811.21 | 3107.88 |
| | Ko Chang | 2.97E-05 | 4.11E-06 | 1.79E-05 | 1.17E-05 | 9.85E-06 | 2.21E-05 | 1.19E-05 | 3.31E-05 | 3.44E-05 | 9.49E-06 | 0.000109 | 3.23E-05 | 6522.36 | 901.49 | 3923.10 | 2565.61 | 2160.24 | 4837.82 | 2608.00 | 7258.79 | 7545.22 | 2081.50 | 23811.47 | 7079.12 |
| CHACHAENGSAO | Mueang Chachoengsao | 1.41E-05 | 8.25E-07 | 2.63E-06 | 3.11E-06 | 4.09E-06 | 6.37E-06 | 5.43E-06 | 2.24E-05 | 1.42E-05 | 4E-06 | 7.67E-05 | 2.48E-05 | 5436.84 | 317.77 | 1014.23 | 1198.55 | 1576.37 | 2452.95 | 2091.44 | 8633.86 | 5483.40 | 1539.10 | 29554.68 | 9533.17 |
| | Bang Khla | 1.83E-05 | 7.23E-07 | 3.43E-06 | 3.91E-06 | 5.4E-06 | 8.59E-06 | 6.82E-06 | 2.86E-05 | 1.83E-05 | 5.06E-06 | 0.000103 | 3.14E-05 | 4307.78 | 170.44 | 808.06 | 920.77 | 1271.25 | 2023.30 | 1607.72 | 6736.06 | 4308.75 | 1191.94 | 24154.12 | 7395.86 |
| | Bang Nam Priao | 1.02E-05 | 5.15E-07 | 2.44E-06 | 2.54E-06 | 3.25E-06 | 4.56E-06 | 3.53E-06 | 1.67E-05 | 9.6E-06 | 2.93E-06 | 5.86E-05 | 1.62E-05 | 5054.00 | 256.24 | 1210.96 | 1263.57 | 1614.22 | 2265.89 | 1753.86 | 8311.31 | 4774.90 | 1457.37 | 29118.88 | 8077.24 |
| | Bang Pakong | 1.23E-05 | 1.13E-06 | 2.41E-06 | 3.2E-06 | 4.01E-06 | 6E-06 | 5.7E-06 | 2.04E-05 | 1.3E-05 | 3.95E-06 | 6.2E-05 | 2.23E-05 | 3195.62 | 294.27 | 627.14 | 833.62 | 1043.32 | 1562.35 | 1482.79 | 5313.51 | 3383.09 | 1027.82 | 16130.11 | 5806.42 |
| | Ban Pho | 1.65E-05 | 6.66E-07 | 1.85E-06 | 2.8E-06 | 4.41E-06 | 8E-06 | 6.98E-06 | 2.6E-05 | 1.74E-05 | 4.48E-06 | 8.91E-05 | 3.16E-05 | 3478.70 | 140.60 | 390.35 | 592.11 | 931.25 | 1690.90 | 1475.08 | 5497.48 | 3666.23 | 945.31 | 18813.85 | 6670.71 |
| | Phanom Sarakham | 1.18E-05 | 4.28E-07 | 2.9E-06 | 2.82E-06 | 3.26E-06 | 5.33E-06 | 3.78E-06 | 1.34E-05 | 1.14E-05 | 3.01E-06 | 6.24E-05 | 1.91E-05 | 6051.13 | 218.63 | 1481.76 | 1442.71 | 1667.40 | 2727.25 | 1930.77 | 6851.14 | 5811.51 | 1538.16 | 31908.87 | 9776.13 |
| | Ratchasan | 2.53E-05 | 1.07E-06 | 5.56E-06 | 5.92E-06 | 7.68E-06 | 1.16E-05 | 8.91E-06 | 3.82E-05 | 2.47E-05 | 7E-06 | 0.000142 | 4.16E-05 | 3665.34 | 154.55 | 805.08 | 857.29 | 1112.16 | 1685.42 | 1290.10 | 5534.12 | 3582.72 | 1013.20 | 20610.28 | 6025.52 |
| | Sanam Chai Khet | 8.04E-06 | 2.49E-07 | 2.58E-06 | 2.19E-06 | 1.97E-06 | 3.39E-06 | 2.03E-06 | 4.95E-06 | 6.94E-06 | 1.85E-06 | 3.9E-05 | 1.21E-05 | 8573.11 | 265.79 | 2756.30 | 2335.46 | 2100.76 | 3612.67 | 2164.25 | 5279.62 | 7400.01 | 1969.30 | 41647.92 | 12938.91 |
| | Plaeng Yao | 2.33E-05 | 6.38E-07 | 4.61E-06 | 4.52E-06 | 5.81E-06 | 1.06E-05 | 8.12E-06 | 2.74E-05 | 2.41E-05 | 5.72E-06 | 0.000121 | 4.04E-05 | 7644.63 | 209.27 | 1511.61 | 1481.42 | 1905.84 | 3488.96 | 2661.83 | 8997.65 | 7892.88 | 1875.00 | 39567.65 | 13255.28 |
| | Tha Takiap | 1.04E-05 | 3.33E-07 | 3.85E-06 | 2.7E-06 | 2.26E-06 | 4.37E-06 | 2.4E-06 | 5.62E-06 | 8.04E-06 | 2.32E-06 | 4.89E-05 | 1.53E-05 | 14751.29 | 473.13 | 5474.91 | 3839.09 | 3219.88 | 6217.13 | 3408.96 | 7992.00 | 11437.38 | 3306.16 | 69583.61 | 21707.55 |
| | Khlong Khuean | 2.72E-05 | 1.2E-06 | 5.7E-06 | 6.24E-06 | 8.32E-06 | 1.26E-05 | 9.83E-06 | 4.33E-05 | 2.65E-05 | 7.65E-06 | 0.000155 | 4.53E-05 | 2918.16 | 128.27 | 610.81 | 669.14 | 891.89 | 1345.96 | 1053.97 | 4640.74 | 2844.89 | 819.70 | 16577.69 | 4856.18 |
| PRACHIN BURI | Mueang Prachin Buri | 1.32E-05 | 8.5E-07 | 3.94E-06 | 3.73E-06 | 4.28E-06 | 6.23E-06 | 4.29E-06 | 1.81E-05 | 1.21E-05 | 3.82E-06 | 7.13E-05 | 2.05E-05 | 6269.56 | 402.76 | 1866.72 | 1768.07 | 2028.26 | 2950.43 | 2035.08 | 8586.33 | 5753.30 | 1812.81 | 33814.81 | 9712.93 |
| | Kabin Buri | 8.31E-06 | 4.79E-07 | 3.19E-06 | 2.69E-06 | 2.48E-06 | 4.26E-06 | 2.33E-06 | 6.56E-06 | 5.31E-06 | 2.48E-06 | 3.91E-05 | 1.2E-05 | 11659.88 | 672.59 | 4481.26 | 3773.95 | 3486.55 | 5975.65 | 3276.35 | 9206.04 | 7447.32 | 3484.89 | 54894.05 | 16813.77 |
| | Na Di | 1.11E-05 | 1.12E-06 | 4.33E-06 | 3.8E-06 | 3.55E-06 | 6.36E-06 | 3.25E-06 | 9.41E-06 | 7.55E-06 | 3.6E-06 | 5.11E-05 | 1.57E-05 | 13359.14 | 1346.14 | 5209.76 | 4579.94 | 4278.01 | 7660.07 | 3917.31 | 11325.48 | 9087.98 | 4340.52 | 61474.54 | 18917.59 |
| | Ban Sang | 1.29E-05 | 6.09E-07 | 3.42E-06 | 3.42E-06 | 4.37E-06 | 6.07E-06 | 4.39E-06 | 2.14E-05 | 1.22E-05 | 3.83E-06 | 7.52E-05 | 1.95E-05 | 4805.41 | 227.23 | 1276.83 | 1277.90 | 1628.92 | 2263.16 | 1639.56 | 7971.77 | 4534.81 | 1429.14 | 28054.89 | 7290.84 |
| | Prachantakham | 1.1E-05 | 1.12E-06 | 3.89E-06 | 3.44E-06 | 3.47E-06 | 5.8E-06 | 3.22E-06 | 1.03E-05 | 9.85E-06 | 3.24E-06 | 5.22E-05 | 1.61E-05 | 10396.19 | 1060.08 | 3689.05 | 3261.93 | 3290.28 | 5492.88 | 3049.44 | 9796.70 | 9326.80 | 3066.58 | 49447.15 | 15241.55 |
| | Si Maha Phot | 1.71E-05 | 8.33E-07 | 4.98E-06 | 4.6E-06 | 5.01E-06 | 8.02E-06 | 5.15E-06 | 1.78E-05 | 1.52E-05 | 4.55E-06 | 8.81E-05 | 2.61E-05 | 8221.99 | 401.02 | 2399.06 | 2215.20 | 2411.14 | 3860.42 | 2479.37 | 8550.76 | 7312.25 | 2192.57 | 42405.63 | 12582.07 |
| | Si Mahosot | 3.05E-05 | 1.47E-06 | 8.02E-06 | 7.88E-06 | 9.34E-06 | 1.42E-05 | 9.89E-06 | 3.98E-05 | 2.89E-05 | 8.33E-06 | 0.000166 | 4.78E-05 | 4315.00 | 208.22 | 1134.23 | 1113.60 | 1320.51 | 2006.22 | 1398.16 | 5618.98 | 4085.68 | 1177.97 | 23504.35 | 6759.71 |

**Table B-2** Fifty percent of $NO_2$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SA KAEO | Mueang Sa Kaeo | 5.84E-06 | 4.88E-07 | 2.49E-06 | 2.19E-06 | 1.89E-06 | 3.51E-06 | 1.76E-06 | 4.96E-06 | 2.23E-06 | 2.12E-06 | 2.67E-05 | 8.08E-06 | 8152.11 | 681.01 | 3472.07 | 3051.17 | 2641.71 | 4891.29 | 2461.38 | 6925.03 | 3108.00 | 2959.19 | 37213.06 | 11276.14 |
| | Khlong Hat | 1.85E-05 | 1.21E-06 | 7.82E-06 | 6.84E-06 | 4.75E-06 | 9.29E-06 | 5.17E-06 | 1.61E-05 | 9.01E-06 | 6.21E-06 | 8.35E-05 | 2.73E-05 | 8937.42 | 584.93 | 3781.70 | 3308.66 | 2300.11 | 4495.44 | 2502.51 | 7792.90 | 4358.52 | 3004.80 | 40387.83 | 13201.76 |
| | Ta Phraya | 7.81E-06 | 2.72E-06 | 3.59E-06 | 5.37E-06 | 2.71E-06 | 7.57E-06 | 2.73E-06 | 9.39E-06 | 5.07E-06 | 4.32E-06 | 3.73E-05 | 1.09E-05 | 7575.10 | 2641.62 | 3482.51 | 5205.49 | 2626.36 | 7336.83 | 2647.14 | 9103.27 | 4918.06 | 4193.61 | 36214.52 | 10551.26 |
| | Wang Nam Yen | 1.15E-05 | 5.81E-07 | 5.59E-06 | 4.99E-06 | 3.24E-06 | 5.8E-06 | 3.23E-06 | 8.46E-06 | 4.22E-06 | 3.98E-06 | 5.1E-05 | 1.79E-05 | 4961.71 | 250.89 | 2413.98 | 2156.88 | 1397.74 | 2503.29 | 1396.38 | 3651.93 | 1823.77 | 1719.01 | 22037.71 | 7712.53 |
| | Watthana Nakhon | 5.92E-06 | 1.65E-06 | 2.6E-06 | 3.83E-06 | 1.96E-06 | 4.96E-06 | 2.04E-06 | 6.73E-06 | 1.77E-06 | 3.21E-06 | 2.79E-05 | 8.4E-06 | 8955.28 | 2499.19 | 3927.29 | 5795.46 | 2967.94 | 7489.30 | 3090.79 | 10167.18 | 2671.95 | 4846.05 | 42164.18 | 12693.82 |
| | Aranyaprathet | 8.3E-06 | 1.64E-06 | 3.17E-06 | 4.32E-06 | 2.43E-06 | 5.54E-06 | 2.83E-06 | 9.67E-06 | 3.7E-06 | 3.89E-06 | 3.95E-05 | 1.2E-05 | 6097.59 | 1204.23 | 2329.66 | 3174.43 | 1788.68 | 4071.45 | 2081.28 | 7106.89 | 2719.62 | 2861.65 | 29048.19 | 8818.73 |
| | Khok Sung | 1.9E-05 | 7.75E-06 | 8.5E-06 | 1.52E-05 | 6.57E-06 | 1.93E-05 | 7.05E-06 | 2.49E-05 | 6.53E-06 | 1.22E-05 | 9.16E-05 | 3.07E-05 | 6492.36 | 2644.23 | 2901.02 | 5197.11 | 2242.54 | 6570.69 | 2405.83 | 8486.80 | 2228.34 | 4168.58 | 31232.04 | 10485.86 |
| | Khao Chakan | 8.87E-06 | 5.14E-07 | 4.01E-06 | 3.57E-06 | 2.51E-06 | 4.55E-06 | 2.5E-06 | 6.62E-06 | 3.79E-06 | 2.99E-06 | 4.01E-05 | 1.17E-05 | 4107.11 | 237.83 | 1856.40 | 1653.48 | 1161.02 | 2105.24 | 1154.82 | 3063.88 | 1755.62 | 1384.91 | 18568.04 | 5401.62 |
| | Wang Sombun | 1.15E-05 | 5.5E-07 | 5.25E-06 | 4.09E-06 | 2.83E-06 | 5.6E-06 | 2.94E-06 | 8.36E-06 | 5.49E-06 | 3.5E-06 | 5.13E-05 | 1.72E-05 | 5749.67 | 275.23 | 2628.39 | 2050.27 | 1415.78 | 2804.94 | 1474.25 | 4184.97 | 2749.40 | 1751.97 | 25666.61 | 8602.91 |

# APPENDIX C

# FIFTY PERCENT OF $NO_x$ MAXIMUM EMISSION LOAD FOR THE EASTERN REGION OF THAILAND

**Table C-1** Fifty percent of $NO_x$ maximum emission load from box model for the Eastern Region of each month in 2010

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 1.87E-05 | 2.05E-06 | 6.07E-06 | 6.82E-06 | 7.64E-06 | 1.06E-05 | 1.01E-05 | 3.06E-05 | 2.21E-05 | 7.24E-06 | 8.18E-05 | 3.11E-05 | 4785.385 | 524.62 | 1551.05 | 1744.13 | 1953.27 | 2713.55 | 2585.87 | 7822.80 | 5662.81 | 1851.73 | 20920.31 | 7962.45 |
| | Ban Bueng | 2.03E-05 | 1.09E-06 | 8.67E-06 | 6.23E-06 | 6.37E-06 | 9.75E-06 | 8.14E-06 | 3.04E-05 | 2.63E-05 | 7.14E-06 | 8.1E-05 | 2.94E-05 | 12024.99 | 647.92 | 5147.71 | 3696.51 | 3777.39 | 5788.58 | 4831.40 | 18020.20 | 15601.50 | 4235.60 | 48038.74 | 17463.28 |
| | Nong Yai | 2.43E-05 | 6.08E-07 | 1.18E-05 | 5.98E-06 | 5.26E-06 | 1.03E-05 | 7.48E-06 | 2.76E-05 | 2.62E-05 | 6.92E-06 | 0.000101 | 3.33E-05 | 11101.78 | 277.10 | 5387.37 | 2725.35 | 2397.85 | 4686.39 | 3408.74 | 12590.77 | 11963.05 | 3153.83 | 46143.34 | 15175.51 |
| | Bang Lamung | 1.98E-05 | 1.61E-06 | 1.05E-05 | 4.69E-06 | 4.2E-06 | 1.45E-05 | 4.22E-06 | 1.83E-05 | 2.75E-05 | 4.69E-06 | 0.000108 | 3.28E-05 | 10620.29 | 860.66 | 5623.23 | 2511.73 | 2248.16 | 7751.12 | 2259.99 | 9825.06 | 14749.65 | 2510.93 | 57838.40 | 17568.45 |
| | Phan Thong | 2.52E-05 | 1.06E-06 | 2.9E-06 | 4.53E-06 | 7.11E-06 | 1.3E-05 | 1.15E-05 | 4.02E-05 | 2.74E-05 | 7.18E-06 | 0.000133 | 4.9E-05 | 4231.82 | 178.31 | 487.22 | 759.40 | 1192.24 | 2173.08 | 1930.03 | 6735.63 | 4603.55 | 1203.99 | 22293.30 | 8219.04 |
| | Phanat Nikhom | 1.79E-05 | 4.64E-07 | 2E-06 | 2.74E-06 | 4.53E-06 | 8.91E-06 | 7.55E-06 | 2.67E-05 | 1.92E-05 | 4.7E-06 | 9.55E-05 | 3.46E-05 | 8605.40 | 222.49 | 960.40 | 1312.25 | 2174.81 | 4273.49 | 3620.24 | 12804.42 | 9190.37 | 2253.63 | 45793.82 | 16617.66 |
| | Si Racha | 1.81E-05 | 1.74E-06 | 1.02E-05 | 8.16E-06 | 7.65E-06 | 9.9E-06 | 9.59E-06 | 3.11E-05 | 2.63E-05 | 8.15E-06 | 6.03E-05 | 2.36E-05 | 11270.15 | 1085.91 | 6343.27 | 5091.55 | 4771.60 | 6173.28 | 5980.64 | 19421.40 | 16377.08 | 5081.15 | 37600.30 | 14694.43 |
| | Ko Si Chang | 0.00037 | 0.000111 | 0.000213 | 0.000309 | 0.000327 | 0.000375 | 0.000392 | 0.000649 | 0.000442 | 0.00025 | 0.001168 | 0.000572 | 2385.87 | 716.95 | 1371.82 | 1994.26 | 2110.48 | 2416.30 | 2529.68 | 4186.27 | 2853.49 | 1611.50 | 7531.29 | 3687.94 |
| | Sattahip | 2.61E-05 | 4.29E-06 | 2.09E-05 | 2.17E-05 | 1.8E-05 | 2.38E-05 | 3.41E-05 | 5.55E-05 | 3.88E-05 | 1.83E-05 | 8.95E-05 | 4E-05 | 7360.79 | 1209.38 | 5899.98 | 6110.67 | 5087.36 | 6726.53 | 9607.33 | 15645.83 | 10949.34 | 5151.21 | 25253.61 | 11278.95 |
| | Bo Thong | 2.3E-05 | 5.72E-07 | 9.26E-06 | 4.51E-06 | 4.42E-06 | 9.82E-06 | 5.81E-06 | 1.78E-05 | 1.93E-05 | 5.25E-06 | 0.000106 | 3.36E-05 | 19129.01 | 475.91 | 7707.51 | 3755.19 | 3679.20 | 8173.26 | 4836.38 | 14802.69 | 16034.85 | 4368.82 | 88076.28 | 27994.40 |
| | Ko Chan | 2.74E-05 | 7.03E-07 | 7.74E-06 | 5.84E-06 | 6.41E-06 | 1.19E-05 | 8.28E-06 | 2.65E-05 | 2.77E-05 | 6.56E-06 | 0.000133 | 4.37E-05 | 7365.68 | 189.23 | 2083.46 | 1573.48 | 1726.31 | 3194.92 | 2230.27 | 7135.06 | 7467.68 | 1766.56 | 35878.21 | 11776.54 |

**Table C-1** Fifty percent of $NO_x$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| RAYONG | Mueang Rayong | 1.66E-05 | 5.52E-07 | 1.07E-05 | 8.62E-06 | 3.99E-06 | 7.04E-06 | 1.27E-05 | 3.32E-05 | 2.33E-05 | 6.12E-06 | 7.32E-05 | 2.32E-05 | 11168.45 | 371.99 | 7219.06 | 5809.64 | 2687.92 | 4741.88 | 8536.27 | 22376.97 | 15710.23 | 4122.13 | 49308.29 | 15668.71 |
| | Ban Khai | 1.58E-05 | 5.32E-07 | 9.58E-06 | 6.72E-06 | 3.89E-06 | 6.8E-06 | 9.54E-06 | 2.65E-05 | 2.04E-05 | 5.65E-06 | 6.52E-05 | 2.14E-05 | 7492.65 | 252.66 | 4550.85 | 3192.49 | 1847.54 | 3231.50 | 4531.21 | 12566.90 | 9705.70 | 2684.05 | 30954.31 | 10178.95 |
| | Pluak Daeng | 2.03E-05 | 7.19E-07 | 1.2E-05 | 7.31E-06 | 5.62E-06 | 8.63E-06 | 8.48E-06 | 3.28E-05 | 2.9E-05 | 7.58E-06 | 7.2E-05 | 2.51E-05 | 10763.13 | 381.06 | 6376.67 | 3872.87 | 2976.17 | 4574.76 | 4492.63 | 17388.36 | 15375.12 | 4016.60 | 38155.37 | 13296.84 |
| | Khao Chamao | 3.61E-05 | 8.5E-07 | 1.69E-05 | 5.78E-06 | 5.29E-06 | 1.57E-05 | 8.06E-06 | 2.57E-05 | 2.39E-05 | 7.2E-06 | 0.000169 | 5.12E-05 | 17206.66 | 404.44 | 8035.67 | 2753.28 | 2518.89 | 7490.75 | 3838.36 | 12221.36 | 11362.48 | 3427.84 | 80240.97 | 24373.22 |
| | Nikhom Phatthana | 3.04E-05 | 1.92E-06 | 2.03E-05 | 1.66E-05 | 1.1E-05 | 1.52E-05 | 2.47E-05 | 5.88E-05 | 4.46E-05 | 1.45E-05 | 0.000105 | 3.95E-05 | 7175.62 | 452.25 | 4802.36 | 3926.24 | 2601.01 | 3581.59 | 5826.03 | 13869.74 | 10529.93 | 3421.29 | 24718.10 | 9331.20 |
| | Klaeng | 1.3E-05 | 4.18E-07 | 7.06E-06 | 4.21E-06 | 2.22E-06 | 5.84E-06 | 4.28E-06 | 1.91E-05 | 1.46E-05 | 2.75E-06 | 6.73E-05 | 1.88E-05 | 9585.94 | 307.32 | 5191.11 | 3092.61 | 1633.67 | 4291.20 | 3148.63 | 14070.92 | 10762.08 | 2018.15 | 49438.57 | 13848.46 |
| | Ban Chang | 2.75E-05 | 2.26E-06 | 2.02E-05 | 1.98E-05 | 1.18E-05 | 1.54E-05 | 3.31E-05 | 6.18E-05 | 4.13E-05 | 1.57E-05 | 9.37E-05 | 3.8E-05 | 4490.74 | 368.78 | 3304.97 | 3227.89 | 1934.38 | 2516.04 | 5403.66 | 10080.80 | 6735.47 | 2567.80 | 15303.80 | 6200.10 |
| | Wang Chan | 2.77E-05 | 6.21E-07 | 1.38E-05 | 5.9E-06 | 4.52E-06 | 1.18E-05 | 7.91E-06 | 2.52E-05 | 2.26E-05 | 6.39E-06 | 0.000127 | 3.91E-05 | 10330.93 | 231.75 | 5135.11 | 2200.44 | 1687.48 | 4417.63 | 2951.23 | 9403.48 | 8438.67 | 2384.43 | 47567.34 | 14611.62 |
| CHANTHABURI | Mueang Chanthaburi | 4.31E-05 | 1.77E-06 | 1.79E-05 | 4.5E-06 | 6.08E-06 | 1.85E-05 | 8.21E-06 | 3.79E-05 | 2.6E-05 | 4.8E-06 | 0.000158 | 4.6E-05 | 12188.68 | 499.75 | 5054.61 | 1272.73 | 1719.41 | 5236.89 | 2319.37 | 10703.97 | 7349.41 | 1356.42 | 44706.96 | 12991.27 |
| | Khlung | 1.58E-05 | 9.44E-07 | 6.92E-06 | 3.05E-06 | 2.96E-06 | 8.22E-06 | 3.95E-06 | 1.22E-05 | 1.49E-05 | 2.67E-06 | 5.98E-05 | 1.78E-05 | 12431.48 | 741.41 | 5431.45 | 2397.94 | 2324.64 | 6455.94 | 3098.84 | 9545.49 | 11668.53 | 2095.31 | 46927.97 | 13956.48 |
| | Tha Mai | 2.67E-05 | 1.12E-06 | 1.16E-05 | 3.84E-06 | 3.95E-06 | 1.19E-05 | 5.44E-06 | 2.39E-05 | 1.77E-05 | 3.73E-06 | 0.000107 | 3.12E-05 | 16686.95 | 703.80 | 7272.47 | 2404.50 | 2471.88 | 7422.65 | 3403.39 | 14987.44 | 11074.14 | 2335.32 | 67244.25 | 19539.83 |
| | Pong Nam Ron | 2.07E-05 | 1.23E-06 | 8.06E-06 | 3.6E-06 | 3.22E-06 | 1.11E-05 | 3.24E-06 | 1.41E-05 | 2.12E-05 | 3.6E-06 | 8.29E-05 | 2.52E-05 | 21075.00 | 1255.56 | 8202.19 | 3664.17 | 3279.42 | 11306.90 | 3296.08 | 14331.95 | 21516.46 | 3662.75 | 84363.06 | 25626.02 |
| | Makham | 2.63E-05 | 1.27E-06 | 1.08E-05 | 3.66E-06 | 3.96E-06 | 1.24E-05 | 5.06E-06 | 2.01E-05 | 2.02E-05 | 3.68E-06 | 0.000101 | 2.98E-05 | 11685.71 | 566.70 | 4794.39 | 1628.73 | 1762.97 | 5509.25 | 2254.05 | 8957.40 | 9006.87 | 1640.08 | 45034.52 | 13268.82 |
| | Laem Sing | 5.63E-05 | 3.22E-06 | 2.63E-05 | 1.1E-05 | 1.11E-05 | 2.85E-05 | 1.5E-05 | 5.31E-05 | 4.21E-05 | 9.03E-06 | 0.000205 | 6.23E-05 | 9608.59 | 550.63 | 4497.83 | 1876.23 | 1898.18 | 4869.25 | 2554.70 | 9062.01 | 7181.97 | 1541.74 | 35094.92 | 10639.27 |
| | Soi Dao | 2.08E-05 | 1.13E-06 | 8.78E-06 | 4.66E-06 | 3.81E-06 | 1.04E-05 | 4.12E-06 | 1.5E-05 | 1.45E-05 | 4.77E-06 | 9.07E-05 | 2.82E-05 | 16720.21 | 903.60 | 7045.31 | 3739.30 | 3058.88 | 8369.26 | 3302.67 | 12016.82 | 11658.01 | 3826.86 | 72808.25 | 22622.68 |
| | Kaeng Hang Maeo | 1.56E-05 | 6.17E-07 | 6.97E-06 | 2.97E-06 | 2.56E-06 | 7.14E-06 | 3.26E-06 | 1.05E-05 | 9.47E-06 | 3.24E-06 | 7.14E-05 | 2.17E-05 | 19003.96 | 750.47 | 8482.54 | 3612.61 | 3113.74 | 8681.68 | 3969.73 | 12745.61 | 11524.76 | 3936.42 | 86892.27 | 26368.01 |
| | Na Yai Am | 3.58E-05 | 1.59E-06 | 1.72E-05 | 7.84E-06 | 6.12E-06 | 1.69E-05 | 8.98E-06 | 3.83E-05 | 2.88E-05 | 6.13E-06 | 0.000157 | 4.56E-05 | 10231.73 | 456.33 | 4931.34 | 2244.26 | 1750.72 | 4823.96 | 2568.12 | 10959.96 | 8227.21 | 1753.92 | 44982.42 | 13034.39 |
| | Khao Khitchakut | 2.37E-05 | 1.19E-06 | 1.02E-05 | 3.73E-06 | 3.56E-06 | 1.12E-05 | 4.34E-06 | 1.62E-05 | 1.48E-05 | 4.32E-06 | 0.000103 | 3.05E-05 | 18501.55 | 927.44 | 7983.77 | 2915.14 | 2779.40 | 8744.93 | 3391.99 | 12652.59 | 11527.70 | 3376.86 | 80387.73 | 23797.82 |
| TRAT | Mueang Trat | 1.53E-05 | 8.78E-07 | 6.62E-06 | 2.11E-06 | 1.99E-06 | 7.19E-06 | 2.76E-06 | 1.27E-05 | 1.61E-05 | 2.28E-06 | 6.03E-05 | 1.57E-05 | 14524.99 | 832.00 | 6266.10 | 1997.15 | 1884.81 | 6811.07 | 2618.76 | 12016.13 | 15261.90 | 2162.67 | 57098.55 | 14838.60 |
| | Khlong Yai | 0.000119 | 1.67E-05 | 4.85E-05 | 2.16E-05 | 1.66E-05 | 6.52E-05 | 2.09E-05 | 0.000115 | 9.77E-05 | 1.66E-05 | 0.000336 | 9E-05 | 9401.69 | 1323.88 | 3843.81 | 1710.74 | 1313.71 | 5166.72 | 1653.69 | 9114.27 | 7738.24 | 1314.56 | 26625.55 | 7130.24 |
| | Khao Saming | 1.83E-05 | 1.07E-06 | 7.62E-06 | 3.4E-06 | 3.17E-06 | 9.33E-06 | 4.45E-06 | 1.24E-05 | 2.01E-05 | 3.05E-06 | 7.07E-05 | 2.02E-05 | 11875.59 | 694.08 | 4954.12 | 2208.97 | 2062.44 | 6068.23 | 2893.18 | 8084.48 | 13101.35 | 1981.23 | 45990.37 | 13120.92 |
| | Bo Rai | 3.56E-05 | 1.65E-06 | 1.17E-05 | 4.74E-06 | 4.45E-06 | 1.64E-05 | 6.89E-06 | 1.68E-05 | 4.28E-05 | 4.62E-06 | 0.000139 | 3.87E-05 | 24150.41 | 1118.94 | 7947.11 | 3212.25 | 3017.03 | 11136.38 | 4673.41 | 11399.94 | 29066.94 | 3133.13 | 94403.45 | 26220.53 |
| | Laem Ngop | 4.6E-05 | 4.27E-06 | 2.53E-05 | 1.3E-05 | 1.15E-05 | 2.82E-05 | 1.45E-05 | 4.73E-05 | 5.04E-05 | 1.13E-05 | 0.000179 | 5.07E-05 | 7637.46 | 709.92 | 4202.83 | 2156.41 | 1904.78 | 4680.68 | 2410.98 | 7856.15 | 8371.28 | 1878.46 | 29765.50 | 8433.40 |
| | Ko Kut | 5.31E-05 | 2.32E-05 | 3.73E-05 | 4.2E-05 | 3.37E-05 | 7.19E-05 | 3.24E-05 | 8.06E-05 | 8.64E-05 | 3.63E-05 | 0.00016 | 3.88E-05 | 6903.24 | 3018.35 | 4850.82 | 5454.02 | 4376.59 | 9343.37 | 4211.37 | 10473.22 | 11230.45 | 4709.49 | 20754.16 | 5034.77 |
| | Ko Chang | 4.82E-05 | 6.66E-06 | 2.9E-05 | 1.9E-05 | 1.6E-05 | 3.57E-05 | 1.93E-05 | 5.36E-05 | 5.58E-05 | 1.54E-05 | 0.000176 | 5.23E-05 | 10566.22 | 1460.41 | 6355.43 | 4156.29 | 3499.59 | 7837.27 | 4224.96 | 11759.24 | 12223.25 | 3372.03 | 38574.59 | 11468.17 |

**Table C-1** Fifty percent of $NO_x$ maximum emission load from box model for the Eastern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHACHAENGSAO | Mueang Chachoengsao | 2.29E-05 | 1.34E-06 | 4.27E-06 | 5.04E-06 | 6.63E-06 | 1.03E-05 | 8.8E-06 | 3.63E-05 | 2.31E-05 | 6.47E-06 | 0.000124 | 4.01E-05 | 8807.68 | 514.80 | 1643.05 | 1941.65 | 2553.73 | 3973.78 | 3388.13 | 13986.85 | 8883.11 | 2493.35 | 47878.59 | 15443.73 |
| | Bang Khla | 2.96E-05 | 1.17E-06 | 5.56E-06 | 6.33E-06 | 8.74E-06 | 1.39E-05 | 1.11E-05 | 4.63E-05 | 2.96E-05 | 8.2E-06 | 0.000166 | 5.09E-05 | 6978.60 | 276.12 | 1309.06 | 1491.65 | 2059.43 | 3277.74 | 2604.51 | 10912.41 | 6980.17 | 1930.95 | 39129.68 | 11981.29 |
| | Bang Nam Priao | 1.65E-05 | 8.35E-07 | 3.95E-06 | 4.12E-06 | 5.26E-06 | 7.38E-06 | 5.71E-06 | 2.71E-05 | 1.56E-05 | 4.75E-06 | 9.49E-05 | 2.63E-05 | 8187.48 | 415.11 | 1961.75 | 2046.99 | 2615.04 | 3670.75 | 2841.26 | 13464.32 | 7735.33 | 2360.94 | 47172.59 | 13085.13 |
| | Bang Pakong | 1.99E-05 | 1.83E-06 | 3.9E-06 | 5.19E-06 | 6.49E-06 | 9.72E-06 | 9.23E-06 | 3.31E-05 | 2.11E-05 | 6.4E-06 | 0.0001 | 3.61E-05 | 5176.90 | 476.72 | 1015.97 | 1350.46 | 1690.19 | 2531.01 | 2402.11 | 8607.88 | 5480.60 | 1665.07 | 26130.78 | 9406.40 |
| | Ban Pho | 2.67E-05 | 1.08E-06 | 2.99E-06 | 4.54E-06 | 7.14E-06 | 1.3E-05 | 1.13E-05 | 4.22E-05 | 2.81E-05 | 7.25E-06 | 0.000144 | 5.12E-05 | 5635.49 | 227.78 | 632.37 | 959.22 | 1508.63 | 2739.25 | 2389.63 | 8905.92 | 5939.30 | 1531.41 | 30478.43 | 10806.56 |
| | Phanom Sarakham | 1.92E-05 | 6.93E-07 | 4.7E-06 | 4.57E-06 | 5.28E-06 | 8.64E-06 | 6.12E-06 | 2.17E-05 | 1.84E-05 | 4.87E-06 | 0.000101 | 3.1E-05 | 9802.82 | 354.18 | 2400.45 | 2337.18 | 2701.18 | 4418.14 | 3127.85 | 11098.85 | 9414.64 | 2491.82 | 51692.37 | 15837.32 |
| | Ratchasan | 4.1E-05 | 1.73E-06 | 9.01E-06 | 9.59E-06 | 1.24E-05 | 1.89E-05 | 1.44E-05 | 6.19E-05 | 4.01E-05 | 1.13E-05 | 0.000231 | 6.74E-05 | 5937.84 | 250.36 | 1304.23 | 1388.81 | 1801.70 | 2730.38 | 2089.97 | 8965.28 | 5804.01 | 1641.39 | 33388.65 | 9761.34 |
| | Sanam Chai Khet | 1.3E-05 | 4.04E-07 | 4.19E-06 | 3.55E-06 | 3.19E-06 | 5.49E-06 | 3.29E-06 | 8.02E-06 | 1.12E-05 | 2.99E-06 | 6.33E-05 | 1.97E-05 | 13888.43 | 430.59 | 4465.21 | 3783.44 | 3403.24 | 5852.53 | 3506.09 | 8552.99 | 11988.02 | 3190.26 | 67469.64 | 20961.03 |
| | Plaeng Yao | 3.78E-05 | 1.03E-06 | 7.47E-06 | 7.32E-06 | 9.42E-06 | 1.72E-05 | 1.32E-05 | 4.45E-05 | 3.9E-05 | 9.26E-06 | 0.000195 | 6.55E-05 | 12384.30 | 339.02 | 2448.81 | 2399.91 | 3087.47 | 5652.12 | 4312.16 | 14576.19 | 12786.47 | 3037.50 | 64099.59 | 21473.56 |
| | Tha Takiap | 1.68E-05 | 5.39E-07 | 6.23E-06 | 4.37E-06 | 3.67E-06 | 7.08E-06 | 3.88E-06 | 9.1E-06 | 1.3E-05 | 3.76E-06 | 7.92E-05 | 2.47E-05 | 23897.09 | 766.48 | 8869.36 | 6219.32 | 5216.21 | 10071.76 | 5522.51 | 12947.05 | 18528.55 | 5355.97 | 112725.45 | 35166.23 |
| | Khlong Khuean | 4.41E-05 | 1.94E-06 | 9.23E-06 | 1.01E-05 | 1.35E-05 | 2.03E-05 | 1.59E-05 | 7.02E-05 | 4.3E-05 | 1.24E-05 | 0.000251 | 7.34E-05 | 4727.41 | 207.81 | 989.51 | 1084.00 | 1444.86 | 2180.46 | 1707.44 | 7517.99 | 4608.72 | 1327.91 | 26855.86 | 7867.00 |
| PRACHIN BURI | Mueang Prachin Buri | 2.14E-05 | 1.38E-06 | 6.38E-06 | 6.04E-06 | 6.93E-06 | 1.01E-05 | 6.96E-06 | 2.93E-05 | 1.97E-05 | 6.2E-06 | 0.000116 | 3.32E-05 | 10156.68 | 652.48 | 3024.09 | 2864.28 | 3285.78 | 4779.70 | 3296.83 | 13909.86 | 9320.35 | 2936.75 | 54779.99 | 15734.94 |
| | Kabin Buri | 1.35E-05 | 7.76E-07 | 5.17E-06 | 4.36E-06 | 4.02E-06 | 6.9E-06 | 3.78E-06 | 1.06E-05 | 8.59E-06 | 4.02E-06 | 6.33E-05 | 1.94E-05 | 18889.01 | 1089.60 | 7259.64 | 6113.79 | 5648.21 | 9680.55 | 5307.68 | 14913.78 | 12064.66 | 5645.52 | 88928.37 | 27238.31 |
| | Na Di | 1.8E-05 | 1.81E-06 | 7.01E-06 | 6.16E-06 | 5.76E-06 | 1.03E-05 | 5.27E-06 | 1.52E-05 | 1.22E-05 | 5.84E-06 | 8.27E-05 | 2.55E-05 | 21641.81 | 2180.75 | 8439.81 | 7419.51 | 6930.38 | 12409.32 | 6346.05 | 18347.28 | 14722.53 | 7031.65 | 99588.75 | 30646.50 |
| | Ban Sang | 2.09E-05 | 9.87E-07 | 5.54E-06 | 5.55E-06 | 7.07E-06 | 9.83E-06 | 7.12E-06 | 3.46E-05 | 1.97E-05 | 6.2E-06 | 0.000122 | 3.17E-05 | 7784.76 | 368.10 | 2068.47 | 2070.20 | 2638.85 | 3666.31 | 2656.09 | 12914.26 | 7346.39 | 2315.20 | 45448.92 | 11811.16 |
| | Prachantakham | 1.78E-05 | 1.81E-06 | 6.31E-06 | 5.58E-06 | 5.63E-06 | 9.39E-06 | 5.21E-06 | 1.68E-05 | 1.59E-05 | 5.24E-06 | 8.46E-05 | 2.61E-05 | 16841.83 | 1717.33 | 5976.27 | 5284.32 | 5330.26 | 8898.46 | 4940.09 | 15870.66 | 15109.42 | 4967.86 | 80104.38 | 24691.31 |
| | Si Maha Phot | 2.77E-05 | 1.35E-06 | 8.07E-06 | 7.45E-06 | 8.11E-06 | 1.3E-05 | 8.34E-06 | 2.88E-05 | 2.46E-05 | 7.38E-06 | 0.000143 | 4.23E-05 | 13319.63 | 649.65 | 3886.47 | 3588.62 | 3906.05 | 6253.89 | 4016.57 | 13852.22 | 11845.84 | 3551.97 | 68697.13 | 20382.95 |
| | Si Mahosot | 4.95E-05 | 2.39E-06 | 1.3E-05 | 1.28E-05 | 1.51E-05 | 2.3E-05 | 1.6E-05 | 6.44E-05 | 4.68E-05 | 1.35E-05 | 0.000269 | 7.75E-05 | 6990.31 | 337.31 | 1837.45 | 1804.03 | 2139.23 | 3250.07 | 2265.01 | 9102.74 | 6618.80 | 1908.31 | 38077.05 | 10950.73 |
| SA KAEO | Mueang Sa Kaeo | 9.47E-06 | 7.91E-07 | 4.03E-06 | 3.54E-06 | 3.07E-06 | 5.68E-06 | 2.86E-06 | 8.04E-06 | 3.61E-06 | 3.44E-06 | 4.32E-05 | 1.31E-05 | 13206.42 | 1103.23 | 5624.75 | 4942.90 | 4279.57 | 7923.88 | 3987.43 | 11218.54 | 5034.96 | 4793.89 | 60285.16 | 18267.35 |
| | Khlong Hat | 2.99E-05 | 1.96E-06 | 1.27E-05 | 1.11E-05 | 7.7E-06 | 1.51E-05 | 8.38E-06 | 2.61E-05 | 1.46E-05 | 1.01E-05 | 0.000135 | 4.42E-05 | 14478.62 | 947.59 | 6126.35 | 5360.03 | 3726.17 | 7282.62 | 4054.06 | 12624.50 | 7060.80 | 4867.77 | 65428.28 | 21386.86 |
| | Ta Phraya | 1.27E-05 | 4.41E-06 | 5.82E-06 | 8.7E-06 | 4.39E-06 | 1.23E-05 | 4.42E-06 | 1.52E-05 | 8.22E-06 | 7.01E-06 | 6.05E-05 | 1.76E-05 | 12271.67 | 4279.43 | 5641.66 | 8432.89 | 4254.71 | 11885.66 | 4288.37 | 14747.29 | 7967.26 | 6793.65 | 58667.53 | 17093.04 |
| | Wang Nam Yen | 1.86E-05 | 9.41E-07 | 9.05E-06 | 8.09E-06 | 5.24E-06 | 9.39E-06 | 5.24E-06 | 1.37E-05 | 6.84E-06 | 6.45E-06 | 8.27E-05 | 2.89E-05 | 8037.97 | 406.44 | 3910.64 | 3494.14 | 2264.34 | 4055.34 | 2262.13 | 5916.13 | 2954.51 | 2784.79 | 35701.10 | 12494.29 |
| | Watthana Nakhon | 9.6E-06 | 2.68E-06 | 4.21E-06 | 6.21E-06 | 3.18E-06 | 8.03E-06 | 3.31E-06 | 1.09E-05 | 2.86E-06 | 5.19E-06 | 4.52E-05 | 1.36E-05 | 14507.55 | 4048.69 | 6362.21 | 9388.65 | 4808.07 | 12132.67 | 5007.08 | 16470.84 | 4328.56 | 7850.60 | 68305.98 | 20563.98 |
| | Aranyaprathet | 1.34E-05 | 2.65E-06 | 5.13E-06 | 7E-06 | 3.94E-06 | 8.97E-06 | 4.59E-06 | 1.57E-05 | 5.99E-06 | 6.31E-06 | 6.4E-05 | 1.94E-05 | 9878.09 | 1950.85 | 3774.05 | 5142.58 | 2897.67 | 6595.74 | 3371.67 | 11513.17 | 4405.78 | 4635.87 | 47058.06 | 14286.34 |
| | Khok Sung | 3.08E-05 | 1.26E-05 | 1.38E-05 | 2.47E-05 | 1.06E-05 | 3.12E-05 | 1.14E-05 | 4.03E-05 | 1.06E-05 | 1.98E-05 | 0.000148 | 4.98E-05 | 10517.63 | 4283.65 | 4699.65 | 8419.32 | 3632.92 | 10644.51 | 3897.45 | 13748.62 | 3609.90 | 6753.10 | 50595.91 | 16987.09 |
| | Khao Chakan | 1.44E-05 | 8.33E-07 | 6.5E-06 | 5.79E-06 | 4.06E-06 | 7.37E-06 | 4.04E-06 | 1.07E-05 | 6.15E-06 | 4.85E-06 | 6.5E-05 | 1.89E-05 | 6653.52 | 385.28 | 3007.36 | 2678.64 | 1880.86 | 3410.49 | 1870.81 | 4963.48 | 2844.11 | 2243.56 | 30080.23 | 8750.62 |
| | Wang Sombun | 1.86E-05 | 8.9E-07 | 8.5E-06 | 6.63E-06 | 4.58E-06 | 9.07E-06 | 4.77E-06 | 1.35E-05 | 8.9E-06 | 5.67E-06 | 8.3E-05 | 2.78E-05 | 9314.47 | 445.87 | 4257.99 | 3321.44 | 2293.56 | 4544.00 | 2388.29 | 6779.65 | 4454.03 | 2838.20 | 41579.90 | 13936.71 |

# APPENDIX D

# $SO_2$ AND $NO_2$ CONCENTRATION FOR THE EASTERN REGION OF THAILAND

**Table D-1** $SO_2$ concentration from screen view for the Eastern Region of each month in 2010

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 200.40 | 20.68 | 53.52 | 73.03 | 81.79 | 70.23 | 73.33 | 209.70 | 252.90 | 82.71 | 593.20 | 196.00 |
| | Ban Bueng | 216.90 | 11.01 | 76.54 | 66.69 | 68.14 | 64.55 | 59.03 | 208.20 | 300.20 | 81.51 | 586.90 | 185.20 |
| | Nong Yai | 260.60 | 6.13 | 104.20 | 63.98 | 56.29 | 68.00 | 54.19 | 189.30 | 299.60 | 78.98 | 733.60 | 209.40 |
| | Bang Lamung | 212.20 | 16.19 | 92.60 | 50.19 | 44.92 | 95.73 | 30.58 | 125.70 | 314.40 | 53.52 | 782.60 | 206.30 |
| | Phan Thong | 270.10 | 10.72 | 25.63 | 48.46 | 76.08 | 85.72 | 83.41 | 275.20 | 313.40 | 81.96 | 963.50 | 308.30 |
| | Phanat Nikhom | 192.10 | 4.68 | 17.67 | 29.29 | 48.54 | 58.95 | 54.72 | 183.00 | 218.80 | 53.65 | 692.10 | 218.00 |
| | Si Racha | 193.40 | 17.55 | 89.73 | 87.39 | 81.90 | 65.50 | 69.52 | 213.50 | 299.90 | 93.03 | 437.10 | 148.30 |
| | Ko Si Chang | 1688.00 | 507.30 | 880.40 | 1448.00 | 1456.00 | 1258.00 | 1369.00 | 2222.00 | 2461.00 | 1348.00 | 3583.00 | 1668.00 |
| | Sattahip | 263.00 | 33.72 | 143.40 | 151.20 | 125.90 | 145.30 | 201.30 | 343.40 | 370.10 | 208.50 | 752.80 | 321.40 |
| | Bo Thong | 246.00 | 5.76 | 81.68 | 48.28 | 47.31 | 64.96 | 42.11 | 121.90 | 219.90 | 59.92 | 766.90 | 211.60 |
| | Ko Chan | 292.90 | 7.09 | 68.28 | 62.57 | 68.65 | 78.53 | 60.06 | 181.70 | 316.80 | 74.93 | 966.20 | 275.30 |

**Table D-1** $SO_2$ concentration from screen view for the Eastern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| RAYONG | Mueang Rayong | 302.00 | 5.73 | 99.45 | 92.28 | 33.54 | 37.65 | 71.64 | 175.30 | 249.50 | 124.90 | 1409.00 | 401.80 |
| | Ban Khai | 287.50 | 5.52 | 88.96 | 71.96 | 32.71 | 36.41 | 53.96 | 139.70 | 218.80 | 115.40 | 1255.00 | 370.50 |
| | Pluak Daeng | 370.00 | 7.47 | 111.70 | 78.23 | 47.22 | 46.19 | 47.94 | 173.20 | 310.60 | 154.80 | 1387.00 | 433.70 |
| | Khao Chamao | 658.70 | 8.82 | 156.70 | 61.92 | 44.50 | 84.21 | 45.61 | 135.60 | 255.50 | 147.10 | 3247.00 | 885.10 |
| | Nikhom Phatthana | 554.00 | 19.89 | 188.90 | 178.10 | 92.68 | 81.20 | 139.60 | 310.30 | 477.60 | 296.00 | 2017.00 | 683.40 |
| | Klaeng | 237.70 | 4.34 | 65.57 | 45.04 | 18.69 | 31.24 | 24.23 | 101.10 | 156.80 | 56.07 | 1296.00 | 325.70 |
| | Ban Chang | 501.30 | 23.45 | 188.00 | 211.70 | 99.65 | 82.47 | 187.20 | 326.00 | 441.70 | 321.20 | 1806.00 | 656.50 |
| | Wang Chan | 504.30 | 6.45 | 127.70 | 63.11 | 38.02 | 63.33 | 44.72 | 133.00 | 242.00 | 130.50 | 2455.00 | 676.60 |
| CHANTHABURI | Mueang Chanthaburi | 1353.00 | 55.49 | 561.20 | 141.30 | 190.90 | 581.50 | 257.50 | 1189.00 | 816.00 | 150.60 | 3047.00 | 755.60 |
| | Khlung | 496.90 | 29.63 | 217.10 | 95.85 | 92.92 | 258.00 | 123.90 | 381.50 | 466.40 | 83.75 | 1151.00 | 292.20 |
| | Tha Mai | 836.70 | 35.29 | 364.70 | 120.60 | 123.90 | 372.20 | 170.70 | 751.50 | 555.30 | 117.10 | 2069.00 | 513.20 |
| | Pong Nam Ron | 650.20 | 38.73 | 253.00 | 113.00 | 101.20 | 348.80 | 101.70 | 442.10 | 663.80 | 113.00 | 1597.00 | 414.10 |
| | Makham | 823.90 | 39.96 | 338.00 | 114.80 | 124.30 | 388.50 | 158.90 | 631.60 | 635.10 | 115.60 | 1949.00 | 490.00 |
| | Laem Sing | 1766.00 | 101.20 | 826.50 | 344.80 | 348.80 | 894.70 | 469.40 | 1665.00 | 1320.00 | 283.30 | 3958.00 | 1024.00 |
| | Soi Dao | 653.90 | 35.34 | 275.50 | 146.20 | 119.60 | 327.30 | 129.20 | 469.90 | 455.90 | 149.70 | 1748.00 | 463.40 |
| | Kaeng Hang Maeo | 490.20 | 19.36 | 218.80 | 93.18 | 80.31 | 223.90 | 102.40 | 328.70 | 297.20 | 101.50 | 1376.00 | 356.20 |
| | Na Yai Am | 1122.00 | 50.05 | 540.90 | 246.20 | 192.00 | 529.10 | 281.70 | 1202.00 | 902.40 | 192.40 | 3028.00 | 748.90 |
| | Khao Khitchakut | 743.40 | 37.27 | 320.80 | 117.10 | 111.70 | 351.40 | 136.30 | 508.40 | 463.20 | 135.70 | 1983.00 | 500.90 |
| TRAT | Mueang Trat | 279.40 | 16.01 | 120.50 | 40.61 | 36.26 | 131.00 | 43.32 | 181.80 | 373.50 | 61.02 | 1098.00 | 245.50 |
| | Khlong Yai | 2098.00 | 295.50 | 857.90 | 402.80 | 293.20 | 1153.00 | 319.20 | 1614.00 | 2179.00 | 424.60 | 5943.00 | 1376.00 |
| | Khao Saming | 332.70 | 19.45 | 138.80 | 65.42 | 57.79 | 170.00 | 69.71 | 178.10 | 467.00 | 81.42 | 1289.00 | 316.10 |
| | Bo Rai | 648.70 | 30.06 | 213.50 | 91.21 | 81.04 | 299.10 | 107.90 | 240.80 | 993.40 | 123.40 | 2536.00 | 605.70 |
| | Laem Ngop | 837.30 | 77.83 | 460.80 | 249.90 | 208.80 | 513.10 | 227.30 | 677.20 | 1168.00 | 302.00 | 3263.00 | 795.00 |
| | Ko Kut | 968.30 | 423.40 | 680.40 | 808.70 | 613.90 | 1311.00 | 508.00 | 1155.00 | 2004.00 | 968.90 | 2911.00 | 607.30 |
| | Ko Chang | 878.20 | 121.40 | 528.20 | 365.10 | 290.80 | 651.40 | 301.90 | 768.50 | 1293.00 | 411.00 | 3206.00 | 819.60 |

**Table D-1** $SO_2$ concentration from screen view for the Eastern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHACHAENGSAO | Mueang Chachoengsao | 717.80 | 41.95 | 133.90 | 158.20 | 208.10 | 323.80 | 276.10 | 1140.00 | 723.90 | 203.20 | 2395.00 | 628.40 |
| | Bang Khla | 929.60 | 36.78 | 174.40 | 198.70 | 274.30 | 436.60 | 346.90 | 1454.00 | 929.80 | 257.20 | 3199.00 | 796.80 |
| | Bang Nam Priao | 516.80 | 26.20 | 123.80 | 129.20 | 165.10 | 231.70 | 179.30 | 849.90 | 488.30 | 149.00 | 1828.00 | 412.40 |
| | Bang Pakong | 624.00 | 57.46 | 122.50 | 162.80 | 203.70 | 305.10 | 289.50 | 1038.00 | 660.60 | 200.70 | 1933.00 | 566.10 |
| | Ban Pho | 837.20 | 33.84 | 93.95 | 142.50 | 224.10 | 407.00 | 355.00 | 1323.00 | 882.40 | 227.50 | 2779.00 | 801.60 |
| | Phanom Sarakham | 601.70 | 21.74 | 147.40 | 143.50 | 165.80 | 271.20 | 192.00 | 681.30 | 577.90 | 153.00 | 1948.00 | 485.40 |
| | Ratchasan | 1287.00 | 54.27 | 282.70 | 301.10 | 390.60 | 591.90 | 453.10 | 1943.00 | 1258.00 | 355.80 | 4442.00 | 1057.00 |
| | Sanam Chai Khet | 408.60 | 12.67 | 131.40 | 111.30 | 100.10 | 172.20 | 103.20 | 251.70 | 352.70 | 93.87 | 1218.00 | 307.90 |
| | Plaeng Yao | 1185.00 | 32.45 | 234.40 | 229.70 | 295.50 | 541.00 | 412.70 | 1395.00 | 1224.00 | 290.70 | 3765.00 | 1026.00 |
| | Tha Takiap | 527.20 | 16.91 | 195.70 | 137.20 | 115.10 | 222.20 | 121.80 | 285.60 | 408.70 | 118.20 | 1526.00 | 387.30 |
| | Khlong Khuean | 1384.00 | 60.85 | 289.80 | 317.40 | 423.10 | 638.50 | 500.00 | 2201.00 | 1350.00 | 388.90 | 4827.00 | 1150.00 |
| PRACHIN BURI | Mueang Prachin Buri | 672.50 | 43.20 | 200.20 | 189.70 | 217.60 | 316.50 | 218.30 | 921.00 | 617.10 | 194.50 | 2226.00 | 520.20 |
| | Kabin Buri | 422.30 | 24.36 | 162.30 | 136.70 | 126.30 | 216.40 | 118.70 | 333.40 | 269.70 | 126.20 | 1220.00 | 304.00 |
| | Na Di | 564.00 | 56.84 | 220.00 | 193.40 | 180.60 | 323.40 | 165.40 | 478.20 | 383.70 | 183.30 | 1593.00 | 398.80 |
| | Ban Sang | 654.80 | 30.96 | 174.00 | 174.10 | 221.90 | 308.40 | 223.40 | 1086.00 | 617.90 | 194.70 | 2346.00 | 496.00 |
| | Prachantakham | 557.90 | 56.89 | 198.00 | 175.10 | 176.60 | 294.80 | 163.70 | 525.80 | 500.50 | 164.60 | 1629.00 | 408.40 |
| | Si Maha Phot | 868.00 | 42.34 | 253.30 | 233.90 | 254.50 | 407.50 | 261.70 | 902.70 | 771.90 | 231.50 | 2748.00 | 663.20 |
| | Si Mahosot | 1552.00 | 74.90 | 408.00 | 400.60 | 475.00 | 721.60 | 502.90 | 2021.00 | 1470.00 | 423.70 | 5189.00 | 1214.00 |
| SA KAEO | Mueang Sa Kaeo | 273.50 | 17.18 | 73.48 | 76.98 | 96.29 | 123.40 | 58.38 | 139.00 | 113.30 | 107.90 | 1002.00 | 267.50 |
| | Khlong Hat | 864.50 | 42.54 | 230.70 | 240.60 | 241.70 | 327.00 | 171.10 | 451.00 | 458.00 | 315.70 | 3135.00 | 902.70 |
| | Ta Phraya | 365.60 | 95.86 | 106.00 | 188.90 | 137.70 | 266.20 | 90.32 | 262.90 | 257.90 | 219.90 | 1403.00 | 360.00 |
| | Wang Nam Yen | 537.60 | 20.44 | 165.00 | 175.70 | 164.50 | 203.90 | 107.00 | 236.80 | 214.70 | 202.30 | 1916.00 | 590.80 |
| | Watthana Nakhon | 277.30 | 58.18 | 76.70 | 134.90 | 99.83 | 174.40 | 67.65 | 188.40 | 89.88 | 163.00 | 1048.00 | 277.80 |
| | Aranyaprathet | 388.20 | 57.65 | 93.56 | 152.00 | 123.70 | 194.90 | 93.68 | 270.70 | 188.10 | 197.90 | 1484.00 | 396.90 |
| | Khok Sung | 890.60 | 272.70 | 251.00 | 536.10 | 334.20 | 677.80 | 233.30 | 696.60 | 332.10 | 621.20 | 3439.00 | 1017.00 |
| | Khao Chakan | 415.30 | 18.08 | 118.40 | 125.70 | 127.50 | 160.10 | 82.56 | 185.40 | 192.90 | 152.10 | 1507.00 | 386.20 |
| | Wang Sombun | 537.40 | 19.34 | 154.90 | 144.10 | 143.70 | 197.10 | 97.40 | 234.00 | 279.20 | 177.90 | 1925.00 | 568.40 |

**Table D-2** $NO_2$ concentration from screen view for the Eastern Region of each month in 2010

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHON BURI | Mueang Chon Buri | 71.60 | 7.39 | 19.13 | 26.10 | 29.23 | 25.10 | 26.20 | 74.95 | 90.38 | 29.55 | 212.00 | 70.03 |
| | Ban Bueng | 77.52 | 3.93 | 27.35 | 23.83 | 24.35 | 23.07 | 21.09 | 74.38 | 107.30 | 29.13 | 209.70 | 66.17 |
| | Nong Yai | 93.13 | 2.19 | 37.25 | 22.86 | 20.12 | 24.30 | 19.37 | 67.63 | 107.10 | 28.22 | 262.20 | 74.83 |
| | Bang Lamung | 75.83 | 5.79 | 33.09 | 17.93 | 16.05 | 34.21 | 10.93 | 44.92 | 112.30 | 19.12 | 279.70 | 73.73 |
| | Phan Thong | 96.50 | 3.83 | 9.16 | 17.32 | 27.19 | 30.63 | 29.81 | 98.35 | 112.00 | 29.29 | 344.30 | 110.20 |
| | Phanat Nikhom | 68.63 | 1.67 | 6.31 | 10.47 | 17.34 | 21.07 | 19.55 | 65.39 | 78.18 | 19.17 | 247.30 | 77.90 |
| | Si Racha | 69.13 | 6.27 | 32.07 | 31.23 | 29.27 | 23.40 | 24.84 | 76.28 | 107.20 | 33.24 | 156.20 | 52.98 |
| | Ko Si Chang | 603.30 | 181.30 | 314.60 | 517.50 | 520.30 | 449.60 | 489.10 | 793.90 | 879.40 | 481.60 | 1280.00 | 596.20 |
| | Sattahip | 93.99 | 12.05 | 51.23 | 54.04 | 44.99 | 51.94 | 71.93 | 122.70 | 132.30 | 74.51 | 269.00 | 114.80 |
| | Bo Thong | 87.89 | 2.06 | 29.19 | 17.25 | 16.90 | 23.21 | 15.05 | 43.55 | 78.59 | 21.41 | 274.10 | 75.61 |
| | Ko Chan | 104.70 | 2.53 | 24.40 | 22.36 | 24.53 | 28.06 | 21.46 | 64.92 | 113.20 | 26.78 | 345.30 | 98.37 |
| RAYONG | Mueang Rayong | 107.90 | 2.05 | 35.54 | 32.97 | 11.98 | 13.45 | 25.60 | 62.64 | 89.17 | 44.63 | 503.60 | 143.60 |
| | Ban Khai | 102.70 | 1.97 | 31.79 | 25.71 | 11.69 | 13.01 | 19.28 | 49.92 | 78.18 | 41.24 | 448.60 | 132.40 |
| | Pluak Daeng | 132.20 | 2.67 | 39.92 | 27.95 | 16.87 | 16.50 | 17.13 | 61.90 | 111.00 | 55.30 | 495.50 | 155.00 |
| | Khao Chamao | 235.40 | 3.15 | 56.01 | 22.13 | 15.90 | 30.09 | 16.30 | 48.44 | 91.31 | 52.55 | 1160.00 | 316.30 |
| | Nikhom Phatthana | 198.00 | 7.11 | 67.50 | 63.64 | 33.12 | 29.02 | 49.89 | 110.90 | 170.70 | 105.80 | 720.90 | 244.20 |
| | Klaeng | 84.92 | 1.55 | 23.43 | 16.10 | 6.68 | 11.16 | 8.66 | 36.12 | 56.01 | 20.04 | 463.00 | 116.40 |
| | Ban Chang | 179.10 | 8.38 | 67.16 | 75.64 | 35.61 | 29.47 | 66.90 | 116.50 | 157.80 | 114.80 | 645.20 | 234.60 |
| | Wang Chan | 180.20 | 2.30 | 45.64 | 22.55 | 13.59 | 22.63 | 15.98 | 47.53 | 86.48 | 46.62 | 877.10 | 241.80 |
| CHANTHABURI | Mueang Chanthaburi | 483.60 | 19.83 | 200.60 | 50.50 | 68.22 | 207.80 | 92.03 | 424.70 | 291.60 | 53.82 | 1089.00 | 270.00 |
| | Khlung | 177.60 | 10.59 | 77.58 | 34.25 | 33.20 | 92.21 | 44.26 | 136.30 | 166.70 | 29.93 | 411.40 | 104.40 |
| | Tha Mai | 299.00 | 12.61 | 130.30 | 43.08 | 44.29 | 133.00 | 60.98 | 268.50 | 198.40 | 41.84 | 739.50 | 183.40 |
| | Pong Nam Ron | 232.30 | 13.84 | 90.42 | 40.39 | 36.15 | 124.60 | 36.34 | 158.00 | 237.20 | 40.38 | 570.80 | 148.00 |
| | Makham | 294.40 | 14.28 | 120.80 | 41.04 | 44.42 | 138.80 | 56.79 | 225.70 | 226.90 | 41.32 | 696.40 | 175.10 |
| | Laem Sing | 630.90 | 36.16 | 295.30 | 123.20 | 124.60 | 319.70 | 167.70 | 595.00 | 471.60 | 101.20 | 1414.00 | 365.90 |
| | Soi Dao | 233.70 | 12.63 | 98.45 | 52.25 | 42.75 | 117.00 | 46.15 | 167.90 | 162.90 | 53.48 | 624.50 | 165.60 |
| | Kaeng Hang Maeo | 175.20 | 6.92 | 78.18 | 33.30 | 28.70 | 80.02 | 36.59 | 117.50 | 106.20 | 36.28 | 491.50 | 127.30 |
| | Na Yai Am | 401.00 | 17.89 | 193.30 | 87.97 | 68.62 | 189.10 | 100.70 | 429.60 | 322.50 | 68.75 | 1082.00 | 267.60 |
| | Khao Khitchakut | 265.70 | 13.32 | 114.60 | 41.86 | 39.91 | 125.60 | 48.70 | 181.70 | 165.50 | 48.49 | 708.40 | 179.00 |

**Table D-2** $NO_2$ concentration from screen view for the Eastern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| TRAT | Mueang Trat | 99.85 | 5.72 | 43.07 | 14.51 | 12.96 | 46.82 | 15.48 | 64.95 | 133.50 | 21.80 | 392.50 | 87.71 |
| | Khlong Yai | 749.80 | 105.60 | 306.60 | 143.90 | 104.80 | 412.10 | 114.10 | 576.70 | 778.50 | 151.70 | 2124.00 | 491.80 |
| | Khao Saming | 118.90 | 6.95 | 49.60 | 23.38 | 20.65 | 60.76 | 24.91 | 63.65 | 166.90 | 29.09 | 460.50 | 113.00 |
| | Bo Rai | 231.80 | 10.74 | 76.28 | 32.59 | 28.96 | 106.90 | 38.57 | 86.05 | 355.00 | 44.11 | 906.20 | 216.40 |
| | Laem Ngop | 299.20 | 27.81 | 164.60 | 89.30 | 74.62 | 183.40 | 81.22 | 242.00 | 417.30 | 107.90 | 1166.00 | 284.10 |
| | Ko Kut | 346.00 | 151.30 | 243.10 | 289.00 | 219.40 | 468.30 | 181.50 | 412.80 | 716.20 | 346.20 | 1040.00 | 217.00 |
| | Ko Chang | 313.80 | 43.37 | 188.70 | 130.50 | 103.90 | 232.80 | 107.90 | 274.60 | 461.90 | 146.90 | 1146.00 | 292.90 |
| CHACHAENGSAO | Mueang Chachoengsao | 256.50 | 14.99 | 47.85 | 56.54 | 74.37 | 115.70 | 98.67 | 407.30 | 258.70 | 72.61 | 855.80 | 224.60 |
| | Bang Khla | 332.20 | 13.14 | 62.31 | 71.00 | 98.03 | 156.00 | 124.00 | 519.40 | 332.20 | 91.91 | 1143.00 | 284.70 |
| | Bang Nam Priao | 184.70 | 9.36 | 44.25 | 46.17 | 58.98 | 82.80 | 64.09 | 303.70 | 174.50 | 53.25 | 653.10 | 147.40 |
| | Bang Pakong | 223.00 | 20.53 | 43.76 | 58.17 | 72.80 | 109.00 | 103.50 | 370.80 | 236.10 | 71.72 | 690.80 | 202.30 |
| | Ban Pho | 299.20 | 12.09 | 33.57 | 50.92 | 80.09 | 145.40 | 126.90 | 472.80 | 315.30 | 81.30 | 993.10 | 286.40 |
| | Phanom Sarakham | 215.00 | 7.77 | 52.65 | 51.27 | 59.25 | 96.91 | 68.61 | 243.50 | 206.50 | 54.66 | 695.90 | 173.40 |
| | Ratchasan | 460.00 | 19.39 | 101.00 | 107.60 | 139.60 | 211.50 | 161.90 | 694.50 | 449.60 | 127.10 | 1587.00 | 377.50 |
| | Sanam Chai Khet | 146.00 | 4.53 | 46.95 | 39.78 | 35.78 | 61.53 | 36.86 | 89.93 | 126.00 | 33.54 | 435.40 | 110.00 |
| | Plaeng Yao | 423.50 | 11.59 | 83.75 | 82.08 | 105.60 | 193.30 | 147.50 | 498.50 | 437.30 | 103.90 | 1346.00 | 366.70 |
| | Tha Takiap | 188.40 | 6.04 | 69.92 | 49.03 | 41.12 | 79.39 | 43.53 | 102.10 | 146.10 | 42.22 | 545.40 | 138.40 |
| | Khlong Khuean | 494.70 | 21.74 | 103.50 | 113.40 | 151.20 | 228.20 | 178.70 | 786.70 | 482.30 | 139.00 | 1725.00 | 411.00 |
| PRACHIN BURI | Mueang Prachin Buri | 240.30 | 15.44 | 71.55 | 67.77 | 77.75 | 113.10 | 78.01 | 329.10 | 220.50 | 69.49 | 795.60 | 185.90 |
| | Kabin Buri | 150.90 | 8.70 | 57.99 | 48.84 | 45.12 | 77.33 | 42.40 | 119.10 | 96.38 | 45.10 | 436.00 | 108.60 |
| | Na Di | 201.60 | 20.31 | 78.60 | 69.10 | 64.54 | 115.60 | 59.10 | 170.90 | 137.10 | 65.49 | 569.30 | 142.50 |
| | Ban Sang | 234.00 | 11.06 | 62.17 | 62.22 | 79.31 | 110.20 | 79.83 | 388.10 | 220.80 | 69.58 | 838.40 | 177.20 |
| | Prachantakham | 199.40 | 20.33 | 70.75 | 62.55 | 63.10 | 105.30 | 58.48 | 187.90 | 178.90 | 58.81 | 582.00 | 145.90 |
| | Si Maha Phot | 310.20 | 15.13 | 90.50 | 83.57 | 90.96 | 145.60 | 93.53 | 322.60 | 275.80 | 82.71 | 981.90 | 237.00 |
| | Si Mahosot | 554.60 | 26.76 | 145.80 | 143.10 | 169.70 | 257.90 | 179.70 | 722.20 | 525.20 | 151.40 | 1854.00 | 433.80 |

**Table D-2** $NO_2$ concentration from screen view for the Eastern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SA KAEO | Mueang Sa Kaeo | 97.74 | 6.14 | 26.26 | 27.51 | 34.41 | 44.10 | 20.86 | 49.68 | 40.48 | 38.54 | 358.10 | 95.58 |
| | Khlong Hat | 308.90 | 15.20 | 82.45 | 85.99 | 86.37 | 116.80 | 61.15 | 161.20 | 163.70 | 112.80 | 1120.00 | 322.60 |
| | Ta Phraya | 130.60 | 34.26 | 37.88 | 67.50 | 49.21 | 95.14 | 32.27 | 93.94 | 92.14 | 78.57 | 501.20 | 128.60 |
| | Wang Nam Yen | 192.10 | 7.30 | 58.96 | 62.79 | 58.79 | 72.88 | 38.22 | 84.60 | 76.71 | 72.31 | 684.80 | 211.10 |
| | Watthana Nakhon | 99.08 | 20.79 | 27.41 | 48.21 | 35.67 | 62.31 | 24.18 | 67.31 | 32.12 | 58.25 | 374.40 | 99.29 |
| | Aranyaprathet | 138.70 | 20.60 | 33.43 | 54.30 | 44.21 | 69.65 | 33.47 | 96.75 | 67.22 | 70.73 | 530.40 | 141.80 |
| | Khok Sung | 318.30 | 97.46 | 89.70 | 191.60 | 119.40 | 242.20 | 83.37 | 248.90 | 118.70 | 222.00 | 1229.00 | 363.40 |
| | Khao Chakan | 148.40 | 6.46 | 42.31 | 44.93 | 45.58 | 57.20 | 29.50 | 66.25 | 68.92 | 54.37 | 538.50 | 138.00 |
| | Wang Sombun | 192.00 | 6.91 | 55.37 | 51.49 | 51.37 | 70.44 | 34.81 | 83.63 | 99.75 | 63.56 | 687.90 | 203.10 |

# APPENDIX E

# MAXIMUM $SO_2$ AND $NO_2$ EMISSION LOAD FOR THE SOUTHERN REGION OF THAILAND

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 0.000233 | 6.69E-05 | 7.03E-05 | 7.41E-05 | 4.31E-06 | 7.29E-05 | 3.53E-06 | 8.07E-05 | 5.23E-05 | 9.36E-05 | 0.000125 | 5.34E-05 | 211255.05 | 60544.67 | 63662.72 | 67037.81 | 3899.70 | 66028.33 | 3194.59 | 73089.46 | 47374.18 | 84719.82 | 113016.42 | 48308.33 |
| | Khao Phanom | 0.000259 | 7.67E-05 | 6.42E-05 | 7.8E-05 | 4.21E-06 | 7.29E-05 | 4.56E-06 | 0.000106 | 7.24E-05 | 6.97E-05 | 0.000157 | 6.13E-05 | 219690.31 | 65219.71 | 54543.33 | 66292.31 | 3579.21 | 61942.40 | 3872.02 | 90412.09 | 61526.46 | 59196.10 | 133331.21 | 52089.32 |
| | Ko Lanta | 0.000383 | 0.000129 | 0.000159 | 0.000137 | 3.17E-05 | 0.000158 | 2.66E-05 | 0.000165 | 0.000138 | 0.000186 | 0.000183 | 0.000142 | 128716.75 | 43415.30 | 53542.59 | 45910.74 | 10652.78 | 52994.90 | 8936.34 | 55606.74 | 46275.86 | 62505.13 | 61655.61 | 47717.05 |
| | Khlong Thom | 0.000229 | 7.16E-05 | 7.33E-05 | 7.05E-05 | 6.72E-06 | 6.54E-05 | 5.62E-06 | 8.16E-05 | 6.85E-05 | 6.15E-05 | 0.000103 | 5.02E-05 | 255464.86 | 80071.96 | 81875.40 | 78781.00 | 7505.30 | 73063.06 | 6277.35 | 91242.65 | 76604.06 | 68786.54 | 114690.66 | 56126.67 |
| | Ao Luek | 0.000232 | 5.34E-05 | 5.9E-05 | 6.38E-05 | 3.43E-06 | 6.45E-05 | 3.29E-06 | 9.82E-05 | 5.81E-05 | 9.71E-05 | 0.00015 | 5.77E-05 | 182885.97 | 42189.29 | 46624.26 | 50426.85 | 2712.69 | 50943.92 | 2600.91 | 77518.52 | 45849.57 | 76667.81 | 118455.34 | 45577.63 |
| | Plai Phraya | 0.000305 | 6.86E-05 | 8.31E-05 | 8.28E-05 | 4.64E-06 | 7.85E-05 | 4.64E-06 | 0.000147 | 8.52E-05 | 0.000104 | 0.000233 | 9.12E-05 | 161364.33 | 36309.76 | 43977.32 | 43832.94 | 2453.84 | 41539.99 | 2455.77 | 77949.64 | 45098.91 | 55284.50 | 123371.36 | 48267.04 |
| | Lam Thap | 0.00045 | 0.000153 | 0.000115 | 0.000137 | 7.19E-06 | 0.000127 | 8.85E-06 | 0.000178 | 0.000135 | 9.51E-05 | 0.000246 | 9.35E-05 | 126750.01 | 42960.87 | 32348.42 | 38610.00 | 2024.90 | 35643.28 | 2491.35 | 50072.40 | 37954.73 | 26775.86 | 69204.57 | 26332.92 |
| | Nuea Khlong | 0.00027 | 8.45E-05 | 8.33E-05 | 8.72E-05 | 8.01E-06 | 8.87E-05 | 6.83E-06 | 0.000103 | 7.34E-05 | 9.13E-05 | 0.00014 | 6.47E-05 | 138533.43 | 43443.21 | 42826.55 | 44835.74 | 4118.83 | 45596.08 | 3510.39 | 52706.02 | 37707.08 | 46906.75 | 72164.82 | 33273.92 |
| PHANGNGA | Mueang Phangnga | 0.000272 | 5.49E-05 | 5.76E-05 | 7.22E-05 | 3.41E-06 | 8.08E-05 | 4.06E-06 | 0.000127 | 6.42E-05 | 0.000153 | 0.00017 | 6.03E-05 | 177818.15 | 35927.44 | 37685.38 | 47220.02 | 2233.05 | 52829.85 | 2655.49 | 82877.44 | 41997.16 | 100120.41 | 111086.75 | 39429.89 |
| | Ko Yao | 0.000232 | 5.14E-05 | 5.45E-05 | 6.24E-05 | 1.35E-05 | 7.9E-05 | 1.27E-05 | 9.5E-05 | 6.38E-05 | 0.000141 | 0.000126 | 5.26E-05 | 241701.83 | 53570.75 | 56750.08 | 64971.07 | 14089.44 | 82281.99 | 13247.08 | 98986.21 | 66461.17 | 146622.05 | 131254.22 | 54775.73 |
| | Kapong | 0.000234 | 4.86E-05 | 4.88E-05 | 6.15E-05 | 3.64E-06 | 7.49E-05 | 4.73E-06 | 0.000138 | 6.69E-05 | 0.000128 | 0.000167 | 5.95E-05 | 141624.22 | 29498.98 | 29576.68 | 37295.50 | 2210.46 | 45438.51 | 2867.90 | 83537.24 | 40557.26 | 77823.76 | 101417.88 | 36057.73 |
| | Takua Thung | 0.00025 | 3.71E-05 | 3.89E-05 | 5.25E-05 | 3.93E-06 | 6.88E-05 | 3.99E-06 | 0.0001 | 5.89E-05 | 0.00016 | 0.000139 | 4.28E-05 | 163250.39 | 24209.54 | 25375.05 | 34256.77 | 2565.83 | 44875.14 | 2605.16 | 65480.14 | 38435.54 | 104264.76 | 90579.53 | 27903.10 |
| | Takua Pa | 0.000216 | 4.68E-05 | 4.44E-05 | 5.5E-05 | 4.5E-06 | 7.22E-05 | 5.4E-06 | 0.000147 | 7.2E-05 | 0.000124 | 0.000168 | 5.79E-05 | 129722.61 | 28145.76 | 26659.02 | 33055.22 | 2705.56 | 43377.56 | 3247.28 | 88161.29 | 43281.57 | 74323.17 | 101174.43 | 34778.53 |
| | Khura Buri | 0.000115 | 5.18E-05 | 4.45E-05 | 4.89E-05 | 2.31E-05 | 8.3E-05 | 1.9E-05 | 9.74E-05 | 5.96E-05 | 9.9E-05 | 0.000108 | 5.49E-05 | 117874.66 | 53238.70 | 45689.47 | 50194.97 | 23713.08 | 85250.77 | 19509.87 | 100005.39 | 61225.46 | 101735.08 | 111370.59 | 56444.83 |
| | Thap Put | 0.000345 | 7.23E-05 | 8.06E-05 | 9.2E-05 | 4.46E-06 | 9.9E-05 | 5.2E-06 | 0.000167 | 8.86E-05 | 0.000163 | 0.000235 | 8.76E-05 | 103266.07 | 21647.95 | 24120.84 | 27543.67 | 1334.23 | 29624.23 | 1555.40 | 50051.31 | 26515.35 | 48830.56 | 70432.76 | 26211.89 |
| | Thai Mueang | 0.000276 | 5.6E-05 | 5.68E-05 | 7.4E-05 | 3.86E-06 | 8.59E-05 | 4.75E-06 | 0.000133 | 6.52E-05 | 0.000166 | 0.000172 | 6.07E-05 | 168572.92 | 34234.44 | 34732.55 | 45214.39 | 2359.23 | 52486.43 | 2901.27 | 81502.96 | 39833.00 | 101446.56 | 105152.03 | 37125.31 |
| PHUKET | Mueang Phuket | 0.000233 | 5.79E-05 | 5.94E-05 | 6.93E-05 | 3.21E-05 | 8.94E-05 | 3.15E-05 | 0.000108 | 7.89E-05 | 0.000164 | 0.000133 | 6.18E-05 | 42123.05 | 10454.54 | 10721.70 | 12517.15 | 5798.43 | 16151.16 | 5692.33 | 19413.92 | 14249.20 | 29540.55 | 23980.05 | 11163.91 |
| | Kathu | 0.000555 | 0.000102 | 0.000105 | 0.000132 | 4.18E-05 | 0.000182 | 4.07E-05 | 0.000231 | 0.00016 | 0.000382 | 0.000299 | 0.000113 | 43849.66 | 8079.83 | 8326.82 | 10455.49 | 3304.36 | 14394.99 | 3216.42 | 18286.31 | 12614.79 | 30205.51 | 23639.71 | 8950.33 |
| | Thalang | 0.00038 | 4.17E-05 | 4.33E-05 | 6.48E-05 | 7.78E-06 | 0.000101 | 7.35E-06 | 0.00014 | 9.18E-05 | 0.000266 | 0.000194 | 5.29E-05 | 109749.79 | 12057.20 | 12521.18 | 18727.24 | 2246.33 | 29122.62 | 2122.57 | 40585.86 | 26507.69 | 76716.53 | 56163.53 | 15279.16 |

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 0.000209 | 0.000101 | 7.26E-05 | 0.000101 | 3.32E-05 | 7.76E-05 | 3.62E-05 | 0.000112 | 6.45E-05 | 6.38E-05 | 0.00012 | 7.47E-05 | 116619.53 | 56424.54 | 40443.68 | 56187.19 | 18460.20 | 43207.35 | 20170.11 | 62140.50 | 35933.37 | 35504.18 | 66675.84 | 41563.73 |
| | Phrom Khiri | 0.000495 | 0.00018 | 9.4E-05 | 0.000149 | 3.27E-05 | 0.000137 | 3.95E-05 | 0.000251 | 0.000138 | 9.43E-05 | 0.000235 | 0.000107 | 121971.00 | 44432.71 | 23166.40 | 36810.94 | 8057.46 | 33731.53 | 9745.53 | 61971.38 | 34003.36 | 23241.94 | 58049.65 | 26411.66 |
| | Lan Saka | 0.000384 | 0.000151 | 9.63E-05 | 0.000137 | 2.67E-05 | 0.000111 | 3.47E-05 | 0.000186 | 0.000109 | 8.63E-05 | 0.000203 | 9.41E-05 | 132310.66 | 52054.69 | 33192.13 | 47103.84 | 9198.03 | 38328.81 | 11967.38 | 64000.09 | 37592.13 | 29730.95 | 69894.53 | 32448.67 |
| | Chawang | 0.000302 | 9.81E-05 | 5.59E-05 | 9.36E-05 | 1.2E-05 | 8.22E-05 | 1.52E-05 | 0.000145 | 9.18E-05 | 5.62E-05 | 0.000182 | 7.2E-05 | 130924.21 | 42482.17 | 24205.04 | 40540.95 | 5197.52 | 35622.52 | 6588.81 | 62932.39 | 39749.81 | 24352.20 | 78896.09 | 31212.66 |
| | Phipun | 0.000309 | 0.000104 | 5.69E-05 | 9.45E-05 | 1.75E-05 | 8.54E-05 | 2.09E-05 | 0.000154 | 9.22E-05 | 5.74E-05 | 0.000179 | 7.34E-05 | 152473.76 | 51292.62 | 28101.03 | 46647.18 | 8651.16 | 42172.89 | 10302.42 | 76265.68 | 45520.17 | 28359.57 | 88618.47 | 36248.83 |
| | Chian Yai | 0.000207 | 0.000159 | 0.000106 | 0.000141 | 6.41E-05 | 9.9E-05 | 6.17E-05 | 0.000111 | 7.22E-05 | 8.87E-05 | 0.000122 | 0.00012 | 66458.17 | 51222.44 | 34071.93 | 45411.12 | 20636.52 | 31842.76 | 19849.08 | 35744.18 | 23246.78 | 28552.23 | 39375.33 | 38656.55 |
| | Cha-uat | 0.000159 | 8.57E-05 | 6.64E-05 | 7.68E-05 | 2.02E-05 | 4.46E-05 | 2.36E-05 | 6.81E-05 | 4.45E-05 | 4.86E-05 | 8.4E-05 | 5.83E-05 | 119069.25 | 64317.16 | 49865.41 | 57610.84 | 15142.80 | 33473.76 | 17684.38 | 51145.01 | 33428.57 | 36450.57 | 63067.00 | 43759.46 |
| | Tha Sala | 0.000315 | 0.00011 | 6.74E-05 | 0.000106 | 2.93E-05 | 9.38E-05 | 3.23E-05 | 0.000159 | 9.26E-05 | 6.73E-05 | 0.000189 | 8.52E-05 | 131431.54 | 46162.67 | 28142.95 | 44171.14 | 12244.41 | 39182.33 | 13511.71 | 66442.40 | 38699.58 | 28098.15 | 78992.51 | 35589.00 |
| | Thung Song | 0.000207 | 8.08E-05 | 6.71E-05 | 7.82E-05 | 5.47E-06 | 5.27E-05 | 1.31E-05 | 8.2E-05 | 5.68E-05 | 5.01E-05 | 0.00012 | 4.71E-05 | 188418.96 | 73517.72 | 61028.72 | 71154.18 | 4978.26 | 47964.72 | 11908.65 | 74623.64 | 51685.08 | 45597.09 | 109074.41 | 42873.60 |
| | Na Bon | 0.000475 | 0.000168 | 0.00012 | 0.000159 | 1.32E-05 | 0.000126 | 2.28E-05 | 0.000203 | 0.000137 | 0.000102 | 0.000273 | 0.000107 | 98621.60 | 34896.04 | 24924.06 | 32973.49 | 2742.06 | 26281.49 | 4743.95 | 42224.56 | 28460.81 | 21100.21 | 56636.79 | 22178.89 |
| | Thung Yai | 0.000274 | 8.7E-05 | 5.81E-05 | 8.35E-05 | 5.21E-06 | 7.49E-05 | 7.13E-06 | 0.000118 | 8.22E-05 | 5.54E-05 | 0.000163 | 6.2E-05 | 164394.16 | 52280.42 | 34924.02 | 50135.38 | 3129.56 | 44973.94 | 4285.23 | 71175.01 | 49381.08 | 33286.55 | 98160.76 | 37243.06 |
| | Pak Phanang | 0.000192 | 0.000128 | 9.69E-05 | 0.000129 | 5.35E-05 | 9.11E-05 | 5.43E-05 | 0.000109 | 6.56E-05 | 8.14E-05 | 0.000118 | 0.000102 | 101661.64 | 68155.71 | 51422.09 | 68412.78 | 28370.52 | 48328.20 | 28794.05 | 57677.86 | 34800.71 | 43191.35 | 62578.97 | 54090.74 |
| | Ron Phibun | 0.00025 | 0.000118 | 9.31E-05 | 0.000114 | 2.24E-05 | 7.69E-05 | 3.09E-05 | 0.00011 | 7.14E-05 | 7.24E-05 | 0.000148 | 7.52E-05 | 107344.98 | 50671.62 | 39982.22 | 49006.12 | 9601.67 | 33026.15 | 13249.15 | 47175.56 | 30659.98 | 31091.72 | 63386.67 | 32297.70 |
| | Sichon | 0.000143 | 2.55E-05 | 1.4E-05 | 2.9E-05 | 1.05E-05 | 3.28E-05 | 9.15E-06 | 5.99E-05 | 4.19E-05 | 2.08E-05 | 0.000125 | 3.92E-05 | 98122.96 | 17522.22 | 9643.04 | 19962.53 | 7194.58 | 22518.81 | 6286.96 | 41150.37 | 28791.39 | 14275.45 | 86121.74 | 26959.69 |
| | Khanom | 0.000196 | 7E-05 | 5.73E-05 | 8.26E-05 | 4.57E-05 | 6.92E-05 | 3.96E-05 | 0.000108 | 8.85E-05 | 4.99E-05 | 0.000228 | 9.52E-05 | 61113.72 | 21805.93 | 17843.46 | 25707.60 | 14241.13 | 21542.21 | 12323.42 | 33565.51 | 27562.40 | 15536.44 | 71132.66 | 29636.55 |
| | Hua Sai | 0.000217 | 0.000166 | 0.000112 | 0.000144 | 6.5E-05 | 9.74E-05 | 6.21E-05 | 0.000113 | 7.35E-05 | 9.04E-05 | 0.000124 | 0.000125 | 95103.58 | 72395.60 | 49194.04 | 63067.92 | 28408.07 | 42611.66 | 27165.81 | 49551.82 | 32163.98 | 39548.26 | 54283.30 | 54559.15 |
| | Bang Khan | 0.000299 | 0.000103 | 8.83E-05 | 9.68E-05 | 5.64E-06 | 7.41E-05 | 9.47E-06 | 0.000112 | 8.61E-05 | 6.54E-05 | 0.000154 | 6.23E-05 | 140415.20 | 48538.33 | 41473.83 | 45481.73 | 2647.83 | 34808.61 | 4448.89 | 52632.01 | 40441.81 | 30725.20 | 72407.21 | 29264.10 |
| | Tham Phannara | 0.00046 | 0.000132 | 7.21E-05 | 0.000139 | 1.07E-05 | 0.000122 | 1.3E-05 | 0.000219 | 0.000146 | 8.15E-05 | 0.000303 | 0.000116 | 81191.44 | 23303.56 | 12718.74 | 24501.22 | 1891.56 | 21490.14 | 2293.70 | 38591.49 | 25711.11 | 14379.31 | 53532.91 | 20430.64 |
| | Chulabhorn | 0.000421 | 0.000185 | 0.000155 | 0.000179 | 2.01E-05 | 0.000112 | 3.89E-05 | 0.000169 | 0.000114 | 0.000114 | 0.00025 | 0.000109 | 97074.62 | 42532.98 | 35731.45 | 41354.32 | 4638.73 | 25790.72 | 8969.31 | 38846.49 | 26212.52 | 26342.19 | 57730.40 | 25233.62 |
| | Phra Phrom | 0.000438 | 0.000213 | 0.000155 | 0.000206 | 5.82E-05 | 0.000152 | 6.7E-05 | 0.000217 | 0.000132 | 0.00013 | 0.000251 | 0.000147 | 64346.87 | 31358.26 | 22795.08 | 30337.43 | 8558.16 | 22405.38 | 9855.59 | 31956.33 | 19397.81 | 19151.89 | 36856.31 | 21677.98 |
| | Nopphitam | 0.000257 | 8.38E-05 | 4.95E-05 | 8.11E-05 | 2.15E-05 | 7.45E-05 | 2.3E-05 | 0.000131 | 7.96E-05 | 5E-05 | 0.000173 | 7E-05 | 185507.79 | 60458.50 | 35706.92 | 58517.42 | 15485.00 | 53753.15 | 16636.07 | 94245.52 | 57479.85 | 36053.77 | 124995.86 | 50496.51 |
| | Chang Klang | 0.000327 | 0.000118 | 7.66E-05 | 0.00011 | 1.48E-05 | 9.03E-05 | 2.13E-05 | 0.000151 | 9.4E-05 | 6.89E-05 | 0.000182 | 7.57E-05 | 89233.70 | 32290.75 | 20893.41 | 29898.03 | 4031.73 | 24627.60 | 5807.33 | 41260.24 | 25639.44 | 18802.57 | 49772.94 | 20644.31 |
| | Chaloem Phra Kiat | 0.000402 | 0.000253 | 0.00018 | 0.000234 | 8.6E-05 | 0.000162 | 8.96E-05 | 0.000203 | 0.000128 | 0.000148 | 0.000235 | 0.000185 | 72767.01 | 45792.71 | 32633.04 | 42313.06 | 15552.07 | 29254.49 | 16208.70 | 36715.97 | 23196.73 | 26813.12 | 42520.40 | 33395.06 |

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 0.000362 | 0.000213 | 0.000186 | 0.000243 | 9.93E-05 | 0.000208 | 0.000108 | 0.000302 | 0.000196 | 0.000146 | 0.000441 | 0.000216 | 121020.99 | 71278.97 | 62070.98 | 81316.43 | 33231.02 | 69528.70 | 36214.00 | 101174.32 | 65675.84 | 48795.23 | 147563.40 | 72123.39 |
| | Kanchanadit | 0.000138 | 5.64E-05 | 4.43E-05 | 6.36E-05 | 2.73E-05 | 5.67E-05 | 2.88E-05 | 9.04E-05 | 6.26E-05 | 3.9E-05 | 0.000153 | 6.45E-05 | 148348.35 | 60605.18 | 47604.56 | 68359.80 | 29397.85 | 60926.43 | 30971.05 | 97261.73 | 67324.29 | 41946.68 | 164123.86 | 69340.55 |
| | Don Sak | 0.000196 | 7.57E-05 | 6.14E-05 | 8.89E-05 | 4.88E-05 | 7.36E-05 | 4.56E-05 | 0.000118 | 9.45E-05 | 5.41E-05 | 0.000237 | 0.0001 | 71133.99 | 27518.78 | 22327.57 | 32333.64 | 17752.29 | 26751.46 | 16566.41 | 43019.88 | 34358.58 | 19683.08 | 86081.71 | 36490.49 |
| | Ko Samui | 0.00016 | 0.000111 | 0.000128 | 0.000121 | 7.79E-05 | 0.000109 | 5.68E-05 | 0.000122 | 0.000109 | 7.41E-05 | 0.000242 | 0.000142 | 44121.69 | 30540.63 | 35232.91 | 33220.13 | 21453.53 | 29921.20 | 15634.33 | 33670.62 | 30010.65 | 20409.68 | 66678.63 | 39156.07 |
| | Ko Pha-ngan | 0.000358 | 0.000277 | 0.000419 | 0.00028 | 0.000177 | 0.000329 | 0.000124 | 0.000383 | 0.000283 | 0.000203 | 0.000611 | 0.000397 | 43869.04 | 33903.52 | 51250.05 | 34264.39 | 21682.02 | 40301.40 | 15145.99 | 46909.81 | 34665.64 | 24901.88 | 74858.05 | 48619.12 |
| | Chaiya | 0.0002 | 6.82E-05 | 4.45E-05 | 7.26E-05 | 3.13E-05 | 0.000125 | 5.04E-05 | 0.000211 | 0.000123 | 9.84E-05 | 0.000249 | 0.000123 | 131285.13 | 44892.39 | 29249.97 | 47750.02 | 20600.85 | 82231.06 | 33146.05 | 138818.02 | 80912.88 | 64714.83 | 163986.94 | 81240.76 |
| | Tha Chana | 0.000192 | 5.63E-05 | 4.78E-05 | 6.14E-05 | 2.58E-05 | 0.000122 | 4.05E-05 | 0.000198 | 0.000112 | 8.9E-05 | 0.000236 | 0.000123 | 193088.63 | 56546.12 | 48013.36 | 61680.52 | 25911.24 | 122816.75 | 40664.94 | 198951.41 | 112739.74 | 89428.14 | 236887.21 | 123977.69 |
| | Khiri Rat Nikhom | 0.000296 | 6.01E-05 | 5.46E-05 | 8.48E-05 | 1.17E-05 | 0.000121 | 1.81E-05 | 0.000203 | 0.000101 | 0.000118 | 0.000236 | 0.000102 | 226209.36 | 45852.78 | 41621.15 | 64674.21 | 8932.07 | 92200.22 | 13841.32 | 154668.39 | 77031.55 | 89884.49 | 179989.30 | 77880.05 |
| | Ban Ta Khun | 0.000196 | 3.7E-05 | 3.2E-05 | 4.91E-05 | 5.28E-06 | 8.06E-05 | 9.77E-06 | 0.000138 | 6.99E-05 | 8.74E-05 | 0.000159 | 6.89E-05 | 284625.56 | 53766.21 | 46585.94 | 71378.06 | 7673.38 | 117206.69 | 14210.56 | 200137.44 | 101727.79 | 127071.42 | 231085.92 | 100231.20 |
| | Phanom | 0.000174 | 3.45E-05 | 3.57E-05 | 4.53E-05 | 2.95E-06 | 5.61E-05 | 4.43E-06 | 0.000106 | 5.31E-05 | 7.55E-05 | 0.000132 | 5.04E-05 | 212293.33 | 42121.84 | 43572.86 | 55266.53 | 3592.47 | 68437.63 | 5402.39 | 128786.20 | 64788.00 | 92074.52 | 160736.39 | 61476.01 |
| | Tha Chang | 0.000248 | 6.07E-05 | 3.99E-05 | 7.5E-05 | 2.11E-05 | 0.000134 | 3.62E-05 | 0.000218 | 0.000122 | 0.00011 | 0.00026 | 0.000125 | 270335.31 | 66260.60 | 43502.46 | 81842.96 | 23051.33 | 146500.69 | 39520.16 | 237905.33 | 133426.66 | 119526.63 | 283697.52 | 136895.69 |
| | Ban Na San | 0.000174 | 6.99E-05 | 5.26E-05 | 7.8E-05 | 2.28E-05 | 6.68E-05 | 2.4E-05 | 0.000106 | 6.85E-05 | 4.56E-05 | 0.000155 | 6.73E-05 | 133879.33 | 53712.75 | 40434.47 | 59916.19 | 17521.21 | 51305.49 | 18413.89 | 81435.10 | 52640.97 | 35082.33 | 118864.00 | 51688.42 |
| | Ban Na Doem | 0.000436 | 0.000234 | 0.000206 | 0.000272 | 9.94E-05 | 0.000223 | 0.000103 | 0.000322 | 0.000208 | 0.000156 | 0.000477 | 0.000228 | 81059.20 | 43596.01 | 38388.96 | 50693.90 | 18486.67 | 41520.99 | 19193.45 | 59837.89 | 38639.62 | 29023.25 | 88771.51 | 42330.49 |
| | Khian Sa | 0.000214 | 6.45E-05 | 5.35E-05 | 7.63E-05 | 1.4E-05 | 7.25E-05 | 1.53E-05 | 0.000122 | 7.37E-05 | 6.28E-05 | 0.000172 | 7.21E-05 | 161154.49 | 48486.99 | 40239.53 | 57419.38 | 10536.73 | 54551.86 | 11513.40 | 91902.93 | 55426.19 | 47240.46 | 129682.88 | 54266.69 |
| | Wiang Sa | 0.000234 | 6.57E-05 | 3.43E-05 | 7.14E-05 | 6.76E-06 | 6.28E-05 | 7.44E-06 | 0.000114 | 7.61E-05 | 4.05E-05 | 0.000161 | 6.18E-05 | 89908.32 | 25279.62 | 13203.82 | 27465.02 | 2598.00 | 24161.65 | 2861.10 | 43936.58 | 29246.58 | 15576.39 | 61932.97 | 23748.65 |
| | Phrasaeng | 0.000398 | 0.000106 | 8.18E-05 | 0.00012 | 1.02E-05 | 0.00011 | 1.12E-05 | 0.000195 | 0.000123 | 9.82E-05 | 0.000286 | 0.000112 | 282696.10 | 75011.76 | 58063.37 | 84822.97 | 7256.15 | 78156.70 | 7957.52 | 138599.89 | 87564.23 | 69699.31 | 202946.54 | 79592.12 |
| | Phunphin | 0.000142 | 6.06E-05 | 5.22E-05 | 7.16E-05 | 2.4E-05 | 7.09E-05 | 2.76E-05 | 0.000109 | 6.52E-05 | 5.55E-05 | 0.000147 | 6.92E-05 | 135436.37 | 57753.49 | 49747.90 | 68281.82 | 22927.27 | 67581.41 | 26318.05 | 103960.91 | 62172.03 | 52947.59 | 140041.52 | 66002.79 |
| | Chai Buri | 0.000351 | 9.3E-05 | 8.04E-05 | 0.000104 | 7.1E-06 | 9.57E-05 | 7.51E-06 | 0.000163 | 0.000103 | 9.41E-05 | 0.000245 | 9.59E-05 | 163839.95 | 43397.91 | 37509.80 | 48335.85 | 3313.65 | 44647.46 | 3501.68 | 75919.10 | 48144.43 | 43898.33 | 114174.73 | 44756.59 |
| | Vibhavadi | 0.000406 | 8.26E-05 | 5.96E-05 | 0.00011 | 2.05E-05 | 0.000195 | 3.79E-05 | 0.000319 | 0.00017 | 0.000175 | 0.000372 | 0.000173 | 201200.43 | 40968.55 | 29542.68 | 54474.59 | 10184.23 | 96912.84 | 18818.67 | 158098.37 | 84269.50 | 86906.32 | 184493.08 | 85807.72 |
| RANONG | Mueang Ranong | 0.000155 | 4.11E-05 | 5.72E-05 | 4.26E-05 | 1.25E-05 | 0.000117 | 2.26E-05 | 0.000156 | 8.12E-05 | 7.11E-05 | 0.00018 | 0.000124 | 115110.22 | 30569.90 | 42544.44 | 31639.90 | 9275.46 | 86932.30 | 16781.39 | 115581.01 | 60369.91 | 52875.51 | 133984.82 | 91816.75 |
| | La-un | 0.000179 | 3.03E-05 | 9.96E-05 | 3.75E-05 | 1.16E-05 | 0.000116 | 2.41E-05 | 0.000194 | 9.68E-05 | 6.13E-05 | 0.000252 | 0.000151 | 99200.23 | 16749.59 | 55140.71 | 20753.06 | 6428.76 | 64293.17 | 13358.93 | 107407.77 | 53584.94 | 33939.24 | 139450.24 | 83782.64 |
| | Kapoe | 0.000237 | 5.83E-05 | 4.47E-05 | 6.46E-05 | 1.69E-05 | 0.000151 | 3.03E-05 | 0.000195 | 0.000114 | 0.000105 | 0.000238 | 0.000145 | 122826.65 | 30196.17 | 23134.94 | 33447.80 | 8747.42 | 78316.81 | 15677.60 | 100758.99 | 59114.10 | 54203.40 | 123391.26 | 75176.75 |
| | Kra Buri | 0.000159 | 1.21E-05 | 0.000186 | 2.19E-05 | 7.51E-06 | 0.000107 | 2.5E-05 | 0.000212 | 9.62E-05 | 3.74E-05 | 0.000312 | 0.000175 | 151830.32 | 11548.94 | 177492.68 | 20948.49 | 7179.18 | 102174.68 | 23917.76 | 202394.31 | 92059.27 | 35771.24 | 298892.91 | 167214.08 |
| | Suk Samran | 0.000251 | 7.46E-05 | 5.38E-05 | 7.74E-05 | 2.4E-05 | 0.000162 | 3.69E-05 | 0.000181 | 0.000119 | 0.00011 | 0.000242 | 0.000154 | 113637.98 | 33831.69 | 24387.33 | 35105.07 | 10900.16 | 73421.23 | 16751.42 | 82291.80 | 54061.39 | 49873.86 | 109884.15 | 69676.21 |

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 0.000159 | 4.09E-05 | 0.000253 | 4.42E-05 | 2.66E-05 | 0.00012 | 4.52E-05 | 0.000216 | 0.000108 | 6.44E-05 | 0.000297 | 0.000184 | 126431.18 | 32588.82 | 201921.41 | 35227.98 | 21160.20 | 96015.68 | 36049.74 | 172457.82 | 86276.39 | 51294.36 | 236744.14 | 146544.92 |
| | Tha Sae | 8.35E-05 | 7.72E-06 | 0.000171 | 8.66E-06 | 5.3E-06 | 6.04E-05 | 1.29E-05 | 0.000131 | 5.67E-05 | 1.98E-05 | 0.000198 | 0.000113 | 123386.46 | 11411.62 | 252739.75 | 12801.50 | 7829.90 | 89258.07 | 19094.60 | 193159.92 | 83839.39 | 29242.56 | 292504.32 | 166478.36 |
| | Pathio | 0.000106 | 7.98E-06 | 0.000277 | 7.89E-06 | 6.06E-06 | 7.67E-05 | 1.09E-05 | 0.000182 | 7.37E-05 | 2.39E-05 | 0.000275 | 0.000156 | 80422.33 | 6076.97 | 211101.82 | 6008.26 | 4619.29 | 58437.95 | 8311.84 | 138801.51 | 56171.27 | 18215.81 | 209876.79 | 118737.18 |
| | Lang Suan | 0.000144 | 4.14E-05 | 8.35E-05 | 4.49E-05 | 2.39E-05 | 0.000101 | 3.14E-05 | 0.000162 | 8.59E-05 | 5.94E-05 | 0.000201 | 0.000117 | 84493.22 | 24326.75 | 49014.32 | 26347.91 | 14055.71 | 59427.34 | 18444.18 | 95244.85 | 50432.07 | 34886.98 | 118270.29 | 68693.16 |
| | Lamae | 0.000207 | 6.08E-05 | 8.4E-05 | 6.51E-05 | 3.19E-05 | 0.000141 | 4.41E-05 | 0.000226 | 0.000123 | 9.01E-05 | 0.000273 | 0.000153 | 76165.16 | 22391.01 | 30934.84 | 23992.69 | 11765.64 | 52071.10 | 16234.15 | 83174.61 | 45146.38 | 33202.58 | 100449.25 | 56477.41 |
| | Phato | 0.000127 | 2.22E-05 | 3.44E-05 | 2.65E-05 | 6.17E-06 | 7.65E-05 | 1.35E-05 | 0.00012 | 6.39E-05 | 4.63E-05 | 0.00015 | 9.02E-05 | 111290.21 | 19425.51 | 30112.83 | 23248.72 | 5405.52 | 67026.22 | 11847.27 | 105367.55 | 55963.51 | 40522.74 | 131351.48 | 79017.66 |
| | Sawi | 0.000118 | 2.64E-05 | 0.000132 | 3.12E-05 | 1.63E-05 | 8.48E-05 | 2.76E-05 | 0.000149 | 7.4E-05 | 4.37E-05 | 0.000201 | 0.00012 | 99381.42 | 22137.21 | 110683.53 | 26129.60 | 13670.61 | 71162.26 | 23120.11 | 124761.71 | 62049.67 | 36677.22 | 168727.18 | 100925.18 |
| | Thung Tako | 0.000212 | 6.19E-05 | 0.00018 | 6.72E-05 | 3.74E-05 | 0.000156 | 5.19E-05 | 0.000252 | 0.000131 | 8.92E-05 | 0.00032 | 0.000193 | 61362.36 | 17914.28 | 52111.61 | 19429.08 | 10813.73 | 45094.26 | 15003.97 | 72781.59 | 37970.76 | 25799.42 | 92695.07 | 55950.16 |
| SONGKHLA | Mueang Songkhla | 5.28E-05 | 6.43E-05 | 0.000149 | 9.41E-05 | 3.96E-05 | 2.2E-05 | 6.12E-05 | 3.6E-05 | 3.71E-05 | 0.00011 | 0.000121 | 0.000205 | 10782.44 | 13139.86 | 30422.27 | 19226.15 | 8078.52 | 4485.68 | 12492.79 | 7356.98 | 7575.19 | 22439.30 | 24769.73 | 41785.38 |
| | Sathing Phra | 0.000347 | 0.000229 | 0.000257 | 0.000201 | 8.62E-05 | 8.78E-05 | 8.44E-05 | 0.000154 | 9.68E-05 | 0.000216 | 0.000227 | 0.000263 | 68849.29 | 45574.15 | 50965.12 | 39949.07 | 17114.76 | 17441.22 | 16775.90 | 30529.28 | 19221.35 | 42898.66 | 45122.07 | 52331.83 |
| | Chana | 0.000141 | 7.53E-05 | 0.000121 | 7.13E-05 | 1.87E-05 | 1.71E-05 | 1.37E-05 | 2.77E-05 | 3.99E-05 | 3.17E-05 | 3.61E-05 | 6.86E-05 | 88912.28 | 47458.36 | 76073.92 | 44902.06 | 11802.08 | 10771.21 | 8643.01 | 17476.68 | 25121.13 | 19953.63 | 22764.42 | 43190.53 |
| | Na Thawi | 0.000177 | 8.66E-05 | 0.000134 | 7.4E-05 | 1.55E-05 | 1.83E-05 | 5.63E-06 | 3.12E-05 | 4.56E-05 | 1.55E-05 | 2.56E-05 | 4.77E-05 | 137554.08 | 67417.67 | 104355.09 | 57595.59 | 12089.90 | 14252.64 | 4385.17 | 24252.61 | 35498.75 | 12062.45 | 19959.95 | 37147.88 |
| | Thepha | 0.000143 | 8.44E-05 | 0.000157 | 9.66E-05 | 2.89E-05 | 2.15E-05 | 2.34E-05 | 3.17E-05 | 5.35E-05 | 3.03E-05 | 3.41E-05 | 7.26E-05 | 94429.68 | 55881.55 | 103791.80 | 63981.83 | 19119.07 | 14251.40 | 15516.52 | 20985.13 | 35435.67 | 20050.60 | 22571.31 | 48073.29 |
| | Saba Yoi | 0.000115 | 6.16E-05 | 0.000123 | 6.39E-05 | 1.69E-05 | 1.53E-05 | 1.24E-05 | 2.43E-05 | 4.07E-05 | 2.01E-05 | 2.53E-05 | 4.18E-05 | 108650.35 | 58298.08 | 116418.83 | 60431.05 | 15957.42 | 14477.71 | 11743.85 | 23016.83 | 38530.50 | 18994.89 | 23974.10 | 39564.21 |
| | Ranot | 0.000249 | 0.000144 | 0.000115 | 0.000114 | 3.7E-05 | 5.36E-05 | 3.85E-05 | 0.000106 | 5.94E-05 | 8.13E-05 | 0.000109 | 0.000114 | 110074.24 | 63550.52 | 50600.79 | 50388.18 | 16346.70 | 23656.62 | 17006.38 | 46897.42 | 26252.11 | 35894.03 | 48181.69 | 50490.42 |
| | Krasae Sin | 0.000277 | 0.000134 | 0.000113 | 9.66E-05 | 1.92E-05 | 2.85E-05 | 2.6E-05 | 0.000109 | 5E-05 | 8.88E-05 | 0.000104 | 0.000121 | 85385.64 | 41406.33 | 34795.27 | 29832.19 | 5938.09 | 8793.22 | 8026.80 | 33726.83 | 15424.18 | 27403.16 | 32029.23 | 37481.47 |
| | Rattaphum | 7.97E-06 | 4.58E-06 | 4.37E-05 | 1.36E-05 | 1.02E-05 | 6.7E-06 | 1.11E-05 | 7.25E-06 | 6.83E-06 | 0.000108 | 6.41E-05 | 7.21E-05 | 5299.08 | 3047.67 | 29091.21 | 9076.44 | 6787.30 | 4455.29 | 7375.58 | 4817.81 | 4544.18 | 71640.12 | 42623.63 | 47921.97 |
| | Sadao | 9.56E-05 | 4.49E-05 | 9.12E-05 | 4.34E-05 | 1.23E-05 | 1.22E-05 | 7.04E-06 | 2.08E-05 | 2.9E-05 | 5.34E-05 | 4.22E-05 | 5.87E-05 | 98830.07 | 46429.40 | 94351.95 | 44886.75 | 12696.69 | 12628.62 | 7281.22 | 21548.80 | 30037.91 | 55228.29 | 43672.93 | 60674.41 |
| | Hat Yai | 5.7E-05 | 3.33E-05 | 7.82E-05 | 3.84E-05 | 1.55E-05 | 1.14E-05 | 1.53E-05 | 1.63E-05 | 2.04E-05 | 7.98E-05 | 5.86E-05 | 8.12E-05 | 45173.86 | 26416.02 | 61974.85 | 30402.34 | 12277.47 | 9053.52 | 12092.81 | 12948.99 | 16178.29 | 63264.32 | 46471.98 | 64368.50 |
| | Na Mom | 0.000173 | 9.75E-05 | 0.000179 | 0.000102 | 3.15E-05 | 2.49E-05 | 2.93E-05 | 3.96E-05 | 5.46E-05 | 9.4E-05 | 8.35E-05 | 0.000138 | 24499.60 | 13822.28 | 25405.18 | 14395.97 | 4463.47 | 3533.31 | 4150.67 | 5614.96 | 7730.78 | 13323.50 | 11831.16 | 19614.17 |
| | Khuan Niang | 4.64E-05 | 3.17E-05 | 9.81E-05 | 4.5E-05 | 2.39E-05 | 1.74E-05 | 2.77E-05 | 2.56E-05 | 2.12E-05 | 0.000174 | 0.000114 | 0.000134 | 11511.79 | 7853.27 | 24330.01 | 11159.76 | 5927.85 | 4311.41 | 6883.64 | 6361.63 | 5255.85 | 43201.10 | 28258.87 | 33352.17 |
| | Bang Klam | 7.74E-05 | 4.79E-05 | 0.000137 | 6.35E-05 | 2.95E-05 | 2.07E-05 | 3.35E-05 | 3.11E-05 | 3.17E-05 | 0.000199 | 0.000136 | 0.000172 | 11205.49 | 6939.92 | 19893.64 | 9186.31 | 4277.00 | 3003.26 | 4855.37 | 4502.14 | 4583.57 | 28879.28 | 19626.33 | 24886.33 |
| | Singhanakhon | 0.000106 | 9.07E-05 | 0.000166 | 0.000106 | 4.9E-05 | 3.67E-05 | 6.02E-05 | 5.58E-05 | 4.61E-05 | 0.000161 | 0.000149 | 0.000206 | 25608.68 | 21931.57 | 40173.93 | 25748.56 | 11855.64 | 8875.62 | 14558.14 | 13507.69 | 11160.47 | 38945.30 | 35972.85 | 49739.23 |
| | Khlong Hoi Khong | 5.32E-05 | 2.64E-05 | 8.71E-05 | 3.42E-05 | 1.66E-05 | 1.13E-05 | 1.43E-05 | 1.63E-05 | 2.17E-05 | 0.000118 | 7.78E-05 | 0.000102 | 16097.70 | 7999.21 | 26377.35 | 10348.03 | 5013.67 | 3414.16 | 4318.55 | 4942.76 | 6567.01 | 35830.34 | 23564.23 | 30799.32 |

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 3.6E-05 | 1.7E-05 | 5.95E-05 | 2.86E-05 | 1.23E-05 | 1.2E-05 | 1.21E-05 | 1.52E-05 | 1.98E-05 | 9.37E-05 | 6.44E-05 | 0.000101 | 35066.37 | 16567.29 | 57994.45 | 27874.60 | 12002.74 | 11657.23 | 11796.04 | 14786.55 | 19276.16 | 91350.19 | 62803.13 | 98176.94 |
| | Khuan Don | 2.8E-05 | 1.18E-05 | 0.000122 | 3.47E-05 | 2.7E-05 | 1.45E-05 | 2.45E-05 | 1.89E-05 | 2.48E-05 | 0.000244 | 0.000154 | 0.000199 | 6183.13 | 2602.44 | 27000.50 | 7664.89 | 5968.32 | 3207.33 | 5405.17 | 4181.46 | 5483.71 | 53869.00 | 33996.59 | 43976.29 |
| | Khuan Kalong | 2.15E-05 | 1.15E-05 | 8.79E-05 | 2.93E-05 | 2.07E-05 | 1.21E-05 | 2.14E-05 | 1.46E-05 | 1.61E-05 | 0.000193 | 0.000127 | 0.00017 | 11456.82 | 6134.00 | 46765.61 | 15580.51 | 11023.31 | 6462.53 | 11380.40 | 7764.68 | 8563.59 | 102518.52 | 67560.94 | 90479.48 |
| | Tha Phae | 1.77E-05 | 1.11E-05 | 7.86E-05 | 3.19E-05 | 1.94E-05 | 1.16E-05 | 2.03E-05 | 1.32E-05 | 1.53E-05 | 0.000177 | 0.000116 | 0.000204 | 3991.05 | 2500.42 | 17670.74 | 7173.11 | 4367.88 | 2603.06 | 4572.47 | 2980.14 | 3432.10 | 39742.78 | 26042.46 | 45919.97 |
| | La-ngu | 5.26E-06 | 5.75E-06 | 4.66E-05 | 1.96E-05 | 1.32E-05 | 7.33E-06 | 1.58E-05 | 7.93E-06 | 7.13E-06 | 0.00012 | 8.71E-05 | 0.000141 | 2083.20 | 2279.44 | 18477.91 | 7777.89 | 5228.75 | 2905.00 | 6263.67 | 3141.21 | 2824.37 | 47631.98 | 34488.59 | 55950.95 |
| | Thung Wa | 9.49E-06 | 6.96E-06 | 4.6E-05 | 1.81E-05 | 1.34E-05 | 7.59E-06 | 1.77E-05 | 9.87E-06 | 7.5E-06 | 0.00012 | 9.96E-05 | 0.000124 | 4375.77 | 3206.21 | 21204.33 | 8362.09 | 6159.36 | 3498.72 | 8173.04 | 4547.78 | 3456.84 | 55217.86 | 45928.08 | 57012.08 |
| | Manang | 1.77E-05 | 1.15E-05 | 8.45E-05 | 3.16E-05 | 2.24E-05 | 1.28E-05 | 2.7E-05 | 1.61E-05 | 1.42E-05 | 0.000209 | 0.000155 | 0.000205 | 3727.71 | 2413.70 | 17758.37 | 6645.55 | 4699.46 | 2687.73 | 5661.97 | 3376.48 | 2986.45 | 44001.13 | 32519.79 | 43026.89 |
| TRANG | Mueang Trang | 0.000228 | 8.39E-05 | 9.5E-05 | 7.73E-05 | 7.34E-06 | 2.17E-05 | 1.15E-05 | 7.1E-05 | 5.96E-05 | 6.36E-05 | 9.4E-05 | 6.34E-05 | 100292.70 | 36908.51 | 41778.00 | 34004.88 | 3228.92 | 9567.97 | 5049.24 | 31222.61 | 26220.49 | 27995.73 | 41335.42 | 27893.65 |
| | Kantang | 0.000111 | 3.77E-05 | 6.3E-05 | 4.38E-05 | 1.1E-05 | 2.13E-05 | 1.39E-05 | 4.18E-05 | 3.37E-05 | 0.000108 | 9.87E-05 | 9.64E-05 | 71725.85 | 24367.50 | 40753.65 | 28312.01 | 7102.24 | 13753.44 | 9001.64 | 27033.60 | 21815.79 | 69921.09 | 63894.41 | 62374.10 |
| | Yan Ta Khao | 0.000133 | 5.26E-05 | 7.66E-05 | 5.25E-05 | 1.12E-05 | 1.33E-05 | 1.64E-05 | 4.66E-05 | 3.58E-05 | 9.97E-05 | 0.000106 | 0.000101 | 59140.78 | 23305.72 | 33978.66 | 23257.58 | 4958.45 | 5915.42 | 7287.79 | 20651.99 | 15869.18 | 44216.52 | 47034.00 | 44643.82 |
| | Palian | 2.47E-05 | 1.24E-05 | 4.44E-05 | 2.05E-05 | 1.2E-05 | 7.72E-06 | 1.68E-05 | 1.39E-05 | 1.02E-05 | 0.000104 | 9.57E-05 | 0.00011 | 20107.77 | 10105.83 | 36152.78 | 16718.65 | 9761.39 | 6280.76 | 13693.35 | 11337.52 | 8267.78 | 84725.03 | 77925.75 | 89549.94 |
| | Sikao | 0.000321 | 8.88E-05 | 0.00013 | 9.53E-05 | 1.16E-05 | 6.87E-05 | 8.49E-06 | 8.84E-05 | 9.53E-05 | 0.000102 | 0.000109 | 8.01E-05 | 148400.62 | 40999.68 | 59841.19 | 44006.07 | 5332.16 | 31693.22 | 3920.94 | 40815.37 | 43979.29 | 47190.48 | 50167.28 | 36974.24 |
| | Huai Yot | 0.000242 | 8.77E-05 | 9.06E-05 | 8.11E-05 | 6.07E-06 | 3.6E-05 | 1.01E-05 | 7.86E-05 | 6.46E-05 | 5.44E-05 | 9.92E-05 | 5.27E-05 | 187041.25 | 67839.69 | 70067.76 | 62753.55 | 4699.61 | 27882.43 | 7848.94 | 60845.75 | 49996.58 | 42112.38 | 76763.47 | 40735.38 |
| | Wang Wiset | 0.00034 | 0.000103 | 0.000125 | 0.000103 | 9.55E-06 | 7.24E-05 | 8.64E-06 | 0.000102 | 9.85E-05 | 8.8E-05 | 0.000125 | 7.22E-05 | 170174.07 | 51464.62 | 62817.41 | 51732.51 | 4784.96 | 36267.15 | 4327.72 | 51174.59 | 49378.51 | 44102.43 | 62505.05 | 36195.72 |
| | Na Yong | 0.000331 | 0.000131 | 0.000138 | 0.000114 | 9.64E-06 | 1.7E-05 | 1.74E-05 | 0.000105 | 8.21E-05 | 7.79E-05 | 0.000129 | 8.59E-05 | 81511.25 | 32162.63 | 33929.74 | 28054.75 | 2375.83 | 4180.72 | 4298.38 | 25786.26 | 20224.47 | 19185.86 | 31867.07 | 21153.52 |
| | Ratsada | 0.000381 | 0.000151 | 0.000137 | 0.000144 | 1.18E-05 | 8.38E-05 | 2.38E-05 | 0.000139 | 0.000103 | 9.15E-05 | 0.000198 | 8.64E-05 | 83746.00 | 33083.21 | 30054.79 | 31620.09 | 2593.52 | 18391.85 | 5218.70 | 30617.47 | 22711.70 | 20089.91 | 43359.10 | 18963.17 |
| | Hat Samran | 0.000106 | 4.51E-05 | 0.000129 | 7E-05 | 3.38E-05 | 2.86E-05 | 4.64E-05 | 5.69E-05 | 3.98E-05 | 0.000312 | 0.000277 | 0.000317 | 19465.23 | 8270.91 | 23672.89 | 12831.42 | 6186.03 | 5249.15 | 8503.75 | 10432.63 | 7298.03 | 57109.90 | 50770.16 | 58098.33 |
| PHATTHALUNG | Mueang Phatthalung | 0.00016 | 7.28E-05 | 6.29E-05 | 5.36E-05 | 8.15E-06 | 1.4E-05 | 1.31E-05 | 6.14E-05 | 2.98E-05 | 5.5E-05 | 6.39E-05 | 6.85E-05 | 77550.47 | 35282.97 | 30494.76 | 25985.95 | 3949.91 | 6791.27 | 6363.28 | 29753.17 | 14448.28 | 26665.01 | 30956.73 | 33209.15 |
| | Kong Ra | 0.000167 | 7.08E-05 | 0.0001 | 6.64E-05 | 1.51E-05 | 1.6E-05 | 2.22E-05 | 6.18E-05 | 4.1E-05 | 0.000138 | 0.000134 | 0.000133 | 51022.10 | 21605.87 | 30524.56 | 20249.26 | 4593.08 | 4893.06 | 6770.84 | 18847.76 | 12512.23 | 41991.76 | 40900.35 | 40460.42 |
| | Khao Chaison | 0.000117 | 5.43E-05 | 5.93E-05 | 4.31E-05 | 9.52E-06 | 1.15E-05 | 1.31E-05 | 4.57E-05 | 2.36E-05 | 6.86E-05 | 6.55E-05 | 7.07E-05 | 39395.06 | 18241.01 | 19922.52 | 14484.72 | 3196.91 | 3852.83 | 4413.80 | 15343.27 | 7910.69 | 23017.94 | 22004.45 | 23721.01 |
| | Tamot | 6.04E-05 | 2.7E-05 | 7.29E-05 | 3.37E-05 | 1.49E-05 | 1.12E-05 | 1.92E-05 | 2.76E-05 | 1.84E-05 | 0.000153 | 0.000113 | 0.000122 | 16715.10 | 7471.85 | 20179.59 | 9328.82 | 4134.67 | 3096.98 | 5314.34 | 7634.90 | 5082.53 | 42433.24 | 31380.89 | 33761.12 |
| | Khuan Khanun | 0.000167 | 8.23E-05 | 6.83E-05 | 6.65E-05 | 1.39E-05 | 2.57E-05 | 1.77E-05 | 6.54E-05 | 3.85E-05 | 4.86E-05 | 7.1E-05 | 6.22E-05 | 90421.04 | 44500.88 | 36908.63 | 35917.93 | 7503.40 | 13864.65 | 9565.09 | 35338.92 | 20789.13 | 26271.93 | 38388.03 | 33630.26 |
| | Pak Phayun | 7.32E-05 | 4.37E-05 | 7.51E-05 | 4.41E-05 | 1.98E-05 | 1.77E-05 | 2.17E-05 | 3.44E-05 | 2.14E-05 | 0.000116 | 8.6E-05 | 9.62E-05 | 35373.82 | 21090.78 | 36305.35 | 21328.06 | 9569.77 | 8533.54 | 10494.10 | 16634.85 | 10341.92 | 55914.29 | 41542.27 | 46472.34 |
| | Si Banphot | 0.000348 | 0.000143 | 0.000141 | 0.000123 | 1.17E-05 | 2.38E-05 | 2.03E-05 | 0.000114 | 8.5E-05 | 7.47E-05 | 0.000134 | 8.64E-05 | 83413.61 | 34382.16 | 33732.72 | 29492.39 | 2796.03 | 5720.30 | 4873.50 | 27463.18 | 20400.96 | 17924.72 | 32180.32 | 20724.58 |
| | Pa Bon | 1.7E-05 | 8.22E-06 | 4.64E-05 | 1.63E-05 | 1.05E-05 | 7.52E-06 | 1.21E-05 | 1.12E-05 | 8.17E-06 | 0.000116 | 7.13E-05 | 7.66E-05 | 8266.82 | 3990.69 | 22492.10 | 7887.43 | 5102.11 | 3649.89 | 5869.13 | 5418.19 | 3964.48 | 56095.90 | 34589.34 | 37177.03 |
| | Bang Kaeo | 0.000156 | 7.48E-05 | 9.97E-05 | 6.49E-05 | 1.88E-05 | 1.95E-05 | 2.38E-05 | 6.33E-05 | 3.45E-05 | 0.000139 | 0.000115 | 0.000124 | 24121.09 | 11594.71 | 15456.66 | 10053.69 | 2914.43 | 3019.99 | 3695.33 | 9811.76 | 5353.69 | 21500.94 | 17799.74 | 19220.43 |
| | Pa Phayom | 0.00033 | 0.000144 | 0.00013 | 0.000127 | 1.7E-05 | 4.85E-05 | 2.55E-05 | 0.000118 | 8.37E-05 | 7.76E-05 | 0.000142 | 8.76E-05 | 99643.00 | 43433.47 | 39328.63 | 38244.27 | 5147.63 | 14666.45 | 7711.74 | 35526.08 | 25295.92 | 23452.85 | 42999.95 | 26472.53 |
| | Srinagarindra | 0.000251 | 0.000102 | 0.000109 | 8.77E-05 | 9.13E-06 | 1.57E-05 | 1.65E-05 | 8.37E-05 | 5.95E-05 | 8.13E-05 | 0.000113 | 8.62E-05 | 63262.44 | 25700.77 | 27492.25 | 22146.37 | 2305.59 | 3966.80 | 4174.43 | 21127.13 | 15037.83 | 20525.53 | 28656.23 | 21762.79 |

**Table E-1** Maximum $SO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 0.000351 | 0.000253 | 0.000495 | 0.000311 | 0.000116 | 7.22E-05 | 0.000101 | 8.53E-05 | 0.000169 | 0.000101 | 9.77E-05 | 0.000218 | 33033.72 | 23826.76 | 46657.49 | 29298.95 | 10908.10 | 6808.02 | 9533.61 | 8036.20 | 15965.79 | 9528.86 | 9206.23 | 20529.39 |
| | Khok Pho | 0.000225 | 0.00016 | 0.000336 | 0.000224 | 7.72E-05 | 4.68E-05 | 6.91E-05 | 6.09E-05 | 0.000116 | 7.56E-05 | 6.89E-05 | 0.000163 | 68165.27 | 48462.12 | 101640.12 | 67766.74 | 23356.77 | 14159.42 | 20886.04 | 18404.88 | 35063.69 | 22852.67 | 20842.68 | 49347.79 |
| | Nong Chik | 0.000316 | 0.000227 | 0.000466 | 0.00031 | 0.000108 | 6.59E-05 | 9.68E-05 | 8.41E-05 | 0.000161 | 0.000104 | 9.59E-05 | 0.000226 | 75153.60 | 53805.27 | 110793.06 | 73553.53 | 25744.79 | 15641.62 | 22986.26 | 19983.03 | 38216.89 | 24681.34 | 22786.70 | 53682.02 |
| | Panare | 0.000316 | 0.000297 | 0.000462 | 0.000277 | 0.000147 | 8.55E-05 | 0.000123 | 6.22E-05 | 0.000155 | 7.14E-05 | 7.72E-05 | 0.000167 | 45381.62 | 42740.34 | 66404.82 | 39839.24 | 21120.95 | 12294.11 | 17703.41 | 8945.82 | 22304.06 | 10267.66 | 11105.22 | 24039.49 |
| | Mayo | 0.000207 | 0.000169 | 0.000295 | 0.00017 | 7.82E-05 | 4.81E-05 | 6.6E-05 | 4.33E-05 | 9.8E-05 | 4.97E-05 | 5.23E-05 | 0.000107 | 41898.53 | 34107.89 | 59591.38 | 34358.93 | 15806.06 | 9720.02 | 13349.47 | 8742.44 | 19813.24 | 10048.54 | 10565.17 | 21550.24 |
| | Thung Yang Daeng | 0.000189 | 0.00016 | 0.000275 | 0.000152 | 7.46E-05 | 4.59E-05 | 6.19E-05 | 3.75E-05 | 8.86E-05 | 4.39E-05 | 4.73E-05 | 9.21E-05 | 26255.91 | 22216.07 | 38358.19 | 21182.02 | 10383.82 | 6395.44 | 8612.81 | 5221.84 | 12330.02 | 6110.62 | 6584.63 | 12820.61 |
| | Sai Buri | 0.000255 | 0.000246 | 0.000373 | 0.000225 | 0.000122 | 7.05E-05 | 0.000102 | 4.95E-05 | 0.000126 | 5.62E-05 | 6.16E-05 | 0.000134 | 52063.49 | 50082.63 | 76141.11 | 45922.27 | 24895.43 | 14368.16 | 20877.15 | 10092.17 | 25672.32 | 11454.69 | 12559.61 | 27385.93 |
| | Mai Kaen | 0.000701 | 0.000617 | 0.001057 | 0.000561 | 0.00029 | 0.00018 | 0.000232 | 0.000132 | 0.000319 | 0.000157 | 0.000174 | 0.000328 | 40727.87 | 35827.63 | 61348.69 | 32553.11 | 16856.87 | 10446.09 | 13447.89 | 7677.47 | 18547.80 | 9114.61 | 10098.12 | 19070.42 |
| | Yaring | 0.000217 | 0.000175 | 0.000305 | 0.000181 | 8.08E-05 | 4.95E-05 | 6.87E-05 | 4.63E-05 | 0.000103 | 5.27E-05 | 5.48E-05 | 0.000115 | 46966.91 | 37752.97 | 65873.49 | 39062.05 | 17471.41 | 10699.95 | 14848.70 | 10018.83 | 22225.38 | 11387.66 | 11858.68 | 24976.95 |
| | Yarang | 0.000321 | 0.000228 | 0.000446 | 0.000261 | 0.0001 | 6.46E-05 | 8.65E-05 | 7.3E-05 | 0.00015 | 8.49E-05 | 8.49E-05 | 0.000174 | 69988.37 | 49744.33 | 97431.90 | 56911.55 | 21876.06 | 14099.99 | 18888.64 | 15942.58 | 32789.62 | 18545.35 | 18529.68 | 38092.42 |
| | Kapho | 0.000454 | 0.000396 | 0.000668 | 0.000365 | 0.000186 | 0.000114 | 0.000153 | 8.7E-05 | 0.000211 | 0.0001 | 0.000111 | 0.000215 | 37533.72 | 32752.87 | 55300.13 | 30215.66 | 15405.13 | 9395.72 | 12657.48 | 7194.73 | 17467.13 | 8298.41 | 9218.12 | 17764.96 |
| | Mae Lan | 0.000393 | 0.000274 | 0.000563 | 0.000353 | 0.000125 | 7.89E-05 | 0.00011 | 9.85E-05 | 0.000193 | 0.000119 | 0.000112 | 0.000249 | 30685.38 | 21384.87 | 43976.22 | 27549.51 | 9771.01 | 6162.62 | 8616.18 | 7691.09 | 15045.68 | 9294.46 | 8771.13 | 19472.05 |
| YALA | Mueang Yala | 0.000223 | 0.000138 | 0.000295 | 0.000154 | 5.34E-05 | 3.91E-05 | 4.63E-05 | 4.95E-05 | 9.94E-05 | 5.75E-05 | 5.79E-05 | 0.000103 | 71259.29 | 44227.04 | 94205.84 | 49235.79 | 17073.71 | 12508.64 | 14813.48 | 15808.56 | 31767.11 | 18391.61 | 18520.56 | 33015.78 |
| | Betong | 7.95E-05 | 4.95E-05 | 0.000124 | 3.85E-05 | 7.28E-06 | 7.79E-06 | 4.39E-06 | 1.85E-05 | 1.99E-05 | 3.61E-05 | 3.45E-05 | 1.45E-05 | 104825.66 | 65260.76 | 163536.30 | 50772.49 | 9602.53 | 10282.45 | 5791.81 | 24464.95 | 26222.92 | 47567.66 | 45556.00 | 19189.29 |
| | Bannang Sata | 0.000162 | 7.35E-05 | 0.000195 | 5.39E-05 | 1.2E-05 | 1.94E-05 | 1.02E-05 | 3.08E-05 | 6.07E-05 | 4.25E-05 | 4.32E-05 | 2.93E-05 | 93970.34 | 42593.83 | 113222.07 | 31255.32 | 6939.64 | 11220.58 | 5901.98 | 17840.22 | 35217.61 | 24634.78 | 25057.66 | 16974.97 |
| | Than To | 0.000166 | 8.43E-05 | 0.000219 | 6.03E-05 | 1.15E-05 | 1.78E-05 | 7.82E-06 | 3.37E-05 | 5.36E-05 | 5.62E-05 | 5.56E-05 | 2.65E-05 | 112115.87 | 56828.03 | 147705.47 | 40617.99 | 7745.94 | 12026.60 | 5272.12 | 22681.39 | 36144.15 | 37864.39 | 37429.29 | 17863.00 |
| | Yaha | 0.000242 | 0.000114 | 0.000272 | 0.000101 | 2.72E-05 | 3.35E-05 | 2.41E-05 | 4.98E-05 | 9.9E-05 | 5.92E-05 | 5.9E-05 | 7E-05 | 113622.28 | 53553.99 | 127587.20 | 47383.21 | 12782.87 | 15758.25 | 11302.89 | 23384.33 | 46540.39 | 27800.00 | 27723.72 | 32881.90 |
| | Raman | 0.000129 | 8.36E-05 | 0.000182 | 7.71E-05 | 3.08E-05 | 2.31E-05 | 2.49E-05 | 2.41E-05 | 5.32E-05 | 2.85E-05 | 3.23E-05 | 4.28E-05 | 62440.93 | 40542.03 | 88394.12 | 37385.15 | 14927.40 | 11207.64 | 12062.64 | 11696.65 | 25814.59 | 13796.10 | 15681.16 | 20748.71 |
| | Kabang | 0.000147 | 6.61E-05 | 0.000156 | 5.4E-05 | 1.13E-05 | 1.76E-05 | 8.67E-06 | 2.96E-05 | 5.35E-05 | 3.07E-05 | 3.46E-05 | 3.44E-05 | 65231.05 | 29351.29 | 69339.99 | 23991.63 | 5002.05 | 7839.77 | 3849.63 | 13155.08 | 23784.13 | 13658.13 | 15381.70 | 15283.87 |
| | Krong Pinang | 0.00028 | 0.000136 | 0.000334 | 0.000116 | 3.27E-05 | 3.86E-05 | 2.87E-05 | 5.57E-05 | 0.000112 | 6.82E-05 | 7.01E-05 | 7.28E-05 | 51368.71 | 25021.35 | 61382.45 | 21285.76 | 6009.48 | 7091.23 | 5282.23 | 10231.01 | 20668.53 | 12533.15 | 12882.42 | 13375.25 |
| NARATHIWAT | Mueang Narathiwat | 0.000164 | 0.000148 | 0.000319 | 0.000108 | 6.5E-05 | 5.27E-05 | 3.08E-05 | 2.64E-05 | 5.29E-05 | 5.16E-05 | 5E-05 | 6.1E-05 | 51516.85 | 46709.29 | 100341.97 | 33960.54 | 20491.30 | 16606.62 | 9700.12 | 8330.91 | 16679.20 | 16269.83 | 15748.01 | 19223.47 |
| | Tak Bai | 8.9E-05 | 0.000145 | 0.000278 | 9.45E-05 | 8.25E-05 | 6.56E-05 | 2.53E-05 | 1.26E-05 | 1.56E-05 | 5.27E-05 | 3.9E-05 | 7.18E-05 | 24893.96 | 40448.43 | 77868.26 | 26421.70 | 23086.38 | 18359.80 | 7074.24 | 3533.79 | 4357.02 | 14748.25 | 10901.34 | 20081.16 |
| | Bacho | 0.000274 | 0.000218 | 0.000418 | 0.000195 | 9.48E-05 | 6.29E-05 | 7.28E-05 | 4.97E-05 | 0.000116 | 5.88E-05 | 6.81E-05 | 0.000109 | 50192.97 | 39853.08 | 76413.86 | 35732.86 | 17338.34 | 11512.33 | 13314.30 | 9097.01 | 21202.61 | 10749.68 | 12462.55 | 19900.88 |
| | Yi-ngo | 0.000227 | 0.000146 | 0.00036 | 0.000115 | 4.82E-05 | 4.12E-05 | 2.92E-05 | 3.56E-05 | 7.82E-05 | 4.73E-05 | 5.86E-05 | 4.88E-05 | 42130.52 | 27145.72 | 66866.35 | 21330.94 | 8946.41 | 7652.20 | 5423.72 | 6618.17 | 14528.53 | 8788.99 | 10894.47 | 9073.07 |
| | Ra-ngae | 0.000157 | 9.34E-05 | 0.000256 | 6.73E-05 | 2.47E-05 | 2.58E-05 | 1.26E-05 | 2.43E-05 | 5.09E-05 | 3.41E-05 | 4.19E-05 | 2.22E-05 | 69349.84 | 41135.44 | 112764.74 | 29622.64 | 10858.80 | 11372.31 | 5553.30 | 10707.20 | 22432.54 | 15034.36 | 18467.90 | 9764.78 |
| | Rueso | 0.000114 | 5.97E-05 | 0.000167 | 4.98E-05 | 1.44E-05 | 1.42E-05 | 1.04E-05 | 1.8E-05 | 3.95E-05 | 1.87E-05 | 2.72E-05 | 1.72E-05 | 54214.61 | 28396.19 | 79433.12 | 23686.81 | 6840.97 | 6759.24 | 4934.62 | 8576.61 | 18768.22 | 8889.72 | 12919.62 | 8192.52 |
| | Si Sakhon | 0.000154 | 7.37E-05 | 0.000225 | 5.44E-05 | 1.13E-05 | 1.58E-05 | 6.9E-06 | 2.4E-05 | 4.99E-05 | 3.16E-05 | 4.1E-05 | 1.25E-05 | 80747.90 | 38565.30 | 117522.93 | 28476.10 | 5931.36 | 8293.51 | 3612.04 | 12540.10 | 26137.54 | 16530.90 | 21471.48 | 6566.27 |
| | Waeng | 0.000107 | 9.05E-05 | 0.000205 | 3.51E-05 | 1.87E-05 | 3.43E-05 | 1.27E-05 | 3.01E-05 | 4.59E-05 | 5.56E-05 | 3.77E-05 | 1.64E-05 | 30156.86 | 25555.29 | 58035.69 | 9912.73 | 5270.83 | 9694.44 | 3595.57 | 8500.99 | 12950.96 | 15714.06 | 10642.93 | 4624.76 |
| | Sukhirin | 0.000104 | 6.81E-05 | 0.000159 | 2.87E-05 | 1.28E-05 | 1.99E-05 | 7.26E-06 | 2.09E-05 | 4.13E-05 | 6.19E-05 | 4.62E-05 | 1.13E-05 | 53484.65 | 35131.02 | 81784.46 | 14795.22 | 6608.97 | 10265.74 | 3747.21 | 10775.27 | 21320.97 | 31912.81 | 23832.88 | 5849.29 |
| | Su-ngai Kolok | 9.87E-05 | 0.000115 | 0.000238 | 6.42E-05 | 4.88E-05 | 4.87E-05 | 1.98E-05 | 2.17E-05 | 3.27E-05 | 4.95E-05 | 3.55E-05 | 4.25E-05 | 13496.73 | 15730.29 | 32528.25 | 8781.39 | 6671.08 | 6653.51 | 2703.59 | 2967.90 | 4474.15 | 6769.18 | 4857.92 | 5811.18 |
| | Su-ngai Padi | 7.52E-05 | 7.78E-05 | 0.000166 | 4.52E-05 | 3.2E-05 | 3.1E-05 | 1.28E-05 | 1.47E-05 | 2.45E-05 | 3.57E-05 | 2.75E-05 | 2.8E-05 | 28724.33 | 29735.55 | 63297.20 | 17282.30 | 12231.95 | 11864.02 | 4908.98 | 5636.77 | 9346.55 | 13645.16 | 10493.42 | 10703.37 |
| | Chanae | 9.08E-05 | 5.13E-05 | 0.000131 | 2.68E-05 | 8.9E-06 | 1.31E-05 | 4.89E-06 | 1.59E-05 | 3.34E-05 | 4.19E-05 | 3.54E-05 | 8.6E-06 | 52367.78 | 29616.43 | 75828.63 | 15458.31 | 5135.34 | 7537.82 | 2818.70 | 9167.85 | 19268.51 | 24182.32 | 20415.21 | 4959.50 |
| | Cho-airong | 0.000125 | 0.000124 | 0.00027 | 8.15E-05 | 5.51E-05 | 4.8E-05 | 2.12E-05 | 2.05E-05 | 3.69E-05 | 4.95E-05 | 4.29E-05 | 4.86E-05 | 24336.51 | 24151.87 | 52462.47 | 15827.12 | 10699.86 | 9312.22 | 4112.60 | 3975.73 | 7167.23 | 9609.56 | 8337.40 | 9431.12 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 7.92E-05 | 3.83E-05 | 2.75E-05 | 3.82E-05 | 1.25E-05 | 2.93E-05 | 1.37E-05 | 4.22E-05 | 2.44E-05 | 2.41E-05 | 4.53E-05 | 2.82E-05 | 44098.52 | 21336.38 | 15293.38 | 21246.63 | 6980.54 | 16338.43 | 7627.13 | 23497.82 | 13587.85 | 13425.55 | 25212.81 | 15716.91 |
| | Phrom Khiri | 0.000187 | 6.82E-05 | 3.55E-05 | 5.65E-05 | 1.24E-05 | 5.17E-05 | 1.49E-05 | 9.51E-05 | 5.22E-05 | 3.57E-05 | 8.9E-05 | 4.05E-05 | 46122.13 | 16801.79 | 8760.15 | 13919.69 | 3046.85 | 12755.24 | 3685.18 | 23433.86 | 12858.03 | 8788.71 | 21950.90 | 9987.31 |
| | Lan Saka | 0.000145 | 5.71E-05 | 3.64E-05 | 5.17E-05 | 1.01E-05 | 4.21E-05 | 1.31E-05 | 7.02E-05 | 4.12E-05 | 3.26E-05 | 7.67E-05 | 3.56E-05 | 50031.97 | 19683.97 | 12551.28 | 17811.85 | 3478.14 | 14493.66 | 4525.35 | 24201.00 | 14215.09 | 11242.47 | 26429.93 | 12270.14 |
| | Chawang | 0.000114 | 3.71E-05 | 2.11E-05 | 3.54E-05 | 4.54E-06 | 3.11E-05 | 5.75E-06 | 5.49E-05 | 3.47E-05 | 2.13E-05 | 6.89E-05 | 2.72E-05 | 49507.69 | 16064.21 | 9152.90 | 15330.16 | 1965.39 | 13470.30 | 2491.49 | 23797.26 | 15031.00 | 9208.54 | 29833.78 | 11802.76 |
| | Phipun | 0.000117 | 3.93E-05 | 2.15E-05 | 3.57E-05 | 6.62E-06 | 3.23E-05 | 7.89E-06 | 5.84E-05 | 3.49E-05 | 2.17E-05 | 6.79E-05 | 2.78E-05 | 57656.44 | 19395.79 | 10626.12 | 17639.17 | 3271.35 | 15947.26 | 3895.76 | 28839.11 | 17213.00 | 10723.89 | 33510.20 | 13707.14 |
| | Chian Yai | 7.81E-05 | 6.02E-05 | 4E-05 | 5.34E-05 | 2.43E-05 | 3.74E-05 | 2.33E-05 | 4.2E-05 | 2.73E-05 | 3.36E-05 | 4.63E-05 | 4.54E-05 | 25130.50 | 19369.26 | 12883.96 | 17171.77 | 7803.50 | 12041.02 | 7505.73 | 13516.31 | 8790.54 | 10796.74 | 14889.39 | 14617.59 |
| | Cha-uat | 6E-05 | 3.24E-05 | 2.51E-05 | 2.9E-05 | 7.63E-06 | 1.69E-05 | 8.91E-06 | 2.58E-05 | 1.68E-05 | 1.84E-05 | 3.18E-05 | 2.2E-05 | 45024.86 | 24320.90 | 18856.11 | 21784.97 | 5726.10 | 12657.77 | 6687.17 | 19339.98 | 12640.68 | 13783.42 | 23848.16 | 16547.21 |
| | Tha Sala | 0.000119 | 4.18E-05 | 2.55E-05 | 4E-05 | 1.11E-05 | 3.55E-05 | 1.22E-05 | 6.01E-05 | 3.5E-05 | 2.54E-05 | 7.15E-05 | 3.22E-05 | 49699.53 | 17455.96 | 10641.98 | 16702.88 | 4630.10 | 14816.41 | 5109.32 | 25124.54 | 14633.86 | 10625.04 | 29870.24 | 13457.63 |
| | Thung Song | 7.83E-05 | 3.06E-05 | 2.54E-05 | 2.96E-05 | 2.07E-06 | 1.99E-05 | 4.95E-06 | 3.1E-05 | 2.15E-05 | 1.9E-05 | 4.53E-05 | 1.78E-05 | 71248.76 | 27800.00 | 23077.41 | 26906.25 | 1882.48 | 18137.39 | 4503.14 | 28218.19 | 19544.20 | 17242.09 | 41245.41 | 16212.23 |
| | Na Bon | 0.000179 | 6.35E-05 | 4.54E-05 | 6E-05 | 4.99E-06 | 4.78E-05 | 8.63E-06 | 7.68E-05 | 5.18E-05 | 3.84E-05 | 0.000103 | 4.04E-05 | 37292.78 | 13195.59 | 9424.79 | 12468.60 | 1036.88 | 9938.08 | 1793.88 | 15966.80 | 10762.17 | 7978.84 | 21416.64 | 8386.73 |
| | Thung Yai | 0.000103 | 3.29E-05 | 2.2E-05 | 3.16E-05 | 1.97E-06 | 2.83E-05 | 2.7E-06 | 4.48E-05 | 3.11E-05 | 2.1E-05 | 6.18E-05 | 2.34E-05 | 62164.02 | 19769.33 | 13206.17 | 18958.20 | 1183.41 | 17006.45 | 1620.42 | 26914.12 | 18672.97 | 12586.98 | 37118.52 | 14083.10 |
| | Pak Phanang | 7.24E-05 | 4.86E-05 | 3.66E-05 | 4.88E-05 | 2.02E-05 | 3.44E-05 | 2.05E-05 | 4.11E-05 | 2.48E-05 | 3.08E-05 | 4.46E-05 | 3.85E-05 | 38442.34 | 25772.41 | 19444.75 | 25869.62 | 10728.03 | 18274.83 | 10888.18 | 21810.31 | 13159.55 | 16332.38 | 23663.62 | 20453.88 |
| | Ron Phibun | 9.45E-05 | 4.46E-05 | 3.52E-05 | 4.32E-05 | 8.46E-06 | 2.91E-05 | 1.17E-05 | 4.15E-05 | 2.7E-05 | 2.74E-05 | 5.58E-05 | 2.84E-05 | 40591.44 | 19160.97 | 15118.88 | 18531.18 | 3630.78 | 12488.51 | 5010.04 | 17838.97 | 11593.77 | 11757.03 | 23969.04 | 12213.06 |
| | Sichon | 5.4E-05 | 9.64E-06 | 5.3E-06 | 1.1E-05 | 3.96E-06 | 1.24E-05 | 3.46E-06 | 2.26E-05 | 1.58E-05 | 7.85E-06 | 4.74E-05 | 1.48E-05 | 37104.23 | 6625.85 | 3646.42 | 7548.63 | 2720.56 | 8515.26 | 2377.35 | 15560.61 | 10887.18 | 5398.12 | 32566.08 | 10194.54 |
| | Khanom | 7.42E-05 | 2.65E-05 | 2.17E-05 | 3.12E-05 | 1.73E-05 | 2.62E-05 | 1.5E-05 | 4.08E-05 | 3.35E-05 | 1.89E-05 | 8.64E-05 | 3.6E-05 | 23109.55 | 8245.70 | 6747.33 | 9721.07 | 5385.14 | 8145.97 | 4659.98 | 12692.47 | 10422.45 | 5874.95 | 26898.11 | 11206.77 |
| | Hua Sai | 8.22E-05 | 6.26E-05 | 4.25E-05 | 5.45E-05 | 2.46E-05 | 3.68E-05 | 2.35E-05 | 4.28E-05 | 2.78E-05 | 3.42E-05 | 4.69E-05 | 4.72E-05 | 35962.48 | 27375.68 | 18602.24 | 23848.51 | 10742.23 | 16113.18 | 10272.48 | 18737.53 | 12162.49 | 14954.78 | 20526.69 | 20631.00 |
| | Bang Khan | 0.000113 | 3.91E-05 | 3.34E-05 | 3.66E-05 | 2.13E-06 | 2.8E-05 | 3.58E-06 | 4.24E-05 | 3.26E-05 | 2.47E-05 | 5.83E-05 | 2.36E-05 | 53096.62 | 18354.29 | 15682.92 | 17198.47 | 1001.25 | 13162.53 | 1682.30 | 19902.27 | 15292.67 | 11618.43 | 27380.07 | 11065.93 |
| | Tham Phannara | 0.000174 | 4.99E-05 | 2.73E-05 | 5.25E-05 | 4.05E-06 | 4.61E-05 | 4.92E-06 | 8.27E-05 | 5.51E-05 | 3.08E-05 | 0.000115 | 4.38E-05 | 30701.74 | 8812.01 | 4809.46 | 9264.89 | 715.27 | 8126.29 | 867.34 | 14592.99 | 9722.40 | 5437.39 | 20242.94 | 7725.65 |
| | Chulabhorn | 0.000159 | 6.98E-05 | 5.86E-05 | 6.78E-05 | 7.61E-06 | 4.23E-05 | 1.47E-05 | 6.37E-05 | 4.3E-05 | 4.32E-05 | 9.47E-05 | 4.14E-05 | 36707.81 | 16083.42 | 13511.49 | 15637.73 | 1754.09 | 9752.51 | 3391.66 | 14689.42 | 9912.00 | 9961.04 | 21830.18 | 9541.84 |
| | Phra Phrom | 0.000166 | 8.07E-05 | 5.86E-05 | 7.8E-05 | 2.2E-05 | 5.76E-05 | 2.54E-05 | 8.22E-05 | 4.99E-05 | 4.93E-05 | 9.48E-05 | 5.58E-05 | 24332.13 | 11857.82 | 8619.73 | 11471.80 | 3236.18 | 8472.37 | 3726.79 | 12083.97 | 7335.09 | 7242.10 | 13936.85 | 8197.31 |
| | Nopphitam | 9.72E-05 | 3.17E-05 | 1.87E-05 | 3.07E-05 | 8.11E-06 | 2.82E-05 | 8.72E-06 | 4.94E-05 | 3.01E-05 | 1.89E-05 | 6.55E-05 | 2.65E-05 | 70147.94 | 22861.78 | 13502.22 | 22127.78 | 5855.50 | 20326.22 | 6290.76 | 35638.01 | 21735.44 | 13633.38 | 47265.95 | 19094.76 |
| | Chang Klang | 0.000124 | 4.48E-05 | 2.9E-05 | 4.14E-05 | 5.59E-06 | 3.41E-05 | 8.05E-06 | 5.72E-05 | 3.55E-05 | 2.61E-05 | 6.9E-05 | 2.86E-05 | 33742.84 | 12210.43 | 7900.63 | 11305.64 | 1524.56 | 9312.68 | 2195.98 | 15602.15 | 9695.30 | 7110.01 | 18821.14 | 7806.44 |
| | Chaloem Phra Kiat | 0.000152 | 9.57E-05 | 6.82E-05 | 8.84E-05 | 3.25E-05 | 6.12E-05 | 3.39E-05 | 7.67E-05 | 4.85E-05 | 5.6E-05 | 8.89E-05 | 6.98E-05 | 27516.12 | 17316.06 | 12339.86 | 16000.26 | 5880.86 | 11062.29 | 6129.16 | 13883.78 | 8771.62 | 10139.12 | 16078.67 | 12628.01 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 8.83E-05 | 2.53E-05 | 2.66E-05 | 2.8E-05 | 1.63E-06 | 2.76E-05 | 1.33E-06 | 3.05E-05 | 1.98E-05 | 3.54E-05 | 4.72E-05 | 2.02E-05 | 79884.01 | 22894.37 | 24073.43 | 25349.68 | 1474.63 | 24967.96 | 1208.00 | 27638.06 | 17914.08 | 32035.96 | 42736.04 | 18267.32 |
| | Khao Phanom | 9.78E-05 | 2.9E-05 | 2.43E-05 | 2.95E-05 | 1.59E-06 | 2.76E-05 | 1.72E-06 | 4.02E-05 | 2.74E-05 | 2.63E-05 | 5.93E-05 | 2.32E-05 | 83073.71 | 24662.19 | 20625.02 | 25067.78 | 1353.44 | 23422.91 | 1464.17 | 34188.44 | 23265.62 | 22384.42 | 50417.88 | 19697.06 |
| | Ko Lanta | 0.000145 | 4.88E-05 | 6.02E-05 | 5.16E-05 | 1.2E-05 | 5.96E-05 | 1.01E-05 | 6.26E-05 | 5.21E-05 | 7.03E-05 | 6.94E-05 | 5.37E-05 | 48672.96 | 16417.07 | 20246.60 | 17360.69 | 4028.24 | 20039.50 | 3379.19 | 21027.14 | 17498.76 | 23635.69 | 23314.46 | 18043.73 |
| | Khlong Thom | 8.64E-05 | 2.71E-05 | 2.77E-05 | 2.67E-05 | 2.54E-06 | 2.47E-05 | 2.12E-06 | 3.09E-05 | 2.59E-05 | 2.33E-05 | 3.88E-05 | 1.9E-05 | 96601.51 | 30278.42 | 30960.37 | 29790.25 | 2838.05 | 27628.07 | 2373.72 | 34502.51 | 28967.07 | 26010.95 | 43369.14 | 21223.74 |
| | Ao Luek | 8.76E-05 | 2.02E-05 | 2.23E-05 | 2.41E-05 | 1.3E-06 | 2.44E-05 | 1.25E-06 | 3.71E-05 | 2.2E-05 | 3.67E-05 | 5.67E-05 | 2.18E-05 | 69156.52 | 15953.46 | 17630.50 | 19068.41 | 1025.78 | 19263.94 | 983.51 | 29312.86 | 17337.56 | 28991.17 | 44792.71 | 17234.73 |
| | Plai Phraya | 0.000115 | 2.59E-05 | 3.14E-05 | 3.13E-05 | 1.75E-06 | 2.97E-05 | 1.76E-06 | 5.57E-05 | 3.22E-05 | 3.95E-05 | 8.82E-05 | 3.45E-05 | 61018.33 | 13730.18 | 16629.59 | 16574.99 | 927.89 | 15707.93 | 928.63 | 29475.88 | 17053.71 | 20905.29 | 46651.66 | 18251.70 |
| | Lam Thap | 0.00017 | 5.77E-05 | 4.34E-05 | 5.18E-05 | 2.72E-06 | 4.79E-05 | 3.35E-06 | 6.72E-05 | 5.1E-05 | 3.6E-05 | 9.29E-05 | 3.54E-05 | 47929.26 | 16245.23 | 12232.24 | 14599.99 | 765.70 | 13478.15 | 942.08 | 18934.38 | 14352.21 | 10125.03 | 26169.02 | 9957.53 |
| | Nuea Khlong | 0.000102 | 3.2E-05 | 3.15E-05 | 3.3E-05 | 3.03E-06 | 3.35E-05 | 2.58E-06 | 3.88E-05 | 2.77E-05 | 3.45E-05 | 5.31E-05 | 2.45E-05 | 52385.04 | 16427.62 | 16194.44 | 16954.19 | 1557.50 | 17241.71 | 1327.42 | 19930.26 | 14258.56 | 17737.32 | 27288.41 | 12582.20 |
| PHANGNGA | Mueang Phangnga | 0.000103 | 2.08E-05 | 2.18E-05 | 2.73E-05 | 1.29E-06 | 3.06E-05 | 1.54E-06 | 4.79E-05 | 2.43E-05 | 5.79E-05 | 6.42E-05 | 2.28E-05 | 67240.18 | 13585.61 | 14250.35 | 17855.78 | 844.41 | 19977.09 | 1004.15 | 31339.28 | 15880.81 | 37859.54 | 42006.35 | 14910.02 |
| | Ko Yao | 8.77E-05 | 1.94E-05 | 2.06E-05 | 2.36E-05 | 5.12E-06 | 2.99E-05 | 4.81E-06 | 3.59E-05 | 2.41E-05 | 5.32E-05 | 4.77E-05 | 1.99E-05 | 91397.16 | 20257.25 | 21459.48 | 24568.17 | 5327.78 | 31114.12 | 5009.25 | 37430.66 | 25131.63 | 55443.68 | 49632.49 | 20712.90 |
| | Kapong | 8.83E-05 | 1.84E-05 | 1.84E-05 | 2.33E-05 | 1.38E-06 | 2.83E-05 | 1.79E-06 | 5.21E-05 | 2.53E-05 | 4.85E-05 | 6.32E-05 | 2.25E-05 | 53553.80 | 11154.75 | 11184.13 | 14102.93 | 835.86 | 17182.12 | 1084.47 | 31588.78 | 15336.33 | 29428.28 | 38350.17 | 13634.87 |
| | Takua Thung | 9.46E-05 | 1.4E-05 | 1.47E-05 | 1.98E-05 | 1.49E-06 | 2.6E-05 | 1.51E-06 | 3.79E-05 | 2.23E-05 | 6.04E-05 | 5.25E-05 | 1.62E-05 | 61731.52 | 9154.60 | 9595.32 | 12953.86 | 970.24 | 16969.09 | 985.12 | 24760.67 | 14534.02 | 39426.69 | 34251.75 | 10551.28 |
| | Takua Pa | 8.16E-05 | 1.77E-05 | 1.68E-05 | 2.08E-05 | 1.7E-06 | 2.73E-05 | 2.04E-06 | 5.55E-05 | 2.72E-05 | 4.68E-05 | 6.36E-05 | 2.19E-05 | 49053.32 | 10643.04 | 10080.84 | 12499.51 | 1023.08 | 16402.79 | 1227.93 | 33337.32 | 16366.50 | 28104.57 | 38258.11 | 13151.16 |
| | Khura Buri | 4.34E-05 | 1.96E-05 | 1.68E-05 | 1.85E-05 | 8.73E-06 | 3.14E-05 | 7.18E-06 | 3.68E-05 | 2.25E-05 | 3.75E-05 | 4.1E-05 | 2.08E-05 | 44573.13 | 20131.69 | 17277.02 | 18980.73 | 8966.86 | 32236.73 | 7377.46 | 37816.05 | 23151.80 | 38470.12 | 42113.69 | 21344.05 |
| | Thap Put | 0.00013 | 2.74E-05 | 3.05E-05 | 3.48E-05 | 1.69E-06 | 3.74E-05 | 1.97E-06 | 6.32E-05 | 3.35E-05 | 6.17E-05 | 8.9E-05 | 3.31E-05 | 39049.04 | 8185.96 | 9121.06 | 10415.37 | 504.53 | 11202.11 | 588.16 | 18926.41 | 10026.52 | 18464.79 | 26633.45 | 9911.77 |
| | Thai Mueang | 0.000104 | 2.12E-05 | 2.15E-05 | 2.8E-05 | 1.46E-06 | 3.25E-05 | 1.79E-06 | 5.04E-05 | 2.46E-05 | 6.27E-05 | 6.5E-05 | 2.3E-05 | 63744.18 | 12945.42 | 13133.77 | 17097.38 | 892.12 | 19847.22 | 1097.09 | 30819.54 | 15062.45 | 38361.01 | 39762.20 | 14038.57 |
| PHUKET | Mueang Phuket | 8.82E-05 | 2.19E-05 | 2.25E-05 | 2.62E-05 | 1.21E-05 | 3.38E-05 | 1.19E-05 | 4.07E-05 | 2.98E-05 | 6.19E-05 | 5.02E-05 | 2.34E-05 | 15928.41 | 3953.28 | 4054.31 | 4733.24 | 2192.62 | 6107.40 | 2152.50 | 7341.18 | 5388.19 | 11170.47 | 9067.82 | 4221.52 |
| | Kathu | 0.00021 | 3.86E-05 | 3.98E-05 | 5E-05 | 1.58E-05 | 6.89E-05 | 1.54E-05 | 8.75E-05 | 6.03E-05 | 0.000144 | 0.000113 | 4.28E-05 | 16581.32 | 3055.31 | 3148.70 | 3953.64 | 1249.51 | 5443.32 | 1216.26 | 6914.79 | 4770.16 | 11421.92 | 8939.12 | 3384.48 |
| | Thalang | 0.000144 | 1.58E-05 | 1.64E-05 | 2.45E-05 | 2.94E-06 | 3.81E-05 | 2.78E-06 | 5.31E-05 | 3.47E-05 | 0.0001 | 7.35E-05 | 2E-05 | 41500.80 | 4559.31 | 4734.76 | 7081.52 | 849.43 | 11012.43 | 802.63 | 15347.14 | 10023.62 | 29009.60 | 21237.68 | 5777.66 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | *q* (g/s-m$^2$) | | | | | | | | | | | | *q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 0.000137 | 8.06E-05 | 7.02E-05 | 9.19E-05 | 3.76E-05 | 7.86E-05 | 4.09E-05 | 0.000114 | 7.42E-05 | 5.52E-05 | 0.000167 | 8.15E-05 | 45762.89 | 26953.44 | 23471.53 | 30749.00 | 12565.98 | 26291.59 | 13693.97 | 38258.07 | 24834.67 | 18451.43 | 55799.64 | 27272.75 |
| | Kanchanadit | 5.22E-05 | 2.13E-05 | 1.67E-05 | 2.4E-05 | 1.03E-05 | 2.14E-05 | 1.09E-05 | 3.42E-05 | 2.37E-05 | 1.48E-05 | 5.77E-05 | 2.44E-05 | 56096.46 | 22917.25 | 18001.19 | 25849.58 | 11116.50 | 23038.73 | 11711.40 | 36778.56 | 25458.02 | 15861.72 | 62061.81 | 26220.44 |
| | Don Sak | 7.4E-05 | 2.86E-05 | 2.32E-05 | 3.36E-05 | 1.85E-05 | 2.78E-05 | 1.72E-05 | 4.47E-05 | 3.57E-05 | 2.05E-05 | 8.95E-05 | 3.79E-05 | 26898.61 | 10405.95 | 8442.95 | 12226.65 | 6712.85 | 10115.80 | 6264.42 | 16267.54 | 12992.36 | 7442.96 | 32550.95 | 13798.52 |
| | Ko Samui | 6.06E-05 | 4.19E-05 | 4.84E-05 | 4.56E-05 | 2.94E-05 | 4.11E-05 | 2.15E-05 | 4.62E-05 | 4.12E-05 | 2.8E-05 | 9.15E-05 | 5.37E-05 | 16684.18 | 11548.64 | 13322.98 | 12561.86 | 8112.44 | 11314.41 | 5911.97 | 12732.21 | 11348.23 | 7717.72 | 25213.86 | 14806.48 |
| | Ko Pha-ngan | 0.000135 | 0.000105 | 0.000158 | 0.000106 | 6.7E-05 | 0.000124 | 4.68E-05 | 0.000145 | 0.000107 | 7.69E-05 | 0.000231 | 0.00015 | 16588.64 | 12820.28 | 19379.70 | 12956.74 | 8198.84 | 15239.58 | 5727.31 | 17738.48 | 13108.47 | 9416.40 | 28306.83 | 18384.84 |
| | Chaiya | 7.55E-05 | 2.58E-05 | 1.68E-05 | 2.74E-05 | 1.18E-05 | 4.73E-05 | 1.91E-05 | 7.98E-05 | 4.65E-05 | 3.72E-05 | 9.43E-05 | 4.67E-05 | 49644.17 | 16975.61 | 11060.59 | 18056.20 | 7790.01 | 31094.86 | 12533.85 | 52492.66 | 30596.41 | 24471.27 | 62010.04 | 30720.39 |
| | Tha Chana | 7.26E-05 | 2.13E-05 | 1.81E-05 | 2.32E-05 | 9.75E-06 | 4.62E-05 | 1.53E-05 | 7.48E-05 | 4.24E-05 | 3.36E-05 | 8.91E-05 | 4.66E-05 | 73014.55 | 21382.35 | 18155.78 | 23323.88 | 9798.08 | 46441.94 | 15377.04 | 75231.51 | 42631.42 | 33816.36 | 89576.55 | 46880.94 |
| | Khiri Rat Nikhom | 0.000112 | 2.27E-05 | 2.06E-05 | 3.21E-05 | 4.43E-06 | 4.57E-05 | 6.86E-06 | 7.67E-05 | 3.82E-05 | 4.45E-05 | 8.92E-05 | 3.86E-05 | 85538.83 | 17338.78 | 15738.63 | 24455.91 | 3377.57 | 34864.60 | 5233.96 | 58486.32 | 29128.72 | 33988.93 | 68061.17 | 29449.57 |
| | Ban Ta Khun | 7.4E-05 | 1.4E-05 | 1.21E-05 | 1.86E-05 | 1.99E-06 | 3.05E-05 | 3.69E-06 | 5.2E-05 | 2.64E-05 | 3.3E-05 | 6.01E-05 | 2.61E-05 | 107628.34 | 20331.16 | 17616.01 | 26990.91 | 2901.61 | 44320.55 | 5373.58 | 75679.99 | 38467.36 | 48050.80 | 87382.85 | 37901.43 |
| | Phanom | 6.58E-05 | 1.31E-05 | 1.35E-05 | 1.71E-05 | 1.11E-06 | 2.12E-05 | 1.68E-06 | 3.99E-05 | 2.01E-05 | 2.86E-05 | 4.98E-05 | 1.91E-05 | 80276.62 | 15927.96 | 16476.65 | 20898.49 | 1358.46 | 25879.01 | 2042.86 | 48699.23 | 24498.94 | 34817.07 | 60780.87 | 23246.55 |
| | Tha Chang | 9.37E-05 | 2.3E-05 | 1.51E-05 | 2.84E-05 | 7.99E-06 | 5.08E-05 | 1.37E-05 | 8.24E-05 | 4.62E-05 | 4.14E-05 | 9.83E-05 | 4.74E-05 | 102224.62 | 25055.79 | 16450.02 | 30948.11 | 8716.63 | 55397.78 | 14944.16 | 89961.55 | 50453.97 | 45197.81 | 107277.41 | 51765.75 |
| | Ban Na San | 6.59E-05 | 2.64E-05 | 1.99E-05 | 2.95E-05 | 8.62E-06 | 2.52E-05 | 9.06E-06 | 4.01E-05 | 2.59E-05 | 1.73E-05 | 5.85E-05 | 2.54E-05 | 50625.14 | 20310.95 | 15289.90 | 22656.71 | 6625.47 | 19400.66 | 6963.03 | 30793.88 | 19905.66 | 13266.04 | 44947.25 | 19545.47 |
| | Ban Na Doem | 0.000165 | 8.86E-05 | 7.8E-05 | 0.000103 | 3.76E-05 | 8.44E-05 | 3.9E-05 | 0.000122 | 7.85E-05 | 5.9E-05 | 0.00018 | 8.6E-05 | 30651.73 | 16485.40 | 14516.41 | 19169.40 | 6990.55 | 15700.75 | 7257.81 | 22627.11 | 14611.19 | 10974.85 | 33568.07 | 16006.86 |
| | Khian Sa | 8.1E-05 | 2.44E-05 | 2.02E-05 | 2.89E-05 | 5.3E-06 | 2.74E-05 | 5.79E-06 | 4.62E-05 | 2.79E-05 | 2.37E-05 | 6.52E-05 | 2.73E-05 | 60938.98 | 18334.88 | 15216.18 | 21712.57 | 3984.36 | 20628.25 | 4353.68 | 34752.18 | 20958.87 | 17863.51 | 49038.30 | 20520.41 |
| | Wiang Sa | 8.84E-05 | 2.49E-05 | 1.3E-05 | 2.7E-05 | 2.55E-06 | 2.38E-05 | 2.81E-06 | 4.32E-05 | 2.88E-05 | 1.53E-05 | 6.09E-05 | 2.34E-05 | 33997.94 | 9559.24 | 4992.89 | 10385.63 | 982.41 | 9136.49 | 1081.90 | 16614.18 | 11059.30 | 5890.06 | 23419.34 | 8980.32 |
| | Phrasaeng | 0.000151 | 4E-05 | 3.09E-05 | 4.52E-05 | 3.87E-06 | 4.17E-05 | 4.24E-06 | 7.39E-05 | 4.67E-05 | 3.71E-05 | 0.000108 | 4.24E-05 | 106898.73 | 28364.95 | 21956.09 | 32074.97 | 2743.84 | 29554.18 | 3009.06 | 52410.18 | 33111.55 | 26356.11 | 76742.22 | 30096.97 |
| | Phunphin | 5.37E-05 | 2.29E-05 | 1.97E-05 | 2.71E-05 | 9.09E-06 | 2.68E-05 | 1.04E-05 | 4.12E-05 | 2.47E-05 | 2.1E-05 | 5.55E-05 | 2.62E-05 | 51213.92 | 21838.91 | 18811.68 | 25820.09 | 8669.72 | 25555.24 | 9951.91 | 39311.79 | 23509.74 | 20021.61 | 52955.31 | 24958.30 |
| | Chai Buri | 0.000133 | 3.52E-05 | 3.04E-05 | 3.92E-05 | 2.69E-06 | 3.62E-05 | 2.84E-06 | 6.15E-05 | 3.9E-05 | 3.56E-05 | 9.26E-05 | 3.63E-05 | 61954.46 | 16410.49 | 14183.96 | 18277.72 | 1253.03 | 16883.00 | 1324.13 | 28708.06 | 18205.34 | 16599.72 | 43174.04 | 16924.26 |
| | Vibhavadi | 0.000153 | 3.12E-05 | 2.25E-05 | 4.15E-05 | 7.76E-06 | 7.39E-05 | 1.43E-05 | 0.000121 | 6.42E-05 | 6.63E-05 | 0.000141 | 6.54E-05 | 76081.95 | 15491.85 | 11171.27 | 20599.03 | 3851.07 | 36646.63 | 7116.09 | 59783.33 | 31865.68 | 32862.77 | 69764.23 | 32447.34 |
| RANONG | Mueang Ranong | 5.86E-05 | 1.56E-05 | 2.16E-05 | 1.61E-05 | 4.72E-06 | 4.42E-05 | 8.54E-06 | 5.88E-05 | 3.07E-05 | 2.69E-05 | 6.82E-05 | 4.67E-05 | 43527.79 | 11559.70 | 16087.76 | 11964.32 | 3507.42 | 32872.59 | 6345.72 | 43705.81 | 22828.28 | 19994.35 | 50665.03 | 34719.59 |
| | La-un | 6.78E-05 | 1.14E-05 | 3.77E-05 | 1.42E-05 | 4.39E-06 | 4.39E-05 | 9.13E-06 | 7.34E-05 | 3.66E-05 | 2.32E-05 | 9.53E-05 | 5.72E-05 | 37511.59 | 6333.69 | 20850.91 | 7847.56 | 2430.97 | 24311.83 | 5051.55 | 40615.18 | 20262.61 | 12833.79 | 52731.73 | 31681.58 |
| | Kapoe | 8.97E-05 | 2.21E-05 | 1.69E-05 | 2.44E-05 | 6.39E-06 | 5.72E-05 | 1.15E-05 | 7.36E-05 | 4.32E-05 | 3.96E-05 | 9.01E-05 | 5.49E-05 | 46445.68 | 11418.38 | 8748.25 | 12647.95 | 3307.75 | 29614.73 | 5928.33 | 38101.01 | 22353.41 | 20496.48 | 46659.18 | 28427.35 |
| | Kra Buri | 6E-05 | 4.57E-06 | 7.02E-05 | 8.28E-06 | 2.84E-06 | 4.04E-05 | 9.45E-06 | 8E-05 | 3.64E-05 | 1.41E-05 | 0.000118 | 6.61E-05 | 57413.13 | 4367.12 | 67117.10 | 7921.46 | 2714.74 | 38636.34 | 9044.26 | 76533.41 | 34811.30 | 13526.54 | 113023.40 | 63230.35 |
| | Suk Samran | 9.48E-05 | 2.82E-05 | 2.03E-05 | 2.93E-05 | 9.09E-06 | 6.12E-05 | 1.4E-05 | 6.86E-05 | 4.51E-05 | 4.16E-05 | 9.16E-05 | 5.81E-05 | 42971.08 | 12793.12 | 9221.83 | 13274.63 | 4121.79 | 27763.51 | 6334.38 | 31117.83 | 20442.78 | 18859.31 | 41551.61 | 26347.37 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 6E-05 | 1.55E-05 | 9.58E-05 | 1.67E-05 | 1E-05 | 4.56E-05 | 1.71E-05 | 8.18E-05 | 4.09E-05 | 2.43E-05 | 0.000112 | 6.95E-05 | 47808.70 | 12323.14 | 76354.58 | 13321.11 | 8001.52 | 36307.38 | 13631.85 | 65213.22 | 32624.56 | 19396.45 | 89522.45 | 55414.51 |
| | Tha Sae | 3.16E-05 | 2.92E-06 | 6.47E-05 | 3.28E-06 | 2E-06 | 2.28E-05 | 4.89E-06 | 4.94E-05 | 2.15E-05 | 7.48E-06 | 7.48E-05 | 4.26E-05 | 46657.37 | 4315.19 | 95571.03 | 4840.76 | 2960.80 | 33752.06 | 7220.43 | 73041.51 | 31703.04 | 11057.78 | 110607.61 | 62952.14 |
| | Pathio | 3.99E-05 | 3.02E-06 | 0.000105 | 2.98E-06 | 2.29E-06 | 2.9E-05 | 4.13E-06 | 6.89E-05 | 2.79E-05 | 9.04E-06 | 0.000104 | 5.89E-05 | 30410.91 | 2297.95 | 79826.06 | 2271.97 | 1746.74 | 22097.73 | 3143.04 | 52486.42 | 21240.61 | 6888.13 | 79362.83 | 44899.29 |
| | Lang Suan | 5.44E-05 | 1.57E-05 | 3.16E-05 | 1.7E-05 | 9.05E-06 | 3.83E-05 | 1.19E-05 | 6.13E-05 | 3.25E-05 | 2.25E-05 | 7.62E-05 | 4.42E-05 | 31950.28 | 9198.92 | 18534.28 | 9963.20 | 5315.03 | 22471.86 | 6974.48 | 36015.90 | 19070.39 | 13192.17 | 44722.74 | 25975.64 |
| | Lamae | 7.82E-05 | 2.3E-05 | 3.18E-05 | 2.46E-05 | 1.21E-05 | 5.35E-05 | 1.67E-05 | 8.54E-05 | 4.63E-05 | 3.41E-05 | 0.000103 | 5.8E-05 | 28801.10 | 8466.94 | 11697.70 | 9072.60 | 4449.06 | 19690.17 | 6138.78 | 31451.65 | 17071.66 | 12555.23 | 37983.89 | 21356.37 |
| | Phato | 4.8E-05 | 8.38E-06 | 1.3E-05 | 1E-05 | 2.33E-06 | 2.89E-05 | 5.11E-06 | 4.55E-05 | 2.42E-05 | 1.75E-05 | 5.67E-05 | 3.41E-05 | 42083.29 | 7345.56 | 11386.87 | 8791.27 | 2044.04 | 25345.30 | 4479.93 | 39843.70 | 21162.05 | 15323.27 | 49669.26 | 29879.75 |
| | Sawi | 4.48E-05 | 9.98E-06 | 4.99E-05 | 1.18E-05 | 6.16E-06 | 3.21E-05 | 1.04E-05 | 5.62E-05 | 2.8E-05 | 1.65E-05 | 7.61E-05 | 4.55E-05 | 37580.10 | 8370.97 | 41853.88 | 9880.65 | 5169.41 | 26909.30 | 8742.64 | 47177.40 | 23463.47 | 13869.13 | 63802.51 | 38163.86 |
| | Thung Tako | 8.02E-05 | 2.34E-05 | 6.81E-05 | 2.54E-05 | 1.41E-05 | 5.9E-05 | 1.96E-05 | 9.52E-05 | 4.96E-05 | 3.37E-05 | 0.000121 | 7.31E-05 | 23203.57 | 6774.11 | 19705.49 | 7346.92 | 4089.10 | 17051.95 | 5673.60 | 27521.64 | 14358.27 | 9755.79 | 35051.72 | 21157.00 |
| SONGKHLA | Mueang Songkhla | 2E-05 | 2.43E-05 | 5.63E-05 | 3.56E-05 | 1.5E-05 | 8.3E-06 | 2.31E-05 | 1.36E-05 | 1.4E-05 | 4.15E-05 | 4.59E-05 | 7.74E-05 | 4077.27 | 4968.71 | 11503.88 | 7270.18 | 3054.81 | 1696.22 | 4724.03 | 2781.97 | 2864.48 | 8485.20 | 9366.43 | 15800.73 |
| | Sathing Phra | 0.000131 | 8.67E-05 | 9.7E-05 | 7.6E-05 | 3.26E-05 | 3.32E-05 | 3.19E-05 | 5.81E-05 | 3.66E-05 | 8.17E-05 | 8.59E-05 | 9.96E-05 | 26034.68 | 17233.42 | 19271.96 | 15106.35 | 6471.78 | 6595.23 | 6343.64 | 11544.34 | 7268.36 | 16221.70 | 17062.46 | 19788.76 |
| | Chana | 5.34E-05 | 2.85E-05 | 4.57E-05 | 2.69E-05 | 7.08E-06 | 6.46E-06 | 5.19E-06 | 1.05E-05 | 1.51E-05 | 1.2E-05 | 1.37E-05 | 2.59E-05 | 33621.30 | 17945.91 | 28766.60 | 16979.27 | 4462.84 | 4073.03 | 3268.27 | 6608.63 | 9499.31 | 7545.27 | 8608.14 | 16332.07 |
| | Na Thawi | 6.68E-05 | 3.27E-05 | 5.07E-05 | 2.8E-05 | 5.87E-06 | 6.92E-06 | 2.13E-06 | 1.18E-05 | 1.72E-05 | 5.86E-06 | 9.69E-06 | 1.8E-05 | 52014.71 | 25493.33 | 39460.85 | 21779.20 | 4571.68 | 5389.50 | 1658.21 | 9170.89 | 13423.50 | 4561.30 | 7547.66 | 14047.10 |
| | Thepha | 5.39E-05 | 3.19E-05 | 5.92E-05 | 3.65E-05 | 1.09E-05 | 8.14E-06 | 8.86E-06 | 1.2E-05 | 2.02E-05 | 1.14E-05 | 1.29E-05 | 2.74E-05 | 35707.65 | 21131.06 | 39247.84 | 24194.09 | 7229.69 | 5389.03 | 5867.42 | 7935.32 | 13399.65 | 7581.94 | 8535.12 | 18178.44 |
| | Saba Yoi | 4.34E-05 | 2.33E-05 | 4.65E-05 | 2.42E-05 | 6.38E-06 | 5.79E-06 | 4.69E-06 | 9.2E-06 | 1.54E-05 | 7.59E-06 | 9.58E-06 | 1.58E-05 | 41085.06 | 22044.84 | 44022.63 | 22851.41 | 6034.14 | 5474.60 | 4440.82 | 8703.58 | 14569.93 | 7182.73 | 9065.57 | 14960.82 |
| | Ranot | 9.42E-05 | 5.44E-05 | 4.33E-05 | 4.31E-05 | 1.4E-05 | 2.03E-05 | 1.46E-05 | 4.01E-05 | 2.25E-05 | 3.07E-05 | 4.12E-05 | 4.32E-05 | 41623.49 | 24031.00 | 19134.19 | 19053.79 | 6181.34 | 8945.52 | 6430.80 | 17733.80 | 9926.98 | 13572.97 | 18219.43 | 19092.45 |
| | Krasae Sin | 0.000105 | 5.07E-05 | 4.26E-05 | 3.65E-05 | 7.27E-06 | 1.08E-05 | 9.83E-06 | 4.13E-05 | 1.89E-05 | 3.36E-05 | 3.92E-05 | 4.59E-05 | 32287.74 | 15657.39 | 13157.49 | 11280.75 | 2245.43 | 3325.07 | 3035.26 | 12753.47 | 5832.50 | 10362.24 | 12111.54 | 14173.25 |
| | Rattaphum | 3.01E-06 | 1.73E-06 | 1.65E-05 | 5.16E-06 | 3.86E-06 | 2.53E-06 | 4.19E-06 | 2.74E-06 | 2.58E-06 | 4.07E-05 | 2.42E-05 | 2.73E-05 | 2003.80 | 1152.45 | 11000.55 | 3432.17 | 2566.55 | 1684.72 | 2789.00 | 1821.81 | 1718.34 | 27090.00 | 16117.70 | 18121.22 |
| | Sadao | 3.61E-05 | 1.7E-05 | 3.45E-05 | 1.64E-05 | 4.64E-06 | 4.62E-06 | 2.66E-06 | 7.88E-06 | 1.1E-05 | 2.02E-05 | 1.6E-05 | 2.22E-05 | 37371.61 | 17556.82 | 35678.26 | 16973.48 | 4801.13 | 4775.39 | 2753.32 | 8148.47 | 11358.54 | 20884.03 | 16514.49 | 22943.43 |
| | Hat Yai | 2.16E-05 | 1.26E-05 | 2.96E-05 | 1.45E-05 | 5.86E-06 | 4.32E-06 | 5.77E-06 | 6.18E-06 | 7.72E-06 | 3.02E-05 | 2.22E-05 | 3.07E-05 | 17082.05 | 9988.96 | 23435.18 | 11496.34 | 4642.60 | 3423.50 | 4572.78 | 4896.53 | 6117.66 | 23922.78 | 17572.92 | 24340.31 |
| | Na Mom | 6.54E-05 | 3.69E-05 | 6.78E-05 | 3.84E-05 | 1.19E-05 | 9.43E-06 | 1.11E-05 | 1.5E-05 | 2.06E-05 | 3.56E-05 | 3.16E-05 | 5.23E-05 | 9264.28 | 5226.76 | 9606.72 | 5443.69 | 1687.82 | 1336.09 | 1569.53 | 2123.24 | 2923.32 | 5038.15 | 4473.84 | 7416.90 |
| | Khuan Niang | 1.75E-05 | 1.2E-05 | 3.71E-05 | 1.7E-05 | 9.04E-06 | 6.57E-06 | 1.05E-05 | 9.7E-06 | 8.01E-06 | 6.59E-05 | 4.31E-05 | 5.08E-05 | 4353.07 | 2969.64 | 9200.15 | 4219.95 | 2241.56 | 1630.32 | 2602.98 | 2405.59 | 1987.45 | 16336.07 | 10685.81 | 12611.79 |
| | Bang Klam | 2.93E-05 | 1.81E-05 | 5.2E-05 | 2.4E-05 | 1.12E-05 | 7.84E-06 | 1.27E-05 | 1.18E-05 | 1.2E-05 | 7.54E-05 | 5.13E-05 | 6.5E-05 | 4237.25 | 2624.26 | 7522.58 | 3473.71 | 1617.31 | 1135.65 | 1836.01 | 1702.44 | 1733.23 | 10920.41 | 7421.50 | 9410.52 |
| | Singhanakhon | 4E-05 | 3.43E-05 | 6.28E-05 | 4.03E-05 | 1.85E-05 | 1.39E-05 | 2.28E-05 | 2.11E-05 | 1.74E-05 | 6.09E-05 | 5.62E-05 | 7.78E-05 | 9683.67 | 8293.21 | 15191.37 | 9736.56 | 4483.09 | 3356.23 | 5505.02 | 5107.80 | 4220.22 | 14726.78 | 13602.78 | 18808.40 |
| | Khlong Hoi Khong | 2.01E-05 | 9.99E-06 | 3.29E-05 | 1.29E-05 | 6.26E-06 | 4.26E-06 | 5.39E-06 | 6.17E-06 | 8.2E-06 | 4.47E-05 | 2.94E-05 | 3.85E-05 | 6087.18 | 3024.82 | 9974.33 | 3913.01 | 1895.87 | 1291.03 | 1633.02 | 1869.06 | 2483.25 | 13548.89 | 8910.58 | 11646.46 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | $q$ (g/s-m$^2$) | | | | | | | | | | | | $q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 1.36E-05 | 6.42E-06 | 2.25E-05 | 1.08E-05 | 4.65E-06 | 4.52E-06 | 4.57E-06 | 5.73E-06 | 7.48E-06 | 3.54E-05 | 2.44E-05 | 3.81E-05 | 13260.00 | 6264.76 | 21930.03 | 10540.50 | 4538.72 | 4408.06 | 4460.56 | 5591.39 | 7289.09 | 34543.17 | 23748.38 | 37124.64 |
| | Khuan Don | 1.06E-05 | 4.46E-06 | 4.62E-05 | 1.31E-05 | 1.02E-05 | 5.49E-06 | 9.26E-06 | 7.16E-06 | 9.39E-06 | 9.23E-05 | 5.82E-05 | 7.53E-05 | 2338.09 | 984.09 | 10209.97 | 2898.40 | 2256.86 | 1212.82 | 2043.91 | 1581.18 | 2073.61 | 20370.03 | 12855.48 | 16629.20 |
| | Khuan Kalong | 8.14E-06 | 4.36E-06 | 3.32E-05 | 1.11E-05 | 7.83E-06 | 4.59E-06 | 8.09E-06 | 5.52E-06 | 6.09E-06 | 7.29E-05 | 4.8E-05 | 6.43E-05 | 4332.28 | 2319.51 | 17683.95 | 5891.62 | 4168.36 | 2443.74 | 4303.39 | 2936.14 | 3238.24 | 38766.36 | 25547.50 | 34213.92 |
| | Tha Phae | 6.71E-06 | 4.2E-06 | 2.97E-05 | 1.21E-05 | 7.34E-06 | 4.38E-06 | 7.69E-06 | 5.01E-06 | 5.77E-06 | 6.68E-05 | 4.38E-05 | 7.72E-05 | 1509.18 | 945.51 | 6682.01 | 2712.44 | 1651.67 | 984.32 | 1729.04 | 1126.91 | 1297.82 | 15028.34 | 9847.70 | 17364.18 |
| | La-ngu | 1.99E-06 | 2.18E-06 | 1.76E-05 | 7.43E-06 | 4.99E-06 | 2.77E-06 | 5.98E-06 | 3E-06 | 2.7E-06 | 4.55E-05 | 3.29E-05 | 5.34E-05 | 787.74 | 861.95 | 6987.24 | 2941.13 | 1977.20 | 1098.50 | 2368.54 | 1187.82 | 1068.01 | 18011.56 | 13041.52 | 21157.30 |
| | Thung Wa | 3.59E-06 | 2.63E-06 | 1.74E-05 | 6.86E-06 | 5.05E-06 | 2.87E-06 | 6.7E-06 | 3.73E-06 | 2.84E-06 | 4.53E-05 | 3.77E-05 | 4.68E-05 | 1654.65 | 1212.40 | 8018.21 | 3162.04 | 2329.10 | 1323.01 | 3090.55 | 1719.70 | 1307.17 | 20880.09 | 17367.25 | 21558.55 |
| | Manang | 6.71E-06 | 4.34E-06 | 3.2E-05 | 1.2E-05 | 8.46E-06 | 4.84E-06 | 1.02E-05 | 6.08E-06 | 5.38E-06 | 7.92E-05 | 5.85E-05 | 7.75E-05 | 1409.60 | 912.72 | 6715.15 | 2512.95 | 1777.05 | 1016.34 | 2141.02 | 1276.78 | 1129.30 | 16638.59 | 12297.04 | 16270.19 |
| TRANG | Mueang Trang | 8.62E-05 | 3.17E-05 | 3.59E-05 | 2.92E-05 | 2.78E-06 | 8.22E-06 | 4.34E-06 | 2.68E-05 | 2.25E-05 | 2.41E-05 | 3.55E-05 | 2.4E-05 | 37924.69 | 13956.59 | 15797.94 | 12858.61 | 1220.98 | 3618.03 | 1909.32 | 11806.52 | 9915.02 | 10586.31 | 15630.58 | 10547.71 |
| | Kantang | 4.19E-05 | 1.42E-05 | 2.38E-05 | 1.65E-05 | 4.15E-06 | 8.04E-06 | 5.26E-06 | 1.58E-05 | 1.27E-05 | 4.09E-05 | 3.73E-05 | 3.64E-05 | 27122.42 | 9214.33 | 15410.59 | 10705.91 | 2685.64 | 5200.73 | 3403.88 | 10222.49 | 8249.42 | 26439.97 | 24161.04 | 23586.15 |
| | Yan Ta Khao | 5.04E-05 | 1.99E-05 | 2.9E-05 | 1.98E-05 | 4.23E-06 | 5.04E-06 | 6.21E-06 | 1.76E-05 | 1.35E-05 | 3.77E-05 | 4.01E-05 | 3.81E-05 | 22363.50 | 8812.83 | 12848.69 | 8794.63 | 1874.99 | 2236.86 | 2755.80 | 7809.34 | 6000.77 | 16720.04 | 17785.44 | 16881.62 |
| | Palian | 9.34E-06 | 4.69E-06 | 1.68E-05 | 7.77E-06 | 4.53E-06 | 2.92E-06 | 6.36E-06 | 5.27E-06 | 3.84E-06 | 3.94E-05 | 3.62E-05 | 4.16E-05 | 7603.55 | 3821.42 | 13670.81 | 6321.99 | 3691.17 | 2375.01 | 5178.00 | 4287.17 | 3126.38 | 32037.93 | 29466.85 | 33862.42 |
| | Sikao | 0.000122 | 3.36E-05 | 4.9E-05 | 3.6E-05 | 4.37E-06 | 2.6E-05 | 3.21E-06 | 3.34E-05 | 3.6E-05 | 3.87E-05 | 4.11E-05 | 3.03E-05 | 56116.23 | 15503.62 | 22628.35 | 16640.46 | 2016.30 | 11984.48 | 1482.66 | 15433.93 | 16630.33 | 17844.61 | 18970.26 | 13981.44 |
| | Huai Yot | 9.14E-05 | 3.32E-05 | 3.42E-05 | 3.07E-05 | 2.3E-06 | 1.36E-05 | 3.84E-06 | 2.97E-05 | 2.44E-05 | 2.06E-05 | 3.75E-05 | 1.99E-05 | 70727.80 | 25652.91 | 26495.43 | 23729.63 | 1777.11 | 10543.47 | 2968.00 | 23008.22 | 18905.71 | 15924.38 | 29027.35 | 15403.68 |
| | Wang Wiset | 0.000128 | 3.88E-05 | 4.74E-05 | 3.9E-05 | 3.61E-06 | 2.74E-05 | 3.27E-06 | 3.86E-05 | 3.73E-05 | 3.33E-05 | 4.72E-05 | 2.73E-05 | 64349.64 | 19460.84 | 23753.78 | 19562.14 | 1809.39 | 13714.07 | 1636.48 | 19351.17 | 18672.00 | 16676.90 | 23635.67 | 13687.05 |
| | Na Yong | 0.000125 | 4.94E-05 | 5.21E-05 | 4.31E-05 | 3.65E-06 | 6.42E-06 | 6.6E-06 | 3.96E-05 | 3.1E-05 | 2.94E-05 | 4.89E-05 | 3.25E-05 | 30822.67 | 12161.98 | 12830.19 | 10608.63 | 898.40 | 1580.90 | 1625.39 | 9750.82 | 7647.68 | 7254.94 | 12050.22 | 7998.99 |
| | Ratsada | 0.000144 | 5.7E-05 | 5.18E-05 | 5.45E-05 | 4.47E-06 | 3.17E-05 | 8.99E-06 | 5.27E-05 | 3.91E-05 | 3.46E-05 | 7.47E-05 | 3.27E-05 | 31667.72 | 12510.09 | 11364.92 | 11956.82 | 980.71 | 6954.69 | 1973.40 | 11577.69 | 8588.20 | 7596.80 | 16395.81 | 7170.74 |
| | Hat Samran | 4.02E-05 | 1.71E-05 | 4.89E-05 | 2.65E-05 | 1.28E-05 | 1.08E-05 | 1.75E-05 | 2.15E-05 | 1.51E-05 | 0.000118 | 0.000105 | 0.00012 | 7360.59 | 3127.56 | 8951.67 | 4852.07 | 2339.19 | 1984.91 | 3215.61 | 3944.99 | 2759.68 | 21595.54 | 19198.23 | 21969.31 |
| PHATTHALUNG | Mueang Phatthalung | 6.05E-05 | 2.75E-05 | 2.38E-05 | 2.03E-05 | 3.08E-06 | 5.3E-06 | 4.97E-06 | 2.32E-05 | 1.13E-05 | 2.08E-05 | 2.42E-05 | 2.59E-05 | 29324.94 | 13341.91 | 11531.29 | 9826.33 | 1493.62 | 2568.05 | 2406.21 | 11250.87 | 5463.47 | 10083.11 | 11705.98 | 12557.71 |
| | Kong Ra | 6.33E-05 | 2.68E-05 | 3.78E-05 | 2.51E-05 | 5.69E-06 | 6.07E-06 | 8.39E-06 | 2.34E-05 | 1.55E-05 | 5.21E-05 | 5.07E-05 | 5.02E-05 | 19293.50 | 8170.05 | 11542.56 | 7657.06 | 1736.83 | 1850.26 | 2560.33 | 7127.09 | 4731.37 | 15878.77 | 15466.06 | 15299.71 |
| | Khao Chaison | 4.44E-05 | 2.05E-05 | 2.24E-05 | 1.63E-05 | 3.6E-06 | 4.34E-06 | 4.97E-06 | 1.73E-05 | 8.91E-06 | 2.59E-05 | 2.48E-05 | 2.67E-05 | 14896.85 | 6897.66 | 7533.50 | 5477.25 | 1208.88 | 1456.91 | 1669.04 | 5801.90 | 2991.35 | 8704.00 | 8320.76 | 8969.86 |
| | Tamot | 2.28E-05 | 1.02E-05 | 2.76E-05 | 1.27E-05 | 5.65E-06 | 4.23E-06 | 7.26E-06 | 1.04E-05 | 6.95E-06 | 5.8E-05 | 4.29E-05 | 4.61E-05 | 6320.65 | 2825.41 | 7630.71 | 3527.60 | 1563.49 | 1171.09 | 2009.56 | 2887.06 | 1921.91 | 16045.71 | 11866.37 | 12766.43 |
| | Khuan Khanun | 6.33E-05 | 3.11E-05 | 2.58E-05 | 2.51E-05 | 5.25E-06 | 9.7E-06 | 6.69E-06 | 2.47E-05 | 1.45E-05 | 1.84E-05 | 2.69E-05 | 2.35E-05 | 34191.82 | 16827.57 | 13956.63 | 13582.01 | 2837.34 | 5242.78 | 3616.94 | 13363.06 | 7861.20 | 9934.47 | 14516.06 | 12716.95 |
| | Pak Phayun | 2.77E-05 | 1.65E-05 | 2.84E-05 | 1.67E-05 | 7.49E-06 | 6.68E-06 | 8.21E-06 | 1.3E-05 | 8.09E-06 | 4.38E-05 | 3.25E-05 | 3.64E-05 | 13376.26 | 7975.27 | 13728.51 | 8064.99 | 3618.71 | 3226.87 | 3968.24 | 6290.30 | 3910.70 | 21143.44 | 15708.80 | 17573.06 |
| | Si Banphot | 0.000131 | 5.42E-05 | 5.32E-05 | 4.65E-05 | 4.41E-06 | 9.01E-06 | 7.68E-06 | 4.33E-05 | 3.21E-05 | 2.82E-05 | 5.07E-05 | 3.27E-05 | 31542.03 | 13001.27 | 12755.69 | 11152.25 | 1057.29 | 2163.07 | 1842.87 | 10384.93 | 7714.42 | 6778.06 | 12168.67 | 7836.79 |
| | Pa Bon | 6.44E-06 | 3.11E-06 | 1.75E-05 | 6.15E-06 | 3.98E-06 | 2.84E-06 | 4.57E-06 | 4.22E-06 | 3.09E-06 | 4.37E-05 | 2.7E-05 | 2.9E-05 | 3126.02 | 1509.04 | 8505.17 | 2982.55 | 1929.31 | 1380.17 | 2219.35 | 2048.83 | 1499.13 | 21212.11 | 13079.62 | 14058.13 |
| | Bang Kaeo | 5.88E-05 | 2.83E-05 | 3.77E-05 | 2.45E-05 | 7.11E-06 | 7.37E-06 | 9.02E-06 | 2.39E-05 | 1.31E-05 | 5.25E-05 | 4.34E-05 | 4.69E-05 | 9121.15 | 4384.42 | 5844.78 | 3801.70 | 1102.06 | 1141.98 | 1397.35 | 3710.22 | 2024.44 | 8130.37 | 6730.79 | 7268.01 |
| | Pa Phayom | 0.000125 | 5.44E-05 | 4.92E-05 | 4.79E-05 | 6.44E-06 | 1.84E-05 | 9.65E-06 | 4.45E-05 | 3.17E-05 | 2.94E-05 | 5.38E-05 | 3.31E-05 | 37679.01 | 16423.94 | 14871.73 | 14461.69 | 1946.53 | 5545.97 | 2916.12 | 13433.83 | 9565.40 | 8868.46 | 16260.01 | 10010.32 |
| | Srinagarindra | 9.47E-05 | 3.85E-05 | 4.12E-05 | 3.32E-05 | 3.45E-06 | 5.94E-06 | 6.25E-06 | 3.16E-05 | 2.25E-05 | 3.07E-05 | 4.29E-05 | 3.26E-05 | 23922.07 | 9718.49 | 10395.92 | 8374.43 | 871.83 | 1500.01 | 1578.52 | 7989.01 | 5686.41 | 7761.52 | 10836.07 | 8229.38 |

**Table E-2** Maximum $NO_2$ emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | q (g/s-m²) | | | | | | | | | | | | q (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 0.000133 | 9.56E-05 | 0.000187 | 0.000118 | 4.38E-05 | 2.73E-05 | 3.83E-05 | 3.22E-05 | 6.41E-05 | 3.82E-05 | 3.69E-05 | 8.24E-05 | 12491.38 | 9009.85 | 17643.07 | 11079.11 | 4124.79 | 2574.39 | 3605.04 | 3038.81 | 6037.30 | 3603.25 | 3481.25 | 7762.99 |
| | Khok Pho | 8.52E-05 | 6.06E-05 | 0.000127 | 8.47E-05 | 2.92E-05 | 1.77E-05 | 2.61E-05 | 2.3E-05 | 4.38E-05 | 2.86E-05 | 2.61E-05 | 6.17E-05 | 25776.02 | 18325.47 | 38434.20 | 25625.32 | 8832.13 | 5354.25 | 7897.85 | 6959.62 | 13258.99 | 8641.51 | 7881.45 | 18660.38 |
| | Nong Chik | 0.00012 | 8.57E-05 | 0.000176 | 0.000117 | 4.1E-05 | 2.49E-05 | 3.66E-05 | 3.18E-05 | 6.08E-05 | 3.93E-05 | 3.63E-05 | 8.55E-05 | 28418.59 | 20345.93 | 41895.30 | 27813.54 | 9735.14 | 5914.72 | 8692.03 | 7556.39 | 14451.34 | 9333.01 | 8616.57 | 20299.32 |
| | Panare | 0.000119 | 0.000112 | 0.000175 | 0.000105 | 5.56E-05 | 3.23E-05 | 4.66E-05 | 2.35E-05 | 5.87E-05 | 2.7E-05 | 2.92E-05 | 6.32E-05 | 17160.61 | 16161.84 | 25110.33 | 15064.81 | 7986.68 | 4648.90 | 6694.37 | 3382.77 | 8434.06 | 3882.61 | 4199.33 | 9090.29 |
| | Mayo | 7.84E-05 | 6.38E-05 | 0.000111 | 6.43E-05 | 2.96E-05 | 1.82E-05 | 2.5E-05 | 1.64E-05 | 3.71E-05 | 1.88E-05 | 1.98E-05 | 4.03E-05 | 15843.51 | 12897.56 | 22533.89 | 12992.49 | 5976.90 | 3675.53 | 5047.97 | 3305.87 | 7492.18 | 3799.76 | 3995.11 | 8149.01 |
| | Thung Yang Daeng | 7.13E-05 | 6.03E-05 | 0.000104 | 5.75E-05 | 2.82E-05 | 1.74E-05 | 2.34E-05 | 1.42E-05 | 3.35E-05 | 1.66E-05 | 1.79E-05 | 3.48E-05 | 9928.41 | 8400.79 | 14504.77 | 8009.77 | 3926.54 | 2418.37 | 3256.85 | 1974.59 | 4662.48 | 2310.67 | 2489.91 | 4847.99 |
| | Sai Buri | 9.66E-05 | 9.29E-05 | 0.000141 | 8.52E-05 | 4.62E-05 | 2.66E-05 | 3.87E-05 | 1.87E-05 | 4.76E-05 | 2.12E-05 | 2.33E-05 | 5.08E-05 | 19687.29 | 18938.25 | 28792.01 | 17365.05 | 9413.96 | 5433.18 | 7894.49 | 3816.26 | 9707.73 | 4331.48 | 4749.29 | 10355.72 |
| | Mai Kaen | 0.000265 | 0.000233 | 0.0004 | 0.000212 | 0.00011 | 6.8E-05 | 8.76E-05 | 5E-05 | 0.000121 | 5.94E-05 | 6.58E-05 | 0.000124 | 15400.84 | 13547.86 | 23198.40 | 12309.64 | 6374.26 | 3950.09 | 5085.19 | 2903.16 | 7013.67 | 3446.60 | 3818.51 | 7211.29 |
| | Yaring | 8.21E-05 | 6.6E-05 | 0.000115 | 6.83E-05 | 3.05E-05 | 1.87E-05 | 2.6E-05 | 1.75E-05 | 3.89E-05 | 1.99E-05 | 2.07E-05 | 4.37E-05 | 17760.07 | 14275.91 | 24909.41 | 14770.93 | 6606.64 | 4046.08 | 5614.89 | 3788.52 | 8404.31 | 4306.13 | 4484.24 | 9444.79 |
| | Yarang | 0.000121 | 8.61E-05 | 0.000169 | 9.86E-05 | 3.79E-05 | 2.44E-05 | 3.27E-05 | 2.76E-05 | 5.68E-05 | 3.21E-05 | 3.21E-05 | 6.6E-05 | 26465.41 | 18810.32 | 36842.91 | 21520.54 | 8272.22 | 5331.77 | 7142.55 | 6028.53 | 12399.07 | 7012.74 | 7006.81 | 14404.27 |
| | Kapho | 0.000172 | 0.00015 | 0.000253 | 0.000138 | 7.04E-05 | 4.29E-05 | 5.79E-05 | 3.29E-05 | 7.98E-05 | 3.79E-05 | 4.21E-05 | 8.12E-05 | 14193.00 | 12385.17 | 20911.20 | 11425.75 | 5825.30 | 3552.90 | 4786.30 | 2720.62 | 6605.02 | 3137.96 | 3485.74 | 6717.64 |
| | Mae Lan | 0.000149 | 0.000104 | 0.000213 | 0.000133 | 4.73E-05 | 2.98E-05 | 4.17E-05 | 3.72E-05 | 7.28E-05 | 4.5E-05 | 4.25E-05 | 9.43E-05 | 11603.37 | 8086.48 | 16629.17 | 10417.57 | 3694.81 | 2330.33 | 3258.13 | 2908.31 | 5689.37 | 3514.61 | 3316.72 | 7363.16 |
| YALA | Mueang Yala | 8.43E-05 | 5.23E-05 | 0.000111 | 5.83E-05 | 2.02E-05 | 1.48E-05 | 1.75E-05 | 1.87E-05 | 3.76E-05 | 2.18E-05 | 2.19E-05 | 3.91E-05 | 26945.99 | 16724.02 | 35623.01 | 18618.03 | 6456.25 | 4730.02 | 5601.57 | 5977.85 | 12012.42 | 6954.60 | 7003.37 | 12484.59 |
| | Betong | 3E-05 | 1.87E-05 | 4.69E-05 | 1.46E-05 | 2.75E-06 | 2.95E-06 | 1.66E-06 | 7.01E-06 | 7.52E-06 | 1.36E-05 | 1.31E-05 | 5.5E-06 | 39638.78 | 24677.71 | 61839.63 | 19199.11 | 3631.10 | 3888.21 | 2190.12 | 9251.18 | 9915.94 | 17987.24 | 17226.55 | 7256.24 |
| | Bannang Sata | 6.13E-05 | 2.78E-05 | 7.39E-05 | 2.04E-05 | 4.53E-06 | 7.32E-06 | 3.85E-06 | 1.16E-05 | 2.3E-05 | 1.61E-05 | 1.63E-05 | 1.11E-05 | 35533.95 | 16106.43 | 42813.80 | 11818.89 | 2624.16 | 4242.95 | 2231.77 | 6746.10 | 13317.19 | 9315.40 | 9475.31 | 6418.92 |
| | Than To | 6.29E-05 | 3.19E-05 | 8.29E-05 | 2.28E-05 | 4.35E-06 | 6.75E-06 | 2.96E-06 | 1.27E-05 | 2.03E-05 | 2.13E-05 | 2.1E-05 | 1E-05 | 42395.51 | 21488.96 | 55853.36 | 15359.29 | 2929.05 | 4547.74 | 1993.60 | 8576.74 | 13667.55 | 14318.04 | 14153.52 | 6754.72 |
| | Yaha | 9.14E-05 | 4.31E-05 | 0.000103 | 3.81E-05 | 1.03E-05 | 1.27E-05 | 9.1E-06 | 1.88E-05 | 3.75E-05 | 2.24E-05 | 2.23E-05 | 2.65E-05 | 42965.14 | 20250.91 | 48245.84 | 17917.49 | 4833.72 | 5958.83 | 4274.08 | 8842.55 | 17598.79 | 10512.29 | 10483.45 | 12433.97 |
| | Raman | 4.87E-05 | 3.16E-05 | 6.89E-05 | 2.92E-05 | 1.16E-05 | 8.74E-06 | 9.41E-06 | 9.12E-06 | 2.01E-05 | 1.08E-05 | 1.22E-05 | 1.62E-05 | 23611.42 | 15330.57 | 33425.36 | 14136.83 | 5644.65 | 4238.06 | 4561.37 | 4422.97 | 9761.53 | 5216.86 | 5929.67 | 7845.92 |
| | Kabang | 5.55E-05 | 2.5E-05 | 5.9E-05 | 2.04E-05 | 4.26E-06 | 6.67E-06 | 3.28E-06 | 1.12E-05 | 2.02E-05 | 1.16E-05 | 1.31E-05 | 1.3E-05 | 24666.48 | 11098.90 | 26220.23 | 9072.20 | 1891.48 | 2964.53 | 1455.70 | 4974.46 | 8993.73 | 5164.69 | 5816.44 | 5779.44 |
| | Krong Pinang | 0.000106 | 5.15E-05 | 0.000126 | 4.38E-05 | 1.24E-05 | 1.46E-05 | 1.09E-05 | 2.11E-05 | 4.25E-05 | 2.58E-05 | 2.65E-05 | 2.75E-05 | 19424.57 | 9461.58 | 23211.16 | 8049.00 | 2272.42 | 2681.48 | 1997.42 | 3868.76 | 7815.60 | 4739.28 | 4871.36 | 5057.72 |
| NARATHIWAT | Mueang Narathiwat | 6.18E-05 | 5.61E-05 | 0.00012 | 4.08E-05 | 2.46E-05 | 1.99E-05 | 1.16E-05 | 1E-05 | 2E-05 | 1.95E-05 | 1.89E-05 | 2.31E-05 | 19480.59 | 17662.66 | 37943.32 | 12841.84 | 7748.58 | 6279.63 | 3668.00 | 3150.25 | 6307.07 | 6152.27 | 5954.95 | 7269.16 |
| | Tak Bai | 3.37E-05 | 5.47E-05 | 0.000105 | 3.57E-05 | 3.12E-05 | 2.48E-05 | 9.57E-06 | 4.78E-06 | 5.89E-06 | 1.99E-05 | 1.47E-05 | 2.72E-05 | 9413.40 | 15295.17 | 29445.11 | 9991.10 | 8729.89 | 6942.58 | 2675.06 | 1336.27 | 1647.57 | 5576.91 | 4122.23 | 7593.49 |
| | Bacho | 0.000104 | 8.24E-05 | 0.000158 | 7.39E-05 | 3.58E-05 | 2.38E-05 | 2.75E-05 | 1.88E-05 | 4.38E-05 | 2.22E-05 | 2.58E-05 | 4.11E-05 | 18979.97 | 15070.05 | 28895.15 | 13512.03 | 6556.32 | 4353.27 | 5034.67 | 3439.95 | 8017.56 | 4064.89 | 4712.59 | 7525.32 |
| | Yi-ngo | 8.58E-05 | 5.53E-05 | 0.000136 | 4.34E-05 | 1.82E-05 | 1.56E-05 | 1.1E-05 | 1.35E-05 | 2.96E-05 | 1.79E-05 | 2.22E-05 | 1.85E-05 | 15931.24 | 10264.88 | 25284.85 | 8066.08 | 3383.00 | 2893.60 | 2050.92 | 2502.60 | 5493.82 | 3323.47 | 4119.64 | 3430.89 |
| | Ra-ngae | 5.95E-05 | 3.53E-05 | 9.68E-05 | 2.54E-05 | 9.32E-06 | 9.76E-06 | 4.77E-06 | 9.19E-06 | 1.93E-05 | 1.29E-05 | 1.59E-05 | 8.38E-06 | 26223.96 | 15554.96 | 42640.87 | 11201.51 | 4106.15 | 4300.33 | 2099.92 | 4048.82 | 8482.64 | 5685.09 | 6983.45 | 3692.46 |
| | Rueso | 4.31E-05 | 2.26E-05 | 6.31E-05 | 1.88E-05 | 5.44E-06 | 5.37E-06 | 3.92E-06 | 6.82E-06 | 1.49E-05 | 7.07E-06 | 1.03E-05 | 6.51E-06 | 20500.72 | 10737.74 | 30036.85 | 8956.93 | 2586.85 | 2555.94 | 1865.98 | 3243.16 | 7097.02 | 3361.56 | 4885.43 | 3097.92 |
| | Si Sakhon | 5.83E-05 | 2.79E-05 | 8.49E-05 | 2.06E-05 | 4.29E-06 | 5.99E-06 | 2.61E-06 | 9.06E-06 | 1.89E-05 | 1.19E-05 | 1.55E-05 | 4.74E-06 | 30534.02 | 14583.09 | 44440.13 | 10767.95 | 2242.89 | 3136.11 | 1365.86 | 4741.91 | 9883.65 | 6251.00 | 8119.23 | 2482.97 |
| | Waeng | 4.04E-05 | 3.42E-05 | 7.77E-05 | 1.33E-05 | 7.06E-06 | 1.3E-05 | 4.81E-06 | 1.14E-05 | 1.73E-05 | 2.1E-05 | 1.43E-05 | 6.19E-06 | 11403.52 | 9663.48 | 21945.62 | 3748.40 | 1993.11 | 3665.86 | 1359.63 | 3214.57 | 4897.28 | 5942.11 | 4024.52 | 1748.81 |
| | Sukhirin | 3.92E-05 | 2.57E-05 | 5.99E-05 | 1.08E-05 | 4.84E-06 | 7.52E-06 | 2.75E-06 | 7.9E-06 | 1.56E-05 | 2.34E-05 | 1.75E-05 | 4.29E-06 | 20224.69 | 13284.45 | 30925.99 | 5594.66 | 2499.12 | 3881.89 | 1416.97 | 4074.56 | 8062.31 | 12067.51 | 9012.17 | 2211.85 |
| | Su-ngai Kolok | 3.73E-05 | 4.35E-05 | 9E-05 | 2.43E-05 | 1.85E-05 | 1.84E-05 | 7.48E-06 | 8.21E-06 | 1.24E-05 | 1.87E-05 | 1.34E-05 | 1.61E-05 | 5103.66 | 5948.25 | 12300.23 | 3320.60 | 2522.60 | 2515.96 | 1022.34 | 1122.28 | 1691.86 | 2559.70 | 1836.98 | 2197.44 |
| | Su-ngai Padi | 2.84E-05 | 2.94E-05 | 6.26E-05 | 1.71E-05 | 1.21E-05 | 1.17E-05 | 4.86E-06 | 5.58E-06 | 9.25E-06 | 1.35E-05 | 1.04E-05 | 1.06E-05 | 10861.82 | 11244.21 | 23935.21 | 6535.13 | 4625.39 | 4486.26 | 1856.28 | 2131.49 | 3534.31 | 5159.78 | 3967.98 | 4047.37 |
| | Chanae | 3.43E-05 | 1.94E-05 | 4.97E-05 | 1.01E-05 | 3.37E-06 | 4.94E-06 | 1.85E-06 | 6.01E-06 | 1.26E-05 | 1.59E-05 | 1.34E-05 | 3.25E-06 | 19802.36 | 11199.16 | 28673.85 | 5845.41 | 1941.88 | 2850.35 | 1065.86 | 3466.73 | 7286.20 | 9144.30 | 7719.81 | 1875.39 |
| | Cho-airong | 4.74E-05 | 4.7E-05 | 0.000102 | 3.08E-05 | 2.08E-05 | 1.81E-05 | 8.01E-06 | 7.74E-06 | 1.4E-05 | 1.87E-05 | 1.62E-05 | 1.84E-05 | 9202.61 | 9132.79 | 19838.17 | 5984.87 | 4046.05 | 3521.32 | 1555.14 | 1503.38 | 2710.22 | 3633.76 | 3152.71 | 3566.29 |

# APPENDIX F

# FIFTY PERCENT OF $SO_2$ AND $NO_2$ MAXIMUM EMISSION LOAD FOR THE SOUTHERN REGION OF THAILAND

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010

| Province | District | 50%q (g/s-m$^2$) | | | | | | | | | | | | 50%q (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 0.000117 | 3.34E-05 | 3.52E-05 | 3.7E-05 | 2.15E-06 | 3.65E-05 | 1.76E-06 | 4.04E-05 | 2.62E-05 | 4.68E-05 | 6.24E-05 | 2.67E-05 | 105627.53 | 30272.34 | 31831.36 | 33518.90 | 1949.85 | 33014.16 | 1597.30 | 36544.73 | 23687.09 | 42359.91 | 56508.21 | 24154.17 |
| | Khao Phanom | 0.000129 | 3.84E-05 | 3.21E-05 | 3.9E-05 | 2.11E-06 | 3.64E-05 | 2.28E-06 | 5.32E-05 | 3.62E-05 | 3.48E-05 | 7.84E-05 | 3.06E-05 | 109845.15 | 32609.86 | 27271.67 | 33146.15 | 1789.60 | 30971.20 | 1936.01 | 45206.05 | 30763.23 | 29598.05 | 66665.60 | 26044.66 |
| | Ko Lanta | 0.000191 | 6.46E-05 | 7.96E-05 | 6.83E-05 | 1.58E-05 | 7.88E-05 | 1.33E-05 | 8.27E-05 | 6.88E-05 | 9.3E-05 | 9.17E-05 | 7.1E-05 | 64358.37 | 21707.65 | 26771.29 | 22955.37 | 5326.39 | 26497.45 | 4468.17 | 27803.37 | 23137.93 | 31252.56 | 30827.81 | 23858.52 |
| | Khlong Thom | 0.000114 | 3.58E-05 | 3.66E-05 | 3.52E-05 | 3.36E-06 | 3.27E-05 | 2.81E-06 | 4.08E-05 | 3.43E-05 | 3.08E-05 | 5.13E-05 | 2.51E-05 | 127732.43 | 40035.98 | 40937.70 | 39390.50 | 3752.65 | 36531.53 | 3138.68 | 45621.33 | 38302.03 | 34393.27 | 57345.33 | 28063.33 |
| | Ao Luek | 0.000116 | 2.67E-05 | 2.95E-05 | 3.19E-05 | 1.72E-06 | 3.23E-05 | 1.65E-06 | 4.91E-05 | 2.9E-05 | 4.85E-05 | 7.5E-05 | 2.89E-05 | 91442.99 | 21094.64 | 23312.13 | 25213.42 | 1356.35 | 25471.96 | 1300.45 | 38759.26 | 22924.78 | 38333.91 | 59227.67 | 22788.81 |
| | Plai Phraya | 0.000152 | 3.43E-05 | 4.16E-05 | 4.14E-05 | 2.32E-06 | 3.93E-05 | 2.32E-06 | 7.37E-05 | 4.26E-05 | 5.22E-05 | 0.000117 | 4.56E-05 | 80682.17 | 18154.88 | 21988.66 | 21916.47 | 1226.92 | 20769.99 | 1227.89 | 38974.82 | 22549.45 | 27642.25 | 61685.68 | 24133.52 |
| | Lam Thap | 0.000225 | 7.63E-05 | 5.74E-05 | 6.86E-05 | 3.6E-06 | 6.33E-05 | 4.42E-06 | 8.89E-05 | 6.74E-05 | 4.75E-05 | 0.000123 | 4.68E-05 | 63375.00 | 21480.44 | 16174.21 | 19305.00 | 1012.45 | 17821.64 | 1245.67 | 25036.20 | 18977.37 | 13387.93 | 34602.29 | 13166.46 |
| | Nuea Khlong | 0.000135 | 4.23E-05 | 4.17E-05 | 4.36E-05 | 4.01E-06 | 4.44E-05 | 3.41E-06 | 5.13E-05 | 3.67E-05 | 4.56E-05 | 7.02E-05 | 3.24E-05 | 69266.71 | 21721.61 | 21413.28 | 22417.87 | 2059.42 | 22798.04 | 1755.19 | 26353.01 | 18853.54 | 23453.38 | 36082.41 | 16636.96 |

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PHANGNGA | Mueang Phangnga | 0.000136 | 2.75E-05 | 2.88E-05 | 3.61E-05 | 1.71E-06 | 4.04E-05 | 2.03E-06 | 6.34E-05 | 3.21E-05 | 7.66E-05 | 8.49E-05 | 3.01E-05 | 88909.08 | 17963.72 | 18842.69 | 23610.01 | 1116.53 | 26414.93 | 1327.75 | 41438.72 | 20998.58 | 50060.21 | 55543.37 | 19714.95 |
| | Ko Yao | 0.000116 | 2.57E-05 | 2.72E-05 | 3.12E-05 | 6.76E-06 | 3.95E-05 | 6.36E-06 | 4.75E-05 | 3.19E-05 | 7.04E-05 | 6.3E-05 | 2.63E-05 | 120850.92 | 26785.37 | 28375.04 | 32485.54 | 7044.72 | 41140.99 | 6623.54 | 49493.11 | 33230.58 | 73311.03 | 65627.11 | 27387.87 |
| | Kapong | 0.000117 | 2.43E-05 | 2.44E-05 | 3.07E-05 | 1.82E-06 | 3.75E-05 | 2.36E-06 | 6.89E-05 | 3.34E-05 | 6.42E-05 | 8.36E-05 | 2.97E-05 | 70812.11 | 14749.49 | 14788.34 | 18647.75 | 1105.23 | 22719.25 | 1433.95 | 41768.62 | 20278.63 | 38911.88 | 50708.94 | 18028.86 |
| | Takua Thung | 0.000125 | 1.85E-05 | 1.94E-05 | 2.62E-05 | 1.97E-06 | 3.44E-05 | 2E-06 | 5.02E-05 | 2.94E-05 | 7.99E-05 | 6.94E-05 | 2.14E-05 | 81625.20 | 12104.77 | 12687.52 | 17128.39 | 1282.92 | 22437.57 | 1302.58 | 32740.07 | 19217.77 | 52132.38 | 45289.76 | 13951.55 |
| | Takua Pa | 0.000108 | 2.34E-05 | 2.22E-05 | 2.75E-05 | 2.25E-06 | 3.61E-05 | 2.7E-06 | 7.33E-05 | 3.6E-05 | 6.18E-05 | 8.42E-05 | 2.89E-05 | 64861.31 | 14072.88 | 13329.51 | 16527.61 | 1352.78 | 21688.78 | 1623.64 | 44080.65 | 21640.79 | 37161.58 | 50587.22 | 17389.26 |
| | Khura Buri | 5.74E-05 | 2.59E-05 | 2.22E-05 | 2.44E-05 | 1.15E-05 | 4.15E-05 | 9.5E-06 | 4.87E-05 | 2.98E-05 | 4.95E-05 | 5.42E-05 | 2.75E-05 | 58937.33 | 26619.35 | 22844.73 | 25097.48 | 11856.54 | 42625.38 | 9754.93 | 50002.70 | 30612.73 | 50867.54 | 55685.30 | 28222.42 |
| | Thap Put | 0.000173 | 3.62E-05 | 4.03E-05 | 4.6E-05 | 2.23E-06 | 4.95E-05 | 2.6E-06 | 8.36E-05 | 4.43E-05 | 8.16E-05 | 0.000118 | 4.38E-05 | 51633.03 | 10823.98 | 12060.42 | 13771.83 | 667.12 | 14812.11 | 777.70 | 25025.66 | 13257.68 | 24415.28 | 35216.38 | 13105.95 |
| | Thai Mueang | 0.000138 | 2.8E-05 | 2.84E-05 | 3.7E-05 | 1.93E-06 | 4.29E-05 | 2.37E-06 | 6.67E-05 | 3.26E-05 | 8.3E-05 | 8.6E-05 | 3.04E-05 | 84286.46 | 17117.22 | 17366.27 | 22607.20 | 1179.61 | 26243.22 | 1450.63 | 40751.48 | 19916.50 | 50723.28 | 52576.01 | 18562.65 |
| PHUKET | Mueang Phuket | 0.000117 | 2.89E-05 | 2.97E-05 | 3.47E-05 | 1.61E-05 | 4.47E-05 | 1.58E-05 | 5.38E-05 | 3.95E-05 | 8.18E-05 | 6.64E-05 | 3.09E-05 | 21061.52 | 5227.27 | 5360.85 | 6258.57 | 2899.22 | 8075.58 | 2846.16 | 9706.96 | 7124.60 | 14770.27 | 11990.03 | 5581.95 |
| | Kathu | 0.000277 | 5.11E-05 | 5.27E-05 | 6.61E-05 | 2.09E-05 | 9.1E-05 | 2.03E-05 | 0.000116 | 7.98E-05 | 0.000191 | 0.00015 | 5.66E-05 | 21924.83 | 4039.91 | 4163.41 | 5227.75 | 1652.18 | 7197.50 | 1608.21 | 9143.16 | 6307.40 | 15102.76 | 11819.86 | 4475.16 |
| | Thalang | 0.00019 | 2.09E-05 | 2.17E-05 | 3.24E-05 | 3.89E-06 | 5.04E-05 | 3.67E-06 | 7.02E-05 | 4.59E-05 | 0.000133 | 9.72E-05 | 2.64E-05 | 54874.90 | 6028.60 | 6260.59 | 9363.62 | 1123.16 | 14561.31 | 1061.28 | 20292.93 | 13253.84 | 38358.27 | 28081.76 | 7639.58 |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 0.000105 | 5.07E-05 | 3.63E-05 | 5.05E-05 | 1.66E-05 | 3.88E-05 | 1.81E-05 | 5.58E-05 | 3.23E-05 | 3.19E-05 | 5.99E-05 | 3.73E-05 | 58309.77 | 28212.27 | 20221.84 | 28093.59 | 9230.10 | 21603.68 | 10085.06 | 31070.25 | 17966.69 | 17752.09 | 33337.92 | 20781.86 |
| | Phrom Khiri | 0.000247 | 9.01E-05 | 4.7E-05 | 7.47E-05 | 1.63E-05 | 6.84E-05 | 1.98E-05 | 0.000126 | 6.9E-05 | 4.71E-05 | 0.000118 | 5.36E-05 | 60985.50 | 22216.35 | 11583.20 | 18405.47 | 4028.73 | 16865.77 | 4872.76 | 30985.69 | 17001.68 | 11620.97 | 29024.82 | 13205.83 |
| | Lan Saka | 0.000192 | 7.55E-05 | 4.82E-05 | 6.83E-05 | 1.33E-05 | 5.56E-05 | 1.74E-05 | 9.28E-05 | 5.45E-05 | 4.31E-05 | 0.000101 | 4.71E-05 | 66155.33 | 26027.34 | 16596.07 | 23551.92 | 4599.02 | 19164.41 | 5983.69 | 32000.05 | 18796.07 | 14865.48 | 34947.27 | 16224.33 |
| | Chawang | 0.000151 | 4.9E-05 | 2.79E-05 | 4.68E-05 | 6E-06 | 4.11E-05 | 7.6E-06 | 7.26E-05 | 4.59E-05 | 2.81E-05 | 9.11E-05 | 3.6E-05 | 65462.10 | 21241.08 | 12102.52 | 20270.47 | 2598.76 | 17811.26 | 3294.41 | 31466.19 | 19874.91 | 12176.10 | 39448.05 | 15606.33 |
| | Phipun | 0.000154 | 5.19E-05 | 2.84E-05 | 4.72E-05 | 8.76E-06 | 4.27E-05 | 1.04E-05 | 7.72E-05 | 4.61E-05 | 2.87E-05 | 8.97E-05 | 3.67E-05 | 76236.88 | 25646.31 | 14050.51 | 23323.59 | 4325.58 | 21086.45 | 5151.21 | 38132.84 | 22760.08 | 14179.78 | 44309.24 | 18124.41 |
| | Chian Yai | 0.000103 | 7.96E-05 | 5.29E-05 | 7.06E-05 | 3.21E-05 | 4.95E-05 | 3.08E-05 | 5.55E-05 | 3.61E-05 | 4.44E-05 | 6.12E-05 | 6.01E-05 | 33229.08 | 25611.22 | 17035.96 | 22705.56 | 10318.26 | 15921.38 | 9924.54 | 17872.09 | 11623.39 | 14276.11 | 19687.67 | 19328.28 |
| | Cha-uat | 7.93E-05 | 4.28E-05 | 3.32E-05 | 3.84E-05 | 1.01E-05 | 2.23E-05 | 1.18E-05 | 3.41E-05 | 2.23E-05 | 2.43E-05 | 4.2E-05 | 2.92E-05 | 59534.62 | 32158.58 | 24932.70 | 28805.42 | 7571.40 | 16736.88 | 8842.19 | 25572.51 | 16714.29 | 18225.29 | 31533.50 | 21879.73 |
| | Tha Sala | 0.000157 | 5.52E-05 | 3.37E-05 | 5.29E-05 | 1.47E-05 | 4.69E-05 | 1.62E-05 | 7.95E-05 | 4.63E-05 | 3.36E-05 | 9.45E-05 | 4.26E-05 | 65715.77 | 23081.34 | 14071.47 | 22085.57 | 6122.20 | 19591.16 | 6755.85 | 33221.20 | 19349.79 | 14049.07 | 39496.26 | 17794.50 |
| | Thung Song | 0.000104 | 4.04E-05 | 3.35E-05 | 3.91E-05 | 2.74E-06 | 2.64E-05 | 6.54E-06 | 4.1E-05 | 2.84E-05 | 2.51E-05 | 5.99E-05 | 2.36E-05 | 94209.48 | 36758.86 | 30514.36 | 35577.09 | 2489.13 | 23982.36 | 5954.33 | 37311.82 | 25842.54 | 22798.55 | 54537.21 | 21436.80 |
| | Na Bon | 0.000237 | 8.4E-05 | 6E-05 | 7.93E-05 | 6.6E-06 | 6.32E-05 | 1.14E-05 | 0.000102 | 6.85E-05 | 5.08E-05 | 0.000136 | 5.34E-05 | 49310.80 | 17448.02 | 12462.03 | 16486.74 | 1371.03 | 13140.74 | 2371.97 | 21112.28 | 14230.41 | 10550.10 | 28318.40 | 11089.44 |
| | Thung Yai | 0.000137 | 4.35E-05 | 2.91E-05 | 4.17E-05 | 2.6E-06 | 3.74E-05 | 3.57E-06 | 5.92E-05 | 4.11E-05 | 2.77E-05 | 8.17E-05 | 3.1E-05 | 82197.08 | 26140.21 | 17462.01 | 25067.69 | 1564.78 | 22486.97 | 2142.62 | 35587.50 | 24690.54 | 16643.28 | 49080.38 | 18621.53 |
| | Pak Phanang | 9.58E-05 | 6.42E-05 | 4.85E-05 | 6.45E-05 | 2.67E-05 | 4.55E-05 | 2.71E-05 | 5.43E-05 | 3.28E-05 | 4.07E-05 | 5.9E-05 | 5.1E-05 | 50830.82 | 34077.85 | 25711.04 | 34206.39 | 14185.26 | 24164.10 | 14397.02 | 28838.93 | 17400.36 | 21595.68 | 31289.49 | 27045.37 |
| | Ron Phibun | 0.000125 | 5.9E-05 | 4.66E-05 | 5.71E-05 | 1.12E-05 | 3.85E-05 | 1.54E-05 | 5.49E-05 | 3.57E-05 | 3.62E-05 | 7.38E-05 | 3.76E-05 | 53672.49 | 25335.81 | 19991.11 | 24503.06 | 4800.84 | 16513.07 | 6624.58 | 23587.78 | 15329.99 | 15545.86 | 31693.33 | 16148.85 |
| | Sichon | 7.14E-05 | 1.27E-05 | 7.01E-06 | 1.45E-05 | 5.23E-06 | 1.64E-05 | 4.57E-06 | 2.99E-05 | 2.09E-05 | 1.04E-05 | 6.26E-05 | 1.96E-05 | 49061.48 | 8761.11 | 4821.52 | 9981.26 | 3597.29 | 11259.40 | 3143.48 | 20575.19 | 14395.70 | 7137.73 | 43060.87 | 13479.85 |
| | Khanom | 9.81E-05 | 3.5E-05 | 2.87E-05 | 4.13E-05 | 2.29E-05 | 3.46E-05 | 1.98E-05 | 5.39E-05 | 4.43E-05 | 2.49E-05 | 0.000114 | 4.76E-05 | 30556.86 | 10902.96 | 8921.73 | 12853.80 | 7120.57 | 10771.10 | 6161.71 | 16782.76 | 13781.20 | 7768.22 | 35566.33 | 14818.28 |
| | Hua Sai | 0.000109 | 8.28E-05 | 5.62E-05 | 7.21E-05 | 3.25E-05 | 4.87E-05 | 3.11E-05 | 5.67E-05 | 3.68E-05 | 4.52E-05 | 6.21E-05 | 6.24E-05 | 47551.79 | 36197.80 | 24597.02 | 31533.96 | 14204.04 | 21305.83 | 13582.90 | 24775.91 | 16081.99 | 19774.13 | 27141.65 | 27279.57 |
| | Bang Khan | 0.000149 | 5.17E-05 | 4.41E-05 | 4.84E-05 | 2.82E-06 | 3.71E-05 | 4.74E-06 | 5.6E-05 | 4.31E-05 | 3.27E-05 | 7.71E-05 | 3.12E-05 | 70207.60 | 24269.16 | 20736.92 | 22740.87 | 1323.92 | 17404.31 | 2224.45 | 26316.01 | 20220.90 | 15362.60 | 36203.60 | 14632.05 |
| | Tham Phannara | 0.00023 | 6.6E-05 | 3.6E-05 | 6.94E-05 | 5.36E-06 | 6.09E-05 | 6.5E-06 | 0.000109 | 7.29E-05 | 4.07E-05 | 0.000152 | 5.79E-05 | 40595.72 | 11651.78 | 6359.37 | 12250.61 | 945.78 | 10745.07 | 1146.85 | 19295.74 | 12855.56 | 7189.66 | 26766.46 | 10215.32 |
| | Chulabhom | 0.000211 | 9.23E-05 | 7.75E-05 | 8.97E-05 | 1.01E-05 | 5.59E-05 | 1.95E-05 | 8.43E-05 | 5.69E-05 | 5.71E-05 | 0.000125 | 5.47E-05 | 48537.31 | 21266.49 | 17865.73 | 20677.16 | 2319.37 | 12895.36 | 4484.66 | 19423.24 | 13106.26 | 13171.10 | 28865.20 | 12616.81 |
| | Phra Phrom | 0.000219 | 0.000107 | 7.75E-05 | 0.000103 | 2.91E-05 | 7.62E-05 | 3.35E-05 | 0.000109 | 6.6E-05 | 6.51E-05 | 0.000125 | 7.37E-05 | 32173.43 | 15679.13 | 11397.54 | 15168.71 | 4279.08 | 11202.69 | 4927.79 | 15978.17 | 9698.90 | 9575.94 | 18428.16 | 10838.99 |
| | Nopphitam | 0.000129 | 4.19E-05 | 2.47E-05 | 4.05E-05 | 1.07E-05 | 3.72E-05 | 1.15E-05 | 6.53E-05 | 3.98E-05 | 2.5E-05 | 8.66E-05 | 3.5E-05 | 92753.90 | 30229.25 | 17853.46 | 29258.71 | 7742.50 | 26876.57 | 8318.03 | 47122.76 | 28739.93 | 18026.88 | 62497.93 | 25248.26 |
| | Chang Klang | 0.000164 | 5.92E-05 | 3.83E-05 | 5.48E-05 | 7.39E-06 | 4.51E-05 | 1.06E-05 | 7.56E-05 | 4.7E-05 | 3.45E-05 | 9.12E-05 | 3.78E-05 | 44616.85 | 16145.38 | 10446.70 | 14949.01 | 2015.87 | 12313.80 | 2903.67 | 20630.12 | 12819.72 | 9401.29 | 24886.47 | 10322.16 |
| | Chaloem Phra Kiat | 0.000201 | 0.000127 | 9.02E-05 | 0.000117 | 4.3E-05 | 8.09E-05 | 4.48E-05 | 0.000101 | 6.41E-05 | 7.41E-05 | 0.000118 | 9.23E-05 | 36383.50 | 22896.36 | 16316.52 | 21156.53 | 7776.04 | 14627.24 | 8104.35 | 18357.98 | 11598.37 | 13406.56 | 21260.20 | 16697.53 |

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 0.000181 | 0.000107 | 9.28E-05 | 0.000122 | 4.97E-05 | 0.000104 | 5.41E-05 | 0.000151 | 9.82E-05 | 7.29E-05 | 0.000221 | 0.000108 | 60510.50 | 35639.48 | 31035.49 | 40658.21 | 16615.51 | 34764.35 | 18107.00 | 50587.16 | 32837.92 | 24397.62 | 73781.70 | 36061.70 |
| | Kanchanadit | 6.9E-05 | 2.82E-05 | 2.21E-05 | 3.18E-05 | 1.37E-05 | 2.83E-05 | 1.44E-05 | 4.52E-05 | 3.13E-05 | 1.95E-05 | 7.63E-05 | 3.22E-05 | 74174.18 | 30302.59 | 23802.28 | 34179.90 | 14698.92 | 30463.21 | 15485.53 | 48630.86 | 33662.15 | 20973.34 | 82061.93 | 34670.27 |
| | Don Sak | 9.78E-05 | 3.78E-05 | 3.07E-05 | 4.45E-05 | 2.44E-05 | 3.68E-05 | 2.28E-05 | 5.92E-05 | 4.72E-05 | 2.71E-05 | 0.000118 | 5.02E-05 | 35566.99 | 13759.39 | 11163.78 | 16166.82 | 8876.14 | 13375.73 | 8283.20 | 21509.94 | 17179.29 | 9841.54 | 43040.86 | 18245.25 |
| | Ko Samui | 8.01E-05 | 5.54E-05 | 6.39E-05 | 6.03E-05 | 3.89E-05 | 5.43E-05 | 2.84E-05 | 6.11E-05 | 5.45E-05 | 3.7E-05 | 0.000121 | 7.11E-05 | 22060.85 | 15270.31 | 17616.46 | 16610.07 | 10726.77 | 14960.60 | 7817.16 | 16835.31 | 15005.33 | 10204.84 | 33339.31 | 19578.04 |
| | Ko Pha-ngan | 0.000179 | 0.000138 | 0.000209 | 0.00014 | 8.86E-05 | 0.000165 | 6.19E-05 | 0.000192 | 0.000142 | 0.000102 | 0.000306 | 0.000199 | 21934.52 | 16951.76 | 25625.03 | 17132.20 | 10841.01 | 20150.70 | 7573.00 | 23454.91 | 17332.82 | 12450.94 | 37429.02 | 24309.56 |
| | Chaiya | 9.98E-05 | 3.41E-05 | 2.22E-05 | 3.63E-05 | 1.57E-05 | 6.25E-05 | 2.52E-05 | 0.000106 | 6.15E-05 | 4.92E-05 | 0.000125 | 6.17E-05 | 65642.56 | 22446.20 | 14624.98 | 23875.01 | 10300.43 | 41115.53 | 16573.03 | 69409.01 | 40456.44 | 32357.41 | 81993.47 | 40620.38 |
| | Tha Chana | 9.6E-05 | 2.81E-05 | 2.39E-05 | 3.07E-05 | 1.29E-05 | 6.11E-05 | 2.02E-05 | 9.9E-05 | 5.61E-05 | 4.45E-05 | 0.000118 | 6.17E-05 | 96544.32 | 28273.06 | 24006.68 | 30840.26 | 12955.62 | 61408.37 | 20332.47 | 99475.70 | 56369.87 | 44714.07 | 118443.60 | 61988.85 |
| | Khiri Rat Nikhom | 0.000148 | 3E-05 | 2.73E-05 | 4.24E-05 | 5.85E-06 | 6.04E-05 | 9.07E-06 | 0.000101 | 5.05E-05 | 5.89E-05 | 0.000118 | 5.1E-05 | 113104.68 | 22926.39 | 20810.57 | 32337.11 | 4466.04 | 46100.11 | 6920.66 | 77334.20 | 38515.77 | 44942.25 | 89994.65 | 38940.02 |
| | Ban Ta Khun | 9.78E-05 | 1.85E-05 | 1.6E-05 | 2.45E-05 | 2.64E-06 | 4.03E-05 | 4.89E-06 | 6.88E-05 | 3.5E-05 | 4.37E-05 | 7.94E-05 | 3.45E-05 | 142312.78 | 26883.10 | 23292.97 | 35689.03 | 3836.69 | 58603.34 | 7105.28 | 100068.72 | 50863.89 | 63535.71 | 115542.96 | 50115.60 |
| | Phanom | 8.7E-05 | 1.73E-05 | 1.79E-05 | 2.27E-05 | 1.47E-06 | 2.81E-05 | 2.22E-06 | 5.28E-05 | 2.66E-05 | 3.78E-05 | 6.59E-05 | 2.52E-05 | 106146.67 | 21060.92 | 21786.43 | 27633.27 | 1796.23 | 34218.81 | 2701.20 | 64393.10 | 32394.00 | 46037.26 | 80368.19 | 30738.01 |
| | Tha Chang | 0.000124 | 3.04E-05 | 1.99E-05 | 3.75E-05 | 1.06E-05 | 6.71E-05 | 1.81E-05 | 0.000109 | 6.11E-05 | 5.48E-05 | 0.00013 | 6.27E-05 | 135167.65 | 33130.30 | 21751.23 | 40921.48 | 11525.67 | 73250.34 | 19760.08 | 118952.67 | 66713.33 | 59763.32 | 141848.76 | 68447.85 |
| | Ban Na San | 8.71E-05 | 3.49E-05 | 2.63E-05 | 3.9E-05 | 1.14E-05 | 3.34E-05 | 1.2E-05 | 5.3E-05 | 3.42E-05 | 2.28E-05 | 7.73E-05 | 3.36E-05 | 66939.66 | 26856.38 | 20217.24 | 29958.09 | 8760.60 | 25652.75 | 9206.95 | 40717.55 | 26320.49 | 17541.16 | 59432.00 | 25844.21 |
| | Ban Na Doem | 0.000218 | 0.000117 | 0.000103 | 0.000136 | 4.97E-05 | 0.000112 | 5.16E-05 | 0.000161 | 0.000104 | 7.8E-05 | 0.000239 | 0.000114 | 40529.60 | 21798.00 | 19194.48 | 25346.95 | 9243.33 | 20760.49 | 9596.72 | 29918.95 | 19319.81 | 14511.62 | 44385.76 | 21165.25 |
| | Khian Sa | 0.000107 | 3.22E-05 | 2.67E-05 | 3.82E-05 | 7E-06 | 3.63E-05 | 7.65E-06 | 6.11E-05 | 3.68E-05 | 3.14E-05 | 8.62E-05 | 3.61E-05 | 80577.25 | 24243.50 | 20119.76 | 28709.69 | 5268.36 | 27275.93 | 5756.70 | 45951.46 | 27713.10 | 23620.23 | 64841.44 | 27133.35 |
| | Wiang Sa | 0.000117 | 3.29E-05 | 1.72E-05 | 3.57E-05 | 3.38E-06 | 3.14E-05 | 3.72E-06 | 5.71E-05 | 3.8E-05 | 2.03E-05 | 8.05E-05 | 3.09E-05 | 44954.16 | 12639.81 | 6601.91 | 13732.51 | 1299.00 | 12080.82 | 1430.55 | 21968.29 | 14623.29 | 7788.20 | 30966.49 | 11874.33 |
| | Phrasaeng | 0.000199 | 5.29E-05 | 4.09E-05 | 5.98E-05 | 5.11E-06 | 5.51E-05 | 5.61E-06 | 9.77E-05 | 6.17E-05 | 4.91E-05 | 0.000143 | 5.61E-05 | 141348.05 | 37505.88 | 29031.68 | 42411.48 | 3628.08 | 39078.35 | 3978.76 | 69299.95 | 43782.12 | 34849.66 | 101473.27 | 39796.06 |
| | Phunphin | 7.1E-05 | 3.03E-05 | 2.61E-05 | 3.58E-05 | 1.2E-05 | 3.54E-05 | 1.38E-05 | 5.45E-05 | 3.26E-05 | 2.78E-05 | 7.34E-05 | 3.46E-05 | 67718.18 | 28876.75 | 24873.95 | 34140.91 | 11463.64 | 33790.71 | 13159.03 | 51980.46 | 31086.02 | 26473.79 | 70020.76 | 33001.39 |
| | Chai Buri | 0.000176 | 4.65E-05 | 4.02E-05 | 5.18E-05 | 3.55E-06 | 4.79E-05 | 3.75E-06 | 8.14E-05 | 5.16E-05 | 4.71E-05 | 0.000122 | 4.8E-05 | 81919.98 | 21698.95 | 18754.90 | 24167.93 | 1656.83 | 22323.73 | 1750.84 | 37959.55 | 24072.21 | 21949.16 | 57087.37 | 22378.29 |
| | Vibhavadi | 0.000203 | 4.13E-05 | 2.98E-05 | 5.49E-05 | 1.03E-05 | 9.77E-05 | 1.9E-05 | 0.000159 | 8.49E-05 | 8.76E-05 | 0.000186 | 8.65E-05 | 100600.21 | 20484.27 | 14771.34 | 27237.29 | 5092.11 | 48456.42 | 9409.33 | 79049.18 | 42134.75 | 43453.16 | 92246.54 | 42903.86 |
| RANONG | Mueang Ranong | 7.74E-05 | 2.06E-05 | 2.86E-05 | 2.13E-05 | 6.24E-06 | 5.85E-05 | 1.13E-05 | 7.78E-05 | 4.06E-05 | 3.56E-05 | 9.01E-05 | 6.18E-05 | 57555.11 | 15284.95 | 21272.22 | 15819.95 | 4637.73 | 43466.15 | 8390.69 | 57790.50 | 30184.95 | 26437.75 | 66992.41 | 45908.37 |
| | La-un | 8.96E-05 | 1.51E-05 | 4.98E-05 | 1.87E-05 | 5.81E-06 | 5.81E-05 | 1.21E-05 | 9.7E-05 | 4.84E-05 | 3.07E-05 | 0.000126 | 7.57E-05 | 49600.12 | 8374.79 | 27570.36 | 10376.53 | 3214.38 | 32146.59 | 6679.47 | 53703.88 | 26792.47 | 16969.62 | 69725.12 | 41891.32 |
| | Kapoe | 0.000119 | 2.92E-05 | 2.23E-05 | 3.23E-05 | 8.45E-06 | 7.56E-05 | 1.51E-05 | 9.73E-05 | 5.71E-05 | 5.23E-05 | 0.000119 | 7.26E-05 | 61413.32 | 15098.09 | 11567.47 | 16723.90 | 4373.71 | 39158.41 | 7838.80 | 50379.49 | 29557.05 | 27101.70 | 61695.63 | 37588.38 |
| | Kra Buri | 7.94E-05 | 6.04E-06 | 9.28E-05 | 1.09E-05 | 3.75E-06 | 5.34E-05 | 1.25E-05 | 0.000106 | 4.81E-05 | 1.87E-05 | 0.000156 | 8.74E-05 | 75915.16 | 5774.47 | 88746.34 | 10474.24 | 3589.59 | 51087.34 | 11958.88 | 101197.16 | 46029.63 | 17885.62 | 149446.45 | 83607.04 |
| | Suk Samran | 0.000125 | 3.73E-05 | 2.69E-05 | 3.87E-05 | 1.2E-05 | 8.1E-05 | 1.85E-05 | 9.07E-05 | 5.96E-05 | 5.5E-05 | 0.000121 | 7.68E-05 | 56818.99 | 16915.85 | 12193.66 | 17552.53 | 5450.08 | 36710.61 | 8375.71 | 41145.90 | 27030.69 | 24936.93 | 54942.08 | 34838.10 |

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^3$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 7.93E-05 | 2.04E-05 | 0.000127 | 2.21E-05 | 1.33E-05 | 6.02E-05 | 2.26E-05 | 0.000108 | 5.41E-05 | 3.22E-05 | 0.000149 | 9.19E-05 | 63215.59 | 16294.41 | 100960.71 | 17613.99 | 10580.10 | 48007.84 | 18024.87 | 86228.91 | 43138.20 | 25647.18 | 118372.07 | 73272.46 |
| | Tha Sae | 4.17E-05 | 3.86E-06 | 8.55E-05 | 4.33E-06 | 2.65E-06 | 3.02E-05 | 6.46E-06 | 6.54E-05 | 2.84E-05 | 9.89E-06 | 9.9E-05 | 5.63E-05 | 61693.23 | 5705.81 | 126369.87 | 6400.75 | 3914.95 | 44629.04 | 9547.30 | 96579.96 | 41919.70 | 14621.28 | 146252.16 | 83239.18 |
| | Pathio | 5.28E-05 | 3.99E-06 | 0.000139 | 3.94E-06 | 3.03E-06 | 3.84E-05 | 5.45E-06 | 9.11E-05 | 3.69E-05 | 1.2E-05 | 0.000138 | 7.79E-05 | 40211.17 | 3038.49 | 105550.91 | 3004.13 | 2309.65 | 29218.97 | 4155.92 | 69400.75 | 28085.63 | 9107.90 | 104938.40 | 59368.59 |
| | Lang Suan | 7.19E-05 | 2.07E-05 | 4.17E-05 | 2.24E-05 | 1.2E-05 | 5.06E-05 | 1.57E-05 | 8.11E-05 | 4.29E-05 | 2.97E-05 | 0.000101 | 5.85E-05 | 42246.61 | 12163.37 | 24507.16 | 13173.96 | 7027.86 | 29713.67 | 9222.09 | 47622.42 | 25216.04 | 17443.49 | 59135.14 | 34346.58 |
| | Lamae | 0.000103 | 3.04E-05 | 4.2E-05 | 3.26E-05 | 1.6E-05 | 7.07E-05 | 2.2E-05 | 0.000113 | 6.13E-05 | 4.51E-05 | 0.000136 | 7.67E-05 | 38082.58 | 11195.50 | 15467.42 | 11996.35 | 5882.82 | 26035.55 | 8117.08 | 41587.30 | 22573.19 | 16601.29 | 50224.63 | 28238.70 |
| | Phato | 6.35E-05 | 1.11E-05 | 1.72E-05 | 1.33E-05 | 3.09E-06 | 3.83E-05 | 6.76E-06 | 6.01E-05 | 3.19E-05 | 2.31E-05 | 7.5E-05 | 4.51E-05 | 55645.11 | 9712.75 | 15056.42 | 11624.36 | 2702.76 | 33513.11 | 5923.64 | 52683.77 | 27981.75 | 20261.37 | 65675.74 | 39508.83 |
| | Sawi | 5.92E-05 | 1.32E-05 | 6.6E-05 | 1.56E-05 | 8.15E-06 | 4.24E-05 | 1.38E-05 | 7.44E-05 | 3.7E-05 | 2.19E-05 | 0.000101 | 6.02E-05 | 49690.71 | 11068.60 | 55341.77 | 13064.80 | 6835.31 | 35581.13 | 11560.05 | 62380.85 | 31024.83 | 18338.61 | 84363.59 | 50462.59 |
| | Thung Tako | 0.000106 | 3.1E-05 | 9.01E-05 | 3.36E-05 | 1.87E-05 | 7.8E-05 | 2.59E-05 | 0.000126 | 6.56E-05 | 4.46E-05 | 0.00016 | 9.67E-05 | 30681.18 | 8957.14 | 26055.80 | 9714.54 | 5406.86 | 22547.13 | 7501.98 | 36390.79 | 18985.38 | 12899.71 | 46347.54 | 27975.08 |
| SONGKHLA | Mueang Songkhla | 2.64E-05 | 3.22E-05 | 7.45E-05 | 4.71E-05 | 1.98E-05 | 1.1E-05 | 3.06E-05 | 1.8E-05 | 1.85E-05 | 5.49E-05 | 6.06E-05 | 0.000102 | 5391.22 | 6569.93 | 15211.14 | 9613.08 | 4039.26 | 2242.84 | 6246.40 | 3678.49 | 3787.59 | 11219.65 | 12384.86 | 20892.69 |
| | Sathing Phra | 0.000173 | 0.000115 | 0.000128 | 0.000101 | 4.31E-05 | 4.39E-05 | 4.22E-05 | 7.68E-05 | 4.84E-05 | 0.000108 | 0.000114 | 0.000132 | 34424.65 | 22787.08 | 25482.56 | 19974.53 | 8557.38 | 8720.61 | 8387.95 | 15264.64 | 9610.68 | 21449.33 | 22561.03 | 26165.91 |
| | Chana | 7.06E-05 | 3.77E-05 | 6.04E-05 | 3.56E-05 | 9.37E-06 | 8.55E-06 | 6.86E-06 | 1.39E-05 | 1.99E-05 | 1.58E-05 | 1.81E-05 | 3.43E-05 | 44456.14 | 23729.18 | 38036.96 | 22451.03 | 5901.04 | 5385.60 | 4321.51 | 8738.34 | 12560.57 | 9976.82 | 11382.21 | 21595.27 |
| | Na Thawi | 8.83E-05 | 4.33E-05 | 6.7E-05 | 3.7E-05 | 7.76E-06 | 9.15E-06 | 2.82E-06 | 1.56E-05 | 2.28E-05 | 7.75E-06 | 1.28E-05 | 2.39E-05 | 68777.04 | 33708.84 | 52177.55 | 28797.79 | 6044.95 | 7126.32 | 2192.58 | 12126.31 | 17749.38 | 6031.23 | 9979.98 | 18573.94 |
| | Thepha | 7.13E-05 | 4.22E-05 | 7.83E-05 | 4.83E-05 | 1.44E-05 | 1.08E-05 | 1.17E-05 | 1.58E-05 | 2.67E-05 | 1.51E-05 | 1.7E-05 | 3.63E-05 | 47214.84 | 27940.78 | 51895.90 | 31990.91 | 9559.53 | 7125.70 | 7758.26 | 10492.56 | 17717.83 | 10025.30 | 11285.66 | 24036.64 |
| | Saba Yoi | 5.74E-05 | 3.08E-05 | 6.15E-05 | 3.19E-05 | 8.44E-06 | 7.65E-06 | 6.21E-06 | 1.22E-05 | 2.04E-05 | 1E-05 | 1.27E-05 | 2.09E-05 | 54325.18 | 29149.04 | 58209.41 | 30215.53 | 7978.71 | 7238.86 | 5871.93 | 11508.41 | 19265.25 | 9497.45 | 11987.05 | 19782.11 |
| | Ranot | 0.000125 | 7.19E-05 | 5.73E-05 | 5.7E-05 | 1.85E-05 | 2.68E-05 | 1.93E-05 | 5.31E-05 | 2.97E-05 | 4.06E-05 | 5.45E-05 | 5.72E-05 | 55037.12 | 31775.26 | 25300.39 | 25194.09 | 8173.35 | 11828.31 | 8503.19 | 23448.71 | 13126.06 | 17947.02 | 24090.85 | 25245.21 |
| | Krasae Sin | 0.000138 | 6.71E-05 | 5.64E-05 | 4.83E-05 | 9.62E-06 | 1.42E-05 | 1.3E-05 | 5.46E-05 | 2.5E-05 | 4.44E-05 | 5.19E-05 | 6.07E-05 | 42692.82 | 20703.16 | 17397.63 | 14916.09 | 2969.05 | 4396.61 | 4013.40 | 16863.41 | 7712.09 | 13701.58 | 16014.62 | 18740.73 |
| | Rattaphum | 3.98E-06 | 2.29E-06 | 2.19E-05 | 6.82E-06 | 5.1E-06 | 3.35E-06 | 5.55E-06 | 3.62E-06 | 3.42E-06 | 5.39E-05 | 3.21E-05 | 3.6E-05 | 2649.54 | 1523.84 | 14545.60 | 4538.22 | 3393.65 | 2227.64 | 3687.79 | 2408.91 | 2272.09 | 35820.06 | 21311.81 | 23960.98 |
| | Sadao | 4.78E-05 | 2.24E-05 | 4.56E-05 | 2.17E-05 | 6.14E-06 | 6.11E-06 | 3.52E-06 | 1.04E-05 | 1.45E-05 | 2.67E-05 | 2.11E-05 | 2.93E-05 | 49415.04 | 23214.70 | 47175.98 | 22443.38 | 6348.34 | 6314.31 | 3640.61 | 10774.40 | 15018.95 | 27614.14 | 21836.47 | 30337.20 |
| | Hat Yai | 2.85E-05 | 1.67E-05 | 3.91E-05 | 1.92E-05 | 7.75E-06 | 5.71E-06 | 7.63E-06 | 8.17E-06 | 1.02E-05 | 3.99E-05 | 2.93E-05 | 4.06E-05 | 22586.93 | 13208.01 | 30987.42 | 15201.17 | 6138.74 | 4526.76 | 6046.41 | 6474.49 | 8089.14 | 31632.16 | 23235.99 | 32184.25 |
| | Na Mom | 8.64E-05 | 4.88E-05 | 8.96E-05 | 5.08E-05 | 1.57E-05 | 1.25E-05 | 1.46E-05 | 1.98E-05 | 2.73E-05 | 4.7E-05 | 4.17E-05 | 6.92E-05 | 12249.80 | 6911.14 | 12702.59 | 7197.98 | 2231.73 | 1766.66 | 2075.33 | 2807.48 | 3865.39 | 6661.75 | 5915.58 | 9807.08 |
| | Khuan Niang | 2.32E-05 | 1.58E-05 | 4.9E-05 | 2.25E-05 | 1.19E-05 | 8.69E-06 | 1.39E-05 | 1.28E-05 | 1.06E-05 | 8.71E-05 | 5.7E-05 | 6.72E-05 | 5755.90 | 3926.63 | 12165.01 | 5579.88 | 2963.92 | 2155.70 | 3441.82 | 3180.82 | 2627.93 | 21600.55 | 14129.44 | 16676.08 |
| | Bang Klam | 3.87E-05 | 2.4E-05 | 6.87E-05 | 3.17E-05 | 1.48E-05 | 1.04E-05 | 1.68E-05 | 1.55E-05 | 1.58E-05 | 9.97E-05 | 6.78E-05 | 8.59E-05 | 5602.75 | 3469.96 | 9946.82 | 4593.16 | 2138.50 | 1501.63 | 2427.69 | 2251.07 | 2291.78 | 14439.64 | 9813.16 | 12443.16 |
| | Singhanakhon | 5.29E-05 | 4.53E-05 | 8.3E-05 | 5.32E-05 | 2.45E-05 | 1.83E-05 | 3.01E-05 | 2.79E-05 | 2.31E-05 | 8.05E-05 | 7.44E-05 | 0.000103 | 12804.34 | 10965.78 | 20086.96 | 12874.28 | 5927.82 | 4437.81 | 7279.07 | 6753.85 | 5580.24 | 19472.65 | 17986.43 | 24869.61 |
| | Khlong Hoi Khong | 2.66E-05 | 1.32E-05 | 4.35E-05 | 1.71E-05 | 8.28E-06 | 5.64E-06 | 7.13E-06 | 8.16E-06 | 1.08E-05 | 5.92E-05 | 3.89E-05 | 5.08E-05 | 8048.85 | 3999.61 | 13188.68 | 5174.02 | 2506.84 | 1707.08 | 2159.27 | 2471.38 | 3283.50 | 17915.17 | 11782.11 | 15399.66 |

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%q (g/s-m$^3$) | | | | | | | | | | | | 50%q (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 1.8E-05 | 8.5E-06 | 2.97E-05 | 1.43E-05 | 6.15E-06 | 5.98E-06 | 6.05E-06 | 7.58E-06 | 9.88E-06 | 4.68E-05 | 3.22E-05 | 5.03E-05 | 17533.18 | 8283.65 | 28997.23 | 13937.30 | 6001.37 | 5828.61 | 5898.02 | 7393.27 | 9638.08 | 45675.09 | 31401.57 | 49088.47 |
| | Khuan Don | 1.4E-05 | 5.89E-06 | 6.11E-05 | 1.74E-05 | 1.35E-05 | 7.26E-06 | 1.22E-05 | 9.47E-06 | 1.24E-05 | 0.000122 | 7.7E-05 | 9.96E-05 | 3091.57 | 1301.22 | 13500.25 | 3832.45 | 2984.16 | 1603.67 | 2702.59 | 2090.73 | 2741.86 | 26934.50 | 16998.30 | 21988.14 |
| | Khuan Kalong | 1.08E-05 | 5.76E-06 | 4.39E-05 | 1.46E-05 | 1.04E-05 | 6.07E-06 | 1.07E-05 | 7.3E-06 | 8.05E-06 | 9.63E-05 | 6.35E-05 | 8.5E-05 | 5728.41 | 3067.00 | 23382.81 | 7790.25 | 5511.66 | 3231.27 | 5690.20 | 3882.34 | 4281.80 | 51259.26 | 33780.47 | 45239.74 |
| | Tha Phae | 8.87E-06 | 5.56E-06 | 3.93E-05 | 1.59E-05 | 9.71E-06 | 5.79E-06 | 1.02E-05 | 6.62E-06 | 7.63E-06 | 8.83E-05 | 5.79E-05 | 0.000102 | 1995.52 | 1250.21 | 8835.37 | 3586.56 | 2183.94 | 1301.53 | 2286.24 | 1490.07 | 1716.05 | 19871.39 | 13021.23 | 22959.98 |
| | La-ngu | 2.63E-06 | 2.88E-06 | 2.33E-05 | 9.82E-06 | 6.6E-06 | 3.67E-06 | 7.91E-06 | 3.97E-06 | 3.57E-06 | 6.01E-05 | 4.35E-05 | 7.06E-05 | 1041.60 | 1139.72 | 9238.95 | 3888.95 | 2614.37 | 1452.50 | 3131.83 | 1570.61 | 1412.19 | 23815.99 | 17244.29 | 27975.47 |
| | Thung Wa | 4.75E-06 | 3.48E-06 | 2.3E-05 | 9.07E-06 | 6.68E-06 | 3.79E-06 | 8.87E-06 | 4.93E-06 | 3.75E-06 | 5.99E-05 | 4.98E-05 | 6.18E-05 | 2187.88 | 1603.11 | 10602.16 | 4181.05 | 3079.68 | 1749.36 | 4086.52 | 2273.89 | 1728.42 | 27608.93 | 22964.04 | 28506.04 |
| | Manang | 8.87E-06 | 5.75E-06 | 4.23E-05 | 1.58E-05 | 1.12E-05 | 6.4E-06 | 1.35E-05 | 8.04E-06 | 7.11E-06 | 0.000105 | 7.74E-05 | 0.000102 | 1863.86 | 1206.85 | 8879.18 | 3322.77 | 2349.73 | 1343.87 | 2830.99 | 1688.24 | 1493.23 | 22000.57 | 16259.89 | 21513.44 |
| TRANG | Mueang Trang | 0.000114 | 4.19E-05 | 4.75E-05 | 3.86E-05 | 3.67E-06 | 1.09E-05 | 5.74E-06 | 3.55E-05 | 2.98E-05 | 3.18E-05 | 4.7E-05 | 3.17E-05 | 50146.35 | 18454.25 | 20889.00 | 17002.44 | 1614.46 | 4783.99 | 2524.62 | 15611.31 | 13110.24 | 13997.87 | 20667.71 | 13946.83 |
| | Kantang | 5.54E-05 | 1.88E-05 | 3.15E-05 | 2.19E-05 | 5.49E-06 | 1.06E-05 | 6.96E-06 | 2.09E-05 | 1.69E-05 | 5.4E-05 | 4.94E-05 | 4.82E-05 | 35862.92 | 12183.75 | 20376.83 | 14156.01 | 3551.12 | 6876.72 | 4500.82 | 13516.80 | 10907.89 | 34960.55 | 31947.21 | 31187.05 |
| | Yan Ta Khao | 6.67E-05 | 2.63E-05 | 3.83E-05 | 2.62E-05 | 5.59E-06 | 6.67E-06 | 8.22E-06 | 2.33E-05 | 1.79E-05 | 4.99E-05 | 5.3E-05 | 5.03E-05 | 29570.39 | 11652.86 | 16989.33 | 11628.79 | 2479.23 | 2957.71 | 3643.89 | 10325.99 | 7934.59 | 22108.26 | 23517.00 | 22321.91 |
| | Palian | 1.24E-05 | 6.21E-06 | 2.22E-05 | 1.03E-05 | 6E-06 | 3.86E-06 | 8.41E-06 | 6.96E-06 | 5.08E-06 | 5.2E-05 | 4.79E-05 | 5.5E-05 | 10053.88 | 5052.91 | 18076.39 | 8359.32 | 4880.69 | 3140.38 | 6846.67 | 5668.76 | 4133.89 | 42362.52 | 38962.88 | 44774.97 |
| | Sikao | 0.000161 | 4.44E-05 | 6.48E-05 | 4.77E-05 | 5.78E-06 | 3.43E-05 | 4.25E-06 | 4.42E-05 | 4.76E-05 | 5.11E-05 | 5.43E-05 | 4E-05 | 74200.31 | 20499.84 | 29920.60 | 22003.03 | 2666.08 | 15846.61 | 1960.47 | 20407.69 | 21989.65 | 23595.24 | 25083.64 | 18487.12 |
| | Huai Yot | 0.000121 | 4.38E-05 | 4.53E-05 | 4.06E-05 | 3.04E-06 | 1.8E-05 | 5.07E-06 | 3.93E-05 | 3.23E-05 | 2.72E-05 | 4.96E-05 | 2.63E-05 | 93520.63 | 33919.85 | 35033.88 | 31376.78 | 2349.80 | 13941.22 | 3924.47 | 30422.87 | 24998.29 | 21056.19 | 38381.73 | 20367.69 |
| | Wang Wiset | 0.00017 | 5.13E-05 | 6.27E-05 | 5.16E-05 | 4.77E-06 | 3.62E-05 | 4.32E-06 | 5.11E-05 | 4.93E-05 | 4.4E-05 | 6.24E-05 | 3.61E-05 | 85087.04 | 25732.31 | 31408.70 | 25866.25 | 2392.48 | 18133.58 | 2163.86 | 25587.30 | 24689.26 | 22051.22 | 31252.53 | 18097.86 |
| | Na Yong | 0.000165 | 6.53E-05 | 6.89E-05 | 5.69E-05 | 4.82E-06 | 8.48E-06 | 8.72E-06 | 5.23E-05 | 4.1E-05 | 3.89E-05 | 6.47E-05 | 4.29E-05 | 40755.62 | 16081.32 | 16964.87 | 14027.38 | 1187.92 | 2090.36 | 2149.19 | 12893.13 | 10112.24 | 9592.93 | 15933.54 | 10576.76 |
| | Ratsada | 0.000191 | 7.53E-05 | 6.85E-05 | 7.2E-05 | 5.91E-06 | 4.19E-05 | 1.19E-05 | 6.97E-05 | 5.17E-05 | 4.58E-05 | 9.88E-05 | 4.32E-05 | 41873.00 | 16541.61 | 15027.39 | 15810.05 | 1296.76 | 9195.92 | 2609.35 | 15308.73 | 11355.85 | 10044.95 | 21679.55 | 9481.59 |
| | Hat Samran | 5.31E-05 | 2.26E-05 | 6.46E-05 | 3.5E-05 | 1.69E-05 | 1.43E-05 | 2.32E-05 | 2.85E-05 | 1.99E-05 | 0.000156 | 0.000139 | 0.000159 | 9732.62 | 4135.45 | 11836.45 | 6415.71 | 3093.02 | 2624.57 | 4251.88 | 5216.31 | 3649.01 | 28554.95 | 25385.08 | 29049.17 |
| PHATTHALUNG | Mueang Phatthalung | 8E-05 | 3.64E-05 | 3.15E-05 | 2.68E-05 | 4.08E-06 | 7.01E-06 | 6.57E-06 | 3.07E-05 | 1.49E-05 | 2.75E-05 | 3.19E-05 | 3.43E-05 | 38775.23 | 17641.49 | 15247.38 | 12992.97 | 1974.95 | 3395.63 | 3181.64 | 14876.58 | 7224.14 | 13332.50 | 15478.36 | 16604.58 |
| | Kong Ra | 8.36E-05 | 3.54E-05 | 5E-05 | 3.32E-05 | 7.53E-06 | 8.02E-06 | 1.11E-05 | 3.09E-05 | 2.05E-05 | 6.88E-05 | 6.71E-05 | 6.63E-05 | 25511.05 | 10802.94 | 15262.28 | 10124.63 | 2296.54 | 2446.53 | 3385.42 | 9423.88 | 6256.11 | 20995.88 | 20450.18 | 20230.21 |
| | Khao Chaison | 5.87E-05 | 2.72E-05 | 2.97E-05 | 2.16E-05 | 4.76E-06 | 5.74E-06 | 6.57E-06 | 2.29E-05 | 1.18E-05 | 3.43E-05 | 3.28E-05 | 3.53E-05 | 19697.53 | 9120.51 | 9961.26 | 7242.36 | 1598.45 | 1926.41 | 2206.90 | 7671.63 | 3955.35 | 11508.97 | 11002.22 | 11860.50 |
| | Tamot | 3.02E-05 | 1.35E-05 | 3.65E-05 | 1.69E-05 | 7.47E-06 | 5.6E-06 | 9.6E-06 | 1.38E-05 | 9.18E-06 | 7.67E-05 | 5.67E-05 | 6.1E-05 | 8357.55 | 3735.93 | 10089.80 | 4664.41 | 2067.34 | 1548.49 | 2657.17 | 3817.45 | 2541.26 | 21216.62 | 15690.45 | 16880.56 |
| | Khuan Khanun | 8.37E-05 | 4.12E-05 | 3.41E-05 | 3.32E-05 | 6.94E-06 | 1.28E-05 | 8.85E-06 | 3.27E-05 | 1.92E-05 | 2.43E-05 | 3.55E-05 | 3.11E-05 | 45210.52 | 22250.44 | 18454.32 | 17958.97 | 3751.70 | 6932.32 | 4782.54 | 17669.46 | 10394.56 | 13135.97 | 19194.02 | 16815.13 |
| | Pak Phayun | 3.66E-05 | 2.18E-05 | 3.76E-05 | 2.21E-05 | 9.9E-06 | 8.83E-06 | 1.09E-05 | 1.72E-05 | 1.07E-05 | 5.79E-05 | 4.3E-05 | 4.81E-05 | 17686.91 | 10545.39 | 18152.68 | 10664.03 | 4784.88 | 4266.77 | 5247.05 | 8317.42 | 5170.96 | 27957.15 | 20771.14 | 23236.17 |
| | Si Banphot | 0.000174 | 7.16E-05 | 7.03E-05 | 6.14E-05 | 5.83E-06 | 1.19E-05 | 1.02E-05 | 5.72E-05 | 4.25E-05 | 3.73E-05 | 6.7E-05 | 4.32E-05 | 41706.81 | 17191.08 | 16866.36 | 14746.19 | 1398.01 | 2860.15 | 2436.75 | 13731.59 | 10200.48 | 8962.36 | 16090.16 | 10362.29 |
| | Pa Bon | 8.52E-06 | 4.11E-06 | 2.32E-05 | 8.13E-06 | 5.26E-06 | 3.76E-06 | 6.05E-06 | 5.58E-06 | 4.09E-06 | 5.78E-05 | 3.56E-05 | 3.83E-05 | 4133.41 | 1995.35 | 11246.05 | 3943.72 | 2551.06 | 1824.95 | 2934.56 | 2709.09 | 1982.24 | 28047.95 | 17294.67 | 18588.52 |
| | Bang Kaeo | 7.78E-05 | 3.74E-05 | 4.99E-05 | 3.24E-05 | 9.4E-06 | 9.74E-06 | 1.19E-05 | 3.17E-05 | 1.73E-05 | 6.94E-05 | 5.74E-05 | 6.2E-05 | 12060.54 | 5797.35 | 7728.33 | 5026.84 | 1457.22 | 1510.00 | 1847.66 | 4905.88 | 2676.84 | 10750.47 | 8899.87 | 9610.21 |
| | Pa Phayom | 0.000165 | 7.19E-05 | 6.51E-05 | 6.33E-05 | 8.52E-06 | 2.43E-05 | 1.28E-05 | 5.88E-05 | 4.19E-05 | 3.88E-05 | 7.12E-05 | 4.38E-05 | 49821.50 | 21716.73 | 19664.32 | 19122.14 | 2573.82 | 7333.23 | 3855.87 | 17763.04 | 12647.96 | 11726.43 | 21499.98 | 13236.26 |
| | Srinagarindra | 0.000125 | 5.09E-05 | 5.44E-05 | 4.38E-05 | 4.57E-06 | 7.85E-06 | 8.27E-06 | 4.18E-05 | 2.98E-05 | 4.06E-05 | 5.67E-05 | 4.31E-05 | 31631.22 | 12850.38 | 13746.12 | 11073.18 | 1152.79 | 1983.40 | 2087.22 | 10563.56 | 7518.91 | 10262.76 | 14328.12 | 10881.39 |

**Table F-1** Fifty percent of $SO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 0.000175 | 0.000126 | 0.000248 | 0.000155 | 5.79E-05 | 3.61E-05 | 5.06E-05 | 4.26E-05 | 8.47E-05 | 5.06E-05 | 4.88E-05 | 0.000109 | 16516.86 | 11913.38 | 23328.75 | 14649.48 | 5454.05 | 3404.01 | 4766.81 | 4018.10 | 7982.89 | 4764.43 | 4603.12 | 10264.69 |
| | Khok Pho | 0.000113 | 8.01E-05 | 0.000168 | 0.000112 | 3.86E-05 | 2.34E-05 | 3.45E-05 | 3.04E-05 | 5.8E-05 | 3.78E-05 | 3.45E-05 | 8.16E-05 | 34082.63 | 24231.06 | 50820.06 | 33883.37 | 11678.39 | 7079.71 | 10443.02 | 9202.44 | 17531.84 | 11426.34 | 10421.34 | 24673.89 |
| | Nong Chik | 0.000158 | 0.000113 | 0.000233 | 0.000155 | 5.42E-05 | 3.29E-05 | 4.84E-05 | 4.21E-05 | 8.04E-05 | 5.2E-05 | 4.8E-05 | 0.000113 | 37576.80 | 26902.64 | 55396.53 | 36776.77 | 12872.40 | 7820.81 | 11493.13 | 9991.52 | 19108.45 | 12340.67 | 11393.35 | 26841.01 |
| | Panare | 0.000158 | 0.000149 | 0.000231 | 0.000139 | 7.35E-05 | 4.28E-05 | 6.16E-05 | 3.11E-05 | 7.76E-05 | 3.57E-05 | 3.86E-05 | 8.36E-05 | 22690.81 | 21370.17 | 33202.41 | 19919.62 | 10560.47 | 6147.06 | 8851.71 | 4472.91 | 11152.03 | 5133.83 | 5552.61 | 12019.74 |
| | Mayo | 0.000104 | 8.44E-05 | 0.000147 | 8.5E-05 | 3.91E-05 | 2.4E-05 | 3.3E-05 | 2.16E-05 | 4.9E-05 | 2.49E-05 | 2.61E-05 | 5.33E-05 | 20949.26 | 17053.94 | 29795.69 | 17179.46 | 7903.03 | 4860.01 | 6674.74 | 4371.22 | 9906.62 | 5024.27 | 5282.58 | 10775.12 |
| | Thung Yang Daeng | 9.43E-05 | 7.98E-05 | 0.000138 | 7.61E-05 | 3.73E-05 | 2.3E-05 | 3.09E-05 | 1.88E-05 | 4.43E-05 | 2.19E-05 | 2.36E-05 | 4.6E-05 | 13127.96 | 11108.03 | 19179.09 | 10591.01 | 5191.91 | 3197.72 | 4306.41 | 2610.92 | 6165.01 | 3055.31 | 3292.32 | 6410.31 |
| | Sai Buri | 0.000128 | 0.000123 | 0.000187 | 0.000113 | 6.1E-05 | 3.52E-05 | 5.12E-05 | 2.47E-05 | 6.3E-05 | 2.81E-05 | 3.08E-05 | 6.72E-05 | 26031.74 | 25041.31 | 38070.56 | 22961.14 | 12447.71 | 7184.08 | 10438.58 | 5046.09 | 12836.16 | 5727.35 | 6279.81 | 13692.97 |
| | Mai Kaen | 0.000351 | 0.000309 | 0.000528 | 0.00028 | 0.000145 | 9E-05 | 0.000116 | 6.61E-05 | 0.00016 | 7.85E-05 | 8.7E-05 | 0.000164 | 20363.94 | 17913.81 | 30674.34 | 16276.56 | 8428.43 | 5223.04 | 6723.95 | 3838.73 | 9273.90 | 4557.31 | 5049.06 | 9535.21 |
| | Yaring | 0.000109 | 8.73E-05 | 0.000152 | 9.03E-05 | 4.04E-05 | 2.47E-05 | 3.43E-05 | 2.32E-05 | 5.14E-05 | 2.63E-05 | 2.74E-05 | 5.77E-05 | 23483.46 | 18876.48 | 32936.74 | 19531.02 | 8735.70 | 5349.97 | 7424.35 | 5009.42 | 11112.69 | 5693.83 | 5929.34 | 12488.47 |
| | Yarang | 0.00016 | 0.000114 | 0.000223 | 0.00013 | 5.01E-05 | 3.23E-05 | 4.32E-05 | 3.65E-05 | 7.51E-05 | 4.25E-05 | 4.24E-05 | 8.72E-05 | 34994.19 | 24872.16 | 48715.95 | 28455.78 | 10938.03 | 7050.00 | 9444.32 | 7971.29 | 16394.81 | 9272.68 | 9264.84 | 19046.21 |
| | Kapho | 0.000227 | 0.000198 | 0.000334 | 0.000183 | 9.31E-05 | 5.68E-05 | 7.65E-05 | 4.35E-05 | 0.000106 | 5.02E-05 | 5.57E-05 | 0.000107 | 18766.86 | 16376.43 | 27650.06 | 15107.83 | 7702.56 | 4697.86 | 6328.74 | 3597.37 | 8733.57 | 4149.21 | 4609.06 | 8882.48 |
| | Mae Lan | 0.000196 | 0.000137 | 0.000282 | 0.000176 | 6.26E-05 | 3.95E-05 | 5.52E-05 | 4.92E-05 | 9.63E-05 | 5.95E-05 | 5.62E-05 | 0.000125 | 15342.69 | 10692.44 | 21988.11 | 13774.75 | 4885.51 | 3081.31 | 4308.09 | 3845.55 | 7522.84 | 4647.23 | 4385.57 | 9736.03 |
| YALA | Mueang Yala | 0.000111 | 6.92E-05 | 0.000147 | 7.7E-05 | 2.67E-05 | 1.96E-05 | 2.32E-05 | 2.47E-05 | 4.97E-05 | 2.88E-05 | 2.9E-05 | 5.16E-05 | 35629.64 | 22113.52 | 47102.92 | 24617.89 | 8536.86 | 6254.32 | 7406.74 | 7904.28 | 15883.56 | 9195.80 | 9260.28 | 16507.89 |
| | Betong | 3.97E-05 | 2.47E-05 | 6.2E-05 | 1.92E-05 | 3.64E-06 | 3.9E-06 | 2.2E-06 | 9.27E-06 | 9.94E-06 | 1.8E-05 | 1.73E-05 | 7.27E-06 | 52412.83 | 32630.38 | 81768.15 | 25386.25 | 4801.26 | 5141.23 | 2895.91 | 12232.47 | 13111.46 | 23783.83 | 22778.00 | 9594.65 |
| | Bannang Sata | 8.1E-05 | 3.67E-05 | 9.77E-05 | 2.7E-05 | 5.99E-06 | 9.68E-06 | 5.09E-06 | 1.54E-05 | 3.04E-05 | 2.12E-05 | 2.16E-05 | 1.46E-05 | 46985.17 | 21296.91 | 56611.03 | 15627.66 | 3469.82 | 5610.29 | 2950.99 | 8920.11 | 17608.81 | 12317.39 | 12528.83 | 8487.48 |
| | Than To | 8.32E-05 | 4.22E-05 | 0.00011 | 3.01E-05 | 5.75E-06 | 8.92E-06 | 3.91E-06 | 1.68E-05 | 2.68E-05 | 2.81E-05 | 2.78E-05 | 1.33E-05 | 56057.94 | 28414.01 | 73852.73 | 20309.00 | 3872.97 | 6013.30 | 2636.06 | 11340.70 | 18072.07 | 18932.19 | 18714.65 | 8931.50 |
| | Yaha | 0.000121 | 5.7E-05 | 0.000136 | 5.04E-05 | 1.36E-05 | 1.68E-05 | 1.2E-05 | 2.49E-05 | 4.95E-05 | 2.96E-05 | 2.95E-05 | 3.5E-05 | 56811.14 | 26776.99 | 63793.60 | 23691.61 | 6391.44 | 7879.13 | 5651.45 | 11692.16 | 23270.20 | 13900.00 | 13861.86 | 16440.95 |
| | Raman | 6.44E-05 | 4.18E-05 | 9.12E-05 | 3.86E-05 | 1.54E-05 | 1.16E-05 | 1.24E-05 | 1.21E-05 | 2.66E-05 | 1.42E-05 | 1.62E-05 | 2.14E-05 | 31220.46 | 20271.01 | 44197.06 | 18692.58 | 7463.70 | 5603.82 | 6031.32 | 5848.33 | 12907.29 | 6898.05 | 7840.58 | 10374.36 |
| | Kabang | 7.34E-05 | 3.3E-05 | 7.81E-05 | 2.7E-05 | 5.63E-06 | 8.82E-06 | 4.33E-06 | 1.48E-05 | 2.68E-05 | 1.54E-05 | 1.73E-05 | 1.72E-05 | 32615.53 | 14675.65 | 34669.99 | 11995.81 | 2501.03 | 3919.88 | 1924.81 | 6577.54 | 11892.06 | 6829.06 | 7690.85 | 7641.94 |
| | Krong Pinang | 0.00014 | 6.81E-05 | 0.000167 | 5.79E-05 | 1.63E-05 | 1.93E-05 | 1.44E-05 | 2.78E-05 | 5.62E-05 | 3.41E-05 | 3.5E-05 | 3.64E-05 | 25684.36 | 12510.68 | 30691.22 | 10642.88 | 3004.74 | 3545.61 | 2641.12 | 5115.51 | 10334.26 | 6266.57 | 6441.21 | 6687.62 |
| NARATHIWAT | Mueang Narathiwat | 8.18E-05 | 7.41E-05 | 0.000159 | 5.39E-05 | 3.25E-05 | 2.64E-05 | 1.54E-05 | 1.32E-05 | 2.65E-05 | 2.58E-05 | 2.5E-05 | 3.05E-05 | 25758.42 | 23354.65 | 50170.98 | 16980.27 | 10245.65 | 8303.31 | 4850.06 | 4165.45 | 8339.60 | 8134.91 | 7874.00 | 9611.73 |
| | Tak Bai | 4.45E-05 | 7.23E-05 | 0.000139 | 4.72E-05 | 4.13E-05 | 3.28E-05 | 1.26E-05 | 6.32E-06 | 7.79E-06 | 2.64E-05 | 1.95E-05 | 3.59E-05 | 12446.98 | 20224.22 | 38934.13 | 13210.85 | 11543.19 | 9179.90 | 3537.12 | 1766.89 | 2178.51 | 7374.13 | 5450.67 | 10040.58 |
| | Bacho | 0.000137 | 0.000109 | 0.000209 | 9.77E-05 | 4.74E-05 | 3.15E-05 | 3.64E-05 | 2.49E-05 | 5.8E-05 | 2.94E-05 | 3.41E-05 | 5.44E-05 | 25096.48 | 19926.54 | 38206.93 | 17866.43 | 8669.17 | 5756.17 | 6657.15 | 4548.51 | 10601.30 | 5374.84 | 6231.28 | 9950.44 |
| | Yi-ngo | 0.000113 | 7.31E-05 | 0.00018 | 5.74E-05 | 2.41E-05 | 2.06E-05 | 1.46E-05 | 1.78E-05 | 3.91E-05 | 2.37E-05 | 2.93E-05 | 2.44E-05 | 21065.26 | 13572.86 | 33433.17 | 10665.47 | 4473.21 | 3826.10 | 2711.86 | 3309.09 | 7264.27 | 4394.50 | 5447.23 | 4536.54 |
| | Ra-ngae | 7.87E-05 | 4.67E-05 | 0.000128 | 3.36E-05 | 1.23E-05 | 1.29E-05 | 6.3E-06 | 1.22E-05 | 2.55E-05 | 1.71E-05 | 2.1E-05 | 1.11E-05 | 34674.92 | 20567.72 | 56382.37 | 14811.32 | 5429.40 | 5686.16 | 2776.65 | 5353.60 | 11216.27 | 7517.18 | 9233.95 | 4882.39 |
| | Rueso | 5.7E-05 | 2.98E-05 | 8.35E-05 | 2.49E-05 | 7.19E-06 | 7.1E-06 | 5.19E-06 | 9.01E-06 | 1.97E-05 | 9.34E-06 | 1.36E-05 | 8.61E-06 | 27107.31 | 14198.10 | 39716.56 | 11843.41 | 3420.49 | 3379.62 | 2467.31 | 4288.30 | 9384.11 | 4444.86 | 6459.81 | 4096.26 |
| | Si Sakhon | 7.71E-05 | 3.68E-05 | 0.000112 | 2.72E-05 | 5.67E-06 | 7.92E-06 | 3.45E-06 | 1.2E-05 | 2.5E-05 | 1.58E-05 | 2.05E-05 | 6.27E-06 | 40373.95 | 19282.65 | 58761.46 | 14238.05 | 2965.68 | 4146.76 | 1806.02 | 6270.05 | 13068.77 | 8265.45 | 10735.74 | 3283.13 |
| | Waeng | 5.34E-05 | 4.52E-05 | 0.000103 | 1.75E-05 | 9.33E-06 | 1.72E-05 | 6.37E-06 | 1.51E-05 | 2.29E-05 | 2.78E-05 | 1.88E-05 | 8.19E-06 | 15078.43 | 12777.65 | 29017.84 | 4956.36 | 2635.42 | 4847.22 | 1797.79 | 4250.50 | 6475.48 | 7857.03 | 5321.46 | 2312.38 |
| | Sukhirin | 5.18E-05 | 3.4E-05 | 7.93E-05 | 1.43E-05 | 6.4E-06 | 9.95E-06 | 3.63E-06 | 1.04E-05 | 2.07E-05 | 3.09E-05 | 2.31E-05 | 5.67E-06 | 26742.33 | 17565.51 | 40892.23 | 7397.61 | 3304.48 | 5132.87 | 1873.61 | 5387.63 | 10660.48 | 15956.40 | 11916.44 | 2924.64 |
| | Su-ngai Kolok | 4.94E-05 | 5.75E-05 | 0.000119 | 3.21E-05 | 2.44E-05 | 2.43E-05 | 9.89E-06 | 1.09E-05 | 1.64E-05 | 2.48E-05 | 1.78E-05 | 2.13E-05 | 6748.37 | 7865.14 | 16264.12 | 4390.69 | 3335.54 | 3326.75 | 1351.80 | 1483.95 | 2237.08 | 3384.59 | 2428.96 | 2905.59 |
| | Su-ngai Padi | 3.76E-05 | 3.89E-05 | 8.28E-05 | 2.26E-05 | 1.6E-05 | 1.55E-05 | 6.42E-06 | 7.37E-06 | 1.22E-05 | 1.79E-05 | 1.37E-05 | 1.4E-05 | 14362.16 | 14867.78 | 31648.60 | 8641.15 | 6115.98 | 5932.01 | 2454.49 | 2818.39 | 4673.27 | 6822.58 | 5246.71 | 5351.68 |
| | Chanae | 4.54E-05 | 2.57E-05 | 6.57E-05 | 1.34E-05 | 4.45E-06 | 6.53E-06 | 2.44E-06 | 7.95E-06 | 1.67E-05 | 2.1E-05 | 1.77E-05 | 4.3E-06 | 26183.89 | 14808.22 | 37914.32 | 7729.16 | 2567.67 | 3768.91 | 1409.35 | 4583.92 | 9634.25 | 12091.16 | 10207.60 | 2479.75 |
| | Cho-airong | 6.27E-05 | 6.22E-05 | 0.000135 | 4.08E-05 | 2.76E-05 | 2.4E-05 | 1.06E-05 | 1.02E-05 | 1.85E-05 | 2.47E-05 | 2.15E-05 | 2.43E-05 | 12168.26 | 12075.94 | 26231.24 | 7913.56 | 5349.93 | 4656.11 | 2056.30 | 1987.86 | 3583.61 | 4804.78 | 4168.70 | 4715.56 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 3.96E-05 | 1.92E-05 | 1.37E-05 | 1.91E-05 | 6.27E-06 | 1.47E-05 | 6.85E-06 | 2.11E-05 | 1.22E-05 | 1.21E-05 | 2.26E-05 | 1.41E-05 | 22049.26 | 10668.19 | 7646.69 | 10623.31 | 3490.27 | 8169.22 | 3813.56 | 11748.91 | 6793.92 | 6712.78 | 12606.40 | 7858.46 |
| | Phrom Khiri | 9.36E-05 | 3.41E-05 | 1.78E-05 | 2.82E-05 | 6.18E-06 | 2.59E-05 | 7.47E-06 | 4.75E-05 | 2.61E-05 | 1.78E-05 | 4.45E-05 | 2.03E-05 | 23061.06 | 8400.89 | 4380.07 | 6959.85 | 1523.42 | 6377.62 | 1842.59 | 11716.93 | 6429.02 | 4394.35 | 10975.45 | 4993.65 |
| | Lan Saka | 7.26E-05 | 2.86E-05 | 1.82E-05 | 2.58E-05 | 5.05E-06 | 2.1E-05 | 6.56E-06 | 3.51E-05 | 2.06E-05 | 1.63E-05 | 3.83E-05 | 1.78E-05 | 25015.98 | 9841.98 | 6275.64 | 8905.93 | 1739.07 | 7246.83 | 2262.67 | 12100.50 | 7107.55 | 5621.23 | 13214.96 | 6135.07 |
| | Chawang | 5.71E-05 | 1.85E-05 | 1.06E-05 | 1.77E-05 | 2.27E-06 | 1.55E-05 | 2.88E-06 | 2.75E-05 | 1.73E-05 | 1.06E-05 | 3.44E-05 | 1.36E-05 | 24753.85 | 8032.11 | 4576.45 | 7665.08 | 982.70 | 6735.15 | 1245.75 | 11898.63 | 7515.50 | 4604.27 | 14916.89 | 5901.38 |
| | Phipun | 5.84E-05 | 1.96E-05 | 1.08E-05 | 1.79E-05 | 3.31E-06 | 1.61E-05 | 3.94E-06 | 2.92E-05 | 1.74E-05 | 1.09E-05 | 3.39E-05 | 1.39E-05 | 28828.22 | 9697.90 | 5313.06 | 8819.58 | 1635.68 | 7973.63 | 1947.88 | 14419.56 | 8606.50 | 5361.94 | 16755.10 | 6853.57 |
| | Chian Yai | 3.9E-05 | 3.01E-05 | 2E-05 | 2.67E-05 | 1.21E-05 | 1.87E-05 | 1.17E-05 | 2.1E-05 | 1.37E-05 | 1.68E-05 | 2.31E-05 | 2.27E-05 | 12565.25 | 9684.63 | 6441.98 | 8585.88 | 3901.75 | 6020.51 | 3752.87 | 6758.15 | 4395.27 | 5398.37 | 7444.70 | 7308.80 |
| | Cha-uat | 3E-05 | 1.62E-05 | 1.26E-05 | 1.45E-05 | 3.81E-06 | 8.43E-06 | 4.45E-06 | 1.29E-05 | 8.42E-06 | 9.18E-06 | 1.59E-05 | 1.1E-05 | 22512.43 | 12160.45 | 9428.05 | 10892.48 | 2863.05 | 6328.88 | 3343.59 | 9669.99 | 6320.34 | 6891.71 | 11924.08 | 8273.60 |
| | Tha Sala | 5.95E-05 | 2.09E-05 | 1.27E-05 | 2E-05 | 5.54E-06 | 1.77E-05 | 6.11E-06 | 3.01E-05 | 1.75E-05 | 1.27E-05 | 3.57E-05 | 1.61E-05 | 24849.77 | 8727.98 | 5320.99 | 8351.44 | 2315.05 | 7408.20 | 2554.66 | 12562.27 | 7316.93 | 5312.52 | 14935.12 | 6728.81 |
| | Thung Song | 3.92E-05 | 1.53E-05 | 1.27E-05 | 1.48E-05 | 1.03E-06 | 9.97E-06 | 2.47E-06 | 1.55E-05 | 1.07E-05 | 9.48E-06 | 2.27E-05 | 8.91E-06 | 35624.38 | 13900.00 | 11538.70 | 13453.13 | 941.24 | 9068.69 | 2251.57 | 14109.09 | 9772.10 | 8621.04 | 20622.70 | 8106.11 |
| | Na Bon | 8.97E-05 | 3.18E-05 | 2.27E-05 | 3E-05 | 2.5E-06 | 2.39E-05 | 4.32E-06 | 3.84E-05 | 2.59E-05 | 1.92E-05 | 5.15E-05 | 2.02E-05 | 18646.39 | 6597.80 | 4712.39 | 6234.30 | 518.44 | 4969.04 | 896.94 | 7983.40 | 5381.09 | 3989.42 | 10708.32 | 4193.36 |
| | Thung Yai | 5.17E-05 | 1.65E-05 | 1.1E-05 | 1.58E-05 | 9.85E-07 | 1.42E-05 | 1.35E-06 | 2.24E-05 | 1.55E-05 | 1.05E-05 | 3.09E-05 | 1.17E-05 | 31082.01 | 9884.66 | 6603.09 | 9479.10 | 591.71 | 8503.23 | 810.21 | 13457.06 | 9336.48 | 6293.49 | 18559.26 | 7041.55 |
| | Pak Phanang | 3.62E-05 | 2.43E-05 | 1.83E-05 | 2.44E-05 | 1.01E-05 | 1.72E-05 | 1.03E-05 | 2.06E-05 | 1.24E-05 | 1.54E-05 | 2.23E-05 | 1.93E-05 | 19221.17 | 12886.20 | 9722.38 | 12934.81 | 5364.01 | 9137.41 | 5444.09 | 10905.16 | 6579.77 | 8166.19 | 11831.81 | 10226.94 |
| | Ron Phibun | 4.73E-05 | 2.23E-05 | 1.76E-05 | 2.16E-05 | 4.23E-06 | 1.45E-05 | 5.83E-06 | 2.08E-05 | 1.35E-05 | 1.37E-05 | 2.79E-05 | 1.42E-05 | 20295.72 | 9580.49 | 7559.44 | 9265.59 | 1815.39 | 6244.26 | 2505.02 | 8919.49 | 5796.88 | 5878.51 | 11984.52 | 6106.53 |
| | Sichon | 2.7E-05 | 4.82E-06 | 2.65E-06 | 5.49E-06 | 1.98E-06 | 6.19E-06 | 1.73E-06 | 1.13E-05 | 7.92E-06 | 3.93E-06 | 2.37E-05 | 7.41E-06 | 18552.11 | 3312.93 | 1823.21 | 3774.32 | 1360.28 | 4257.63 | 1188.68 | 7780.30 | 5443.59 | 2699.06 | 16283.04 | 5097.27 |
| | Khanom | 3.71E-05 | 1.32E-05 | 1.08E-05 | 1.56E-05 | 8.65E-06 | 1.31E-05 | 7.48E-06 | 2.04E-05 | 1.67E-05 | 9.43E-06 | 4.32E-05 | 1.8E-05 | 11554.77 | 4122.85 | 3373.66 | 4860.54 | 2692.57 | 4072.99 | 2329.99 | 6346.23 | 5211.23 | 2937.47 | 13449.06 | 5603.38 |
| | Hua Sai | 4.11E-05 | 3.13E-05 | 2.13E-05 | 2.73E-05 | 1.23E-05 | 1.84E-05 | 1.17E-05 | 2.14E-05 | 1.39E-05 | 1.71E-05 | 2.35E-05 | 2.36E-05 | 17981.24 | 13687.84 | 9301.12 | 11924.26 | 5371.12 | 8056.59 | 5136.24 | 9368.77 | 6081.25 | 7477.39 | 10263.35 | 10315.50 |
| | Bang Khan | 5.65E-05 | 1.95E-05 | 1.67E-05 | 1.83E-05 | 1.07E-06 | 1.4E-05 | 1.79E-06 | 2.12E-05 | 1.63E-05 | 1.24E-05 | 2.91E-05 | 1.18E-05 | 26548.31 | 9177.14 | 7841.46 | 8599.23 | 500.63 | 6581.27 | 841.15 | 9951.14 | 7646.33 | 5809.22 | 13690.03 | 5532.96 |
| | Tham Phannara | 8.7E-05 | 2.5E-05 | 1.36E-05 | 2.63E-05 | 2.03E-06 | 2.3E-05 | 2.46E-06 | 4.14E-05 | 2.76E-05 | 1.54E-05 | 5.74E-05 | 2.19E-05 | 15350.87 | 4406.00 | 2404.73 | 4632.45 | 357.64 | 4063.14 | 433.67 | 7296.49 | 4861.20 | 2718.70 | 10121.47 | 3862.82 |
| | Chulabhorn | 7.96E-05 | 3.49E-05 | 2.93E-05 | 3.39E-05 | 3.8E-06 | 2.12E-05 | 7.36E-06 | 3.19E-05 | 2.15E-05 | 2.16E-05 | 4.74E-05 | 2.07E-05 | 18353.90 | 8041.71 | 6755.75 | 7818.86 | 877.05 | 4876.25 | 1695.83 | 7344.71 | 4956.00 | 4980.52 | 10915.09 | 4770.92 |
| | Phra Phrom | 8.28E-05 | 4.03E-05 | 2.93E-05 | 3.9E-05 | 1.1E-05 | 2.88E-05 | 1.27E-05 | 4.11E-05 | 2.5E-05 | 2.46E-05 | 4.74E-05 | 2.79E-05 | 12166.07 | 5928.91 | 4309.87 | 5735.90 | 1618.09 | 4236.19 | 1863.40 | 6041.99 | 3667.54 | 3621.05 | 6968.42 | 4098.66 |
| | Nopphitam | 4.86E-05 | 1.58E-05 | 9.35E-06 | 1.53E-05 | 4.06E-06 | 1.41E-05 | 4.36E-06 | 2.47E-05 | 1.51E-05 | 9.44E-06 | 3.27E-05 | 1.32E-05 | 35073.97 | 11430.89 | 6751.11 | 11063.89 | 2927.75 | 10163.11 | 3145.38 | 17819.01 | 10867.72 | 6816.69 | 23632.97 | 9547.38 |
| | Chang Klang | 6.19E-05 | 2.24E-05 | 1.45E-05 | 2.07E-05 | 2.79E-06 | 1.71E-05 | 4.03E-06 | 2.86E-05 | 1.78E-05 | 1.3E-05 | 3.45E-05 | 1.43E-05 | 16871.42 | 6105.21 | 3950.32 | 5652.82 | 762.28 | 4656.34 | 1097.99 | 7801.07 | 4847.65 | 3555.00 | 9410.57 | 3903.22 |
| | Chaloem Phra Kiat | 7.61E-05 | 4.79E-05 | 3.41E-05 | 4.42E-05 | 1.63E-05 | 3.06E-05 | 1.69E-05 | 3.84E-05 | 2.42E-05 | 2.8E-05 | 4.44E-05 | 3.49E-05 | 13758.06 | 8658.03 | 6169.93 | 8000.13 | 2940.43 | 5531.15 | 3064.58 | 6941.89 | 4385.81 | 5069.56 | 8039.33 | 6314.01 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 4.41E-05 | 1.26E-05 | 1.33E-05 | 1.4E-05 | 8.15E-07 | 1.38E-05 | 6.67E-07 | 1.53E-05 | 9.9E-06 | 1.77E-05 | 2.36E-05 | 1.01E-05 | 39942.00 | 11447.18 | 12036.71 | 12674.84 | 737.32 | 12483.98 | 604.00 | 13819.03 | 8957.04 | 16017.98 | 21368.02 | 9133.66 |
| | Khao Phanom | 4.89E-05 | 1.45E-05 | 1.21E-05 | 1.47E-05 | 7.96E-07 | 1.38E-05 | 8.61E-07 | 2.01E-05 | 1.37E-05 | 1.32E-05 | 2.97E-05 | 1.16E-05 | 41536.86 | 12331.09 | 10312.51 | 12533.89 | 676.72 | 11711.45 | 732.08 | 17094.22 | 11632.81 | 11192.21 | 25208.94 | 9848.53 |
| | Ko Lanta | 7.24E-05 | 2.44E-05 | 3.01E-05 | 2.58E-05 | 5.99E-06 | 2.98E-05 | 5.03E-06 | 3.13E-05 | 2.6E-05 | 3.52E-05 | 3.47E-05 | 2.68E-05 | 24336.48 | 8208.53 | 10123.30 | 8680.35 | 2014.12 | 10019.75 | 1689.59 | 10513.57 | 8749.38 | 11817.85 | 11657.23 | 9021.86 |
| | Khlong Thom | 4.32E-05 | 1.35E-05 | 1.39E-05 | 1.33E-05 | 1.27E-06 | 1.24E-05 | 1.06E-06 | 1.54E-05 | 1.3E-05 | 1.16E-05 | 1.94E-05 | 9.49E-06 | 48300.75 | 15139.21 | 15480.19 | 14895.13 | 1419.03 | 13814.04 | 1186.86 | 17251.25 | 14483.53 | 13005.48 | 21684.57 | 10611.87 |
| | Ao Luek | 4.38E-05 | 1.01E-05 | 1.12E-05 | 1.21E-05 | 6.49E-07 | 1.22E-05 | 6.23E-07 | 1.86E-05 | 1.1E-05 | 1.84E-05 | 2.84E-05 | 1.09E-05 | 34578.26 | 7976.73 | 8815.25 | 9534.21 | 512.89 | 9631.97 | 491.75 | 14656.43 | 8668.78 | 14495.59 | 22396.36 | 8617.36 |
| | Plai Phraya | 5.77E-05 | 1.3E-05 | 1.57E-05 | 1.57E-05 | 8.77E-07 | 1.48E-05 | 8.78E-07 | 2.79E-05 | 1.61E-05 | 1.98E-05 | 4.41E-05 | 1.72E-05 | 30509.16 | 6865.09 | 8314.79 | 8287.50 | 463.95 | 7853.97 | 464.31 | 14737.94 | 8526.85 | 10452.64 | 23325.83 | 9125.85 |
| | Lam Thap | 8.51E-05 | 2.88E-05 | 2.17E-05 | 2.59E-05 | 1.36E-06 | 2.39E-05 | 1.67E-06 | 3.36E-05 | 2.55E-05 | 1.8E-05 | 4.65E-05 | 1.77E-05 | 23964.63 | 8122.61 | 6116.12 | 7299.99 | 382.85 | 6739.08 | 471.04 | 9467.19 | 7176.10 | 5062.51 | 13084.51 | 4978.77 |
| | Nuea Khlong | 5.1E-05 | 1.6E-05 | 1.58E-05 | 1.65E-05 | 1.52E-06 | 1.68E-05 | 1.29E-06 | 1.94E-05 | 1.39E-05 | 1.73E-05 | 2.65E-05 | 1.22E-05 | 26192.52 | 8213.81 | 8097.22 | 8477.10 | 778.75 | 8620.85 | 663.71 | 9965.13 | 7129.28 | 8868.66 | 13644.21 | 6291.10 |
| PHANGNGA | Mueang Phangnga | 5.14E-05 | 1.04E-05 | 1.09E-05 | 1.37E-05 | 6.46E-07 | 1.53E-05 | 7.68E-07 | 2.4E-05 | 1.21E-05 | 2.89E-05 | 3.21E-05 | 1.14E-05 | 33620.09 | 6792.80 | 7125.18 | 8927.89 | 422.20 | 9988.54 | 502.07 | 15669.64 | 7940.41 | 18929.77 | 21003.18 | 7455.01 |
| | Ko Yao | 4.39E-05 | 9.72E-06 | 1.03E-05 | 1.18E-05 | 2.56E-06 | 1.49E-05 | 2.4E-06 | 1.8E-05 | 1.21E-05 | 2.66E-05 | 2.38E-05 | 9.94E-06 | 45698.58 | 10128.62 | 10729.74 | 12284.08 | 2663.89 | 15557.06 | 2504.63 | 18715.33 | 12565.82 | 27721.84 | 24816.24 | 10356.45 |
| | Kapong | 4.41E-05 | 9.2E-06 | 9.22E-06 | 1.16E-05 | 6.89E-07 | 1.42E-05 | 8.94E-07 | 2.6E-05 | 1.26E-05 | 2.43E-05 | 3.16E-05 | 1.12E-05 | 26776.90 | 5577.37 | 5592.06 | 7051.46 | 417.93 | 8591.06 | 542.23 | 15794.39 | 7668.16 | 14714.14 | 19175.08 | 6817.44 |
| | Takua Thung | 4.73E-05 | 7.01E-06 | 7.35E-06 | 9.92E-06 | 7.43E-07 | 1.3E-05 | 7.55E-07 | 1.9E-05 | 1.11E-05 | 3.02E-05 | 2.62E-05 | 8.08E-06 | 30865.76 | 4577.30 | 4797.66 | 6476.93 | 485.12 | 8484.54 | 492.56 | 12380.33 | 7267.01 | 19713.34 | 17125.88 | 5275.64 |
| | Takua Pa | 4.08E-05 | 8.85E-06 | 8.39E-06 | 1.04E-05 | 8.51E-07 | 1.36E-05 | 1.02E-06 | 2.77E-05 | 1.36E-05 | 2.34E-05 | 3.18E-05 | 1.09E-05 | 24526.66 | 5321.52 | 5040.42 | 6249.75 | 511.54 | 8201.40 | 613.96 | 16668.66 | 8183.25 | 14052.29 | 19129.06 | 6575.58 |
| | Khura Buri | 2.17E-05 | 9.8E-06 | 8.41E-06 | 9.24E-06 | 4.36E-06 | 1.57E-05 | 3.59E-06 | 1.84E-05 | 1.13E-05 | 1.87E-05 | 2.05E-05 | 1.04E-05 | 22286.57 | 10065.84 | 8638.51 | 9490.36 | 4483.43 | 16118.37 | 3688.73 | 18908.02 | 11575.90 | 19235.06 | 21056.84 | 10672.03 |
| | Thap Put | 6.52E-05 | 1.37E-05 | 1.52E-05 | 1.74E-05 | 8.43E-07 | 1.87E-05 | 9.83E-07 | 3.16E-05 | 1.68E-05 | 3.08E-05 | 4.45E-05 | 1.66E-05 | 19524.52 | 4092.98 | 4560.53 | 5207.68 | 252.26 | 5601.05 | 294.08 | 9463.20 | 5013.26 | 9232.40 | 13316.73 | 4955.88 |
| | Thai Mueang | 5.21E-05 | 1.06E-05 | 1.07E-05 | 1.4E-05 | 7.3E-07 | 1.62E-05 | 8.97E-07 | 2.52E-05 | 1.23E-05 | 3.14E-05 | 3.25E-05 | 1.15E-05 | 31872.09 | 6472.71 | 6566.88 | 8548.69 | 446.06 | 9923.61 | 548.54 | 15409.77 | 7531.23 | 19180.51 | 19881.10 | 7019.28 |
| PHUKET | Mueang Phuket | 4.41E-05 | 1.09E-05 | 1.12E-05 | 1.31E-05 | 6.07E-06 | 1.69E-05 | 5.96E-06 | 2.03E-05 | 1.49E-05 | 3.09E-05 | 2.51E-05 | 1.17E-05 | 7964.21 | 1976.64 | 2027.15 | 2366.62 | 1096.31 | 3053.70 | 1076.25 | 3670.59 | 2694.10 | 5585.23 | 4533.91 | 2110.76 |
| | Kathu | 0.000105 | 1.93E-05 | 1.99E-05 | 2.5E-05 | 7.9E-06 | 3.44E-05 | 7.69E-06 | 4.37E-05 | 3.02E-05 | 7.22E-05 | 5.65E-05 | 2.14E-05 | 8290.66 | 1527.65 | 1574.35 | 1976.82 | 624.75 | 2721.66 | 608.13 | 3457.39 | 2385.08 | 5710.96 | 4469.56 | 1692.24 |
| | Thalang | 7.18E-05 | 7.89E-06 | 8.19E-06 | 1.23E-05 | 1.47E-06 | 1.91E-05 | 1.39E-06 | 2.66E-05 | 1.73E-05 | 5.02E-05 | 3.68E-05 | 1E-05 | 20750.40 | 2279.66 | 2367.38 | 3540.76 | 424.71 | 5506.22 | 401.31 | 7673.57 | 5011.81 | 14504.80 | 10618.84 | 2888.83 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%$q$ (g/s-m$^2$) | | | | | | | | | | | | 50%$q$ (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 6.84E-05 | 4.03E-05 | 3.51E-05 | 4.6E-05 | 1.88E-05 | 3.93E-05 | 2.05E-05 | 5.72E-05 | 3.71E-05 | 2.76E-05 | 8.34E-05 | 4.08E-05 | 22881.45 | 13476.72 | 11735.76 | 15374.50 | 6282.99 | 13145.80 | 6846.98 | 19129.03 | 12417.33 | 9225.72 | 27899.82 | 13636.37 |
| | Kanchanadit | 2.61E-05 | 1.07E-05 | 8.37E-06 | 1.2E-05 | 5.17E-06 | 1.07E-05 | 5.45E-06 | 1.71E-05 | 1.18E-05 | 7.38E-06 | 2.89E-05 | 1.22E-05 | 28048.23 | 11458.62 | 9000.60 | 12924.79 | 5558.25 | 11519.36 | 5855.70 | 18389.28 | 12729.01 | 7930.86 | 31030.91 | 13110.22 |
| | Don Sak | 3.7E-05 | 1.43E-05 | 1.16E-05 | 1.68E-05 | 9.23E-06 | 1.39E-05 | 8.61E-06 | 2.24E-05 | 1.79E-05 | 1.02E-05 | 4.48E-05 | 1.9E-05 | 13449.31 | 5202.98 | 4221.47 | 6113.32 | 3356.43 | 5057.90 | 3132.21 | 8133.77 | 6496.18 | 3721.48 | 16275.47 | 6899.26 |
| | Ko Samui | 3.03E-05 | 2.1E-05 | 2.42E-05 | 2.28E-05 | 1.47E-05 | 2.05E-05 | 1.07E-05 | 2.31E-05 | 2.06E-05 | 1.4E-05 | 4.58E-05 | 2.69E-05 | 8342.09 | 5774.32 | 6661.49 | 6280.93 | 4056.22 | 5657.20 | 2955.98 | 6366.11 | 5674.12 | 3858.86 | 12606.93 | 7403.24 |
| | Ko Pha-ngan | 6.77E-05 | 5.24E-05 | 7.91E-05 | 5.29E-05 | 3.35E-05 | 6.22E-05 | 2.34E-05 | 7.24E-05 | 5.35E-05 | 3.85E-05 | 0.000116 | 7.51E-05 | 8294.32 | 6410.14 | 9689.85 | 6478.37 | 4099.42 | 7619.79 | 2863.65 | 8869.24 | 6554.23 | 4708.20 | 14153.41 | 9192.42 |
| | Chaiya | 3.77E-05 | 1.29E-05 | 8.41E-06 | 1.37E-05 | 5.92E-06 | 2.36E-05 | 9.53E-06 | 3.99E-05 | 2.33E-05 | 1.86E-05 | 4.71E-05 | 2.33E-05 | 24822.09 | 8487.81 | 5530.29 | 9028.10 | 3895.00 | 15547.43 | 6266.93 | 26246.33 | 15298.20 | 12235.64 | 31005.02 | 15360.19 |
| | Tha Chana | 3.63E-05 | 1.06E-05 | 9.03E-06 | 1.16E-05 | 4.87E-06 | 2.31E-05 | 7.65E-06 | 3.74E-05 | 2.12E-05 | 1.68E-05 | 4.46E-05 | 2.33E-05 | 36507.28 | 10691.18 | 9077.89 | 11661.94 | 4899.04 | 23220.97 | 7688.52 | 37615.75 | 21315.71 | 16908.18 | 44788.28 | 23440.47 |
| | Khiri Rat Nikhom | 5.61E-05 | 1.14E-05 | 1.03E-05 | 1.6E-05 | 2.21E-06 | 2.28E-05 | 3.43E-06 | 3.83E-05 | 1.91E-05 | 2.23E-05 | 4.46E-05 | 1.93E-05 | 42769.42 | 8669.39 | 7869.31 | 12227.96 | 1688.79 | 17432.30 | 2616.98 | 29243.16 | 14564.36 | 16994.47 | 34030.59 | 14724.78 |
| | Ban Ta Khun | 3.7E-05 | 6.99E-06 | 6.06E-06 | 9.28E-06 | 9.97E-07 | 1.52E-05 | 1.85E-06 | 2.6E-05 | 1.32E-05 | 1.65E-05 | 3E-05 | 1.3E-05 | 53814.17 | 10165.58 | 8808.01 | 13495.45 | 1450.81 | 22160.27 | 2686.79 | 37840.00 | 19233.68 | 24025.40 | 43691.43 | 18950.72 |
| | Phanom | 3.29E-05 | 6.53E-06 | 6.76E-06 | 8.57E-06 | 5.57E-07 | 1.06E-05 | 8.38E-07 | 2E-05 | 1E-05 | 1.43E-05 | 2.49E-05 | 9.53E-06 | 40138.31 | 7963.98 | 8238.32 | 10449.25 | 679.23 | 12939.51 | 1021.43 | 24349.61 | 12249.47 | 17408.54 | 30390.44 | 11623.27 |
| | Tha Chang | 4.68E-05 | 1.15E-05 | 7.54E-06 | 1.42E-05 | 3.99E-06 | 2.54E-05 | 6.85E-06 | 4.12E-05 | 2.31E-05 | 2.07E-05 | 4.91E-05 | 2.37E-05 | 51112.31 | 12527.90 | 8225.01 | 15474.05 | 4358.32 | 27698.89 | 7472.08 | 44980.77 | 25226.98 | 22598.91 | 53638.70 | 25882.88 |
| | Ban Na San | 3.29E-05 | 1.32E-05 | 9.95E-06 | 1.47E-05 | 4.31E-06 | 1.26E-05 | 4.53E-06 | 2E-05 | 1.29E-05 | 8.63E-06 | 2.92E-05 | 1.27E-05 | 25312.57 | 10155.47 | 7644.95 | 11328.36 | 3312.74 | 9700.33 | 3481.52 | 15396.94 | 9952.83 | 6633.02 | 22473.62 | 9772.73 |
| | Ban Na Doem | 8.24E-05 | 4.43E-05 | 3.9E-05 | 5.15E-05 | 1.88E-05 | 4.22E-05 | 1.95E-05 | 6.08E-05 | 3.93E-05 | 2.95E-05 | 9.02E-05 | 4.3E-05 | 15325.87 | 8242.70 | 7258.20 | 9584.70 | 3495.28 | 7850.38 | 3628.91 | 11313.55 | 7305.60 | 5487.43 | 16784.03 | 8003.43 |
| | Khian Sa | 4.05E-05 | 1.22E-05 | 1.01E-05 | 1.44E-05 | 2.65E-06 | 1.37E-05 | 2.89E-06 | 2.31E-05 | 1.39E-05 | 1.19E-05 | 3.26E-05 | 1.36E-05 | 30469.49 | 9167.44 | 7608.09 | 10856.29 | 1992.18 | 10314.12 | 2176.84 | 17376.09 | 10479.43 | 8931.76 | 24519.15 | 10260.21 |
| | Wiang Sa | 4.42E-05 | 1.24E-05 | 6.49E-06 | 1.35E-05 | 1.28E-06 | 1.19E-05 | 1.41E-06 | 2.16E-05 | 1.44E-05 | 7.66E-06 | 3.04E-05 | 1.17E-05 | 16998.97 | 4779.62 | 2496.45 | 5192.81 | 491.20 | 4568.24 | 540.95 | 8307.09 | 5529.65 | 2945.03 | 11709.67 | 4490.16 |
| | Phrasaeng | 7.53E-05 | 2E-05 | 1.55E-05 | 2.26E-05 | 1.93E-06 | 2.08E-05 | 2.12E-06 | 3.69E-05 | 2.33E-05 | 1.86E-05 | 5.41E-05 | 2.12E-05 | 53449.37 | 14182.48 | 10978.04 | 16037.48 | 1371.92 | 14777.09 | 1504.53 | 26205.09 | 16555.77 | 13178.05 | 38371.11 | 15048.49 |
| | Phunphin | 2.69E-05 | 1.14E-05 | 9.86E-06 | 1.35E-05 | 4.55E-06 | 1.34E-05 | 5.22E-06 | 2.06E-05 | 1.23E-05 | 1.05E-05 | 2.78E-05 | 1.31E-05 | 25606.96 | 10919.46 | 9405.84 | 12910.05 | 4334.86 | 12777.62 | 4975.96 | 19655.89 | 11754.87 | 10010.80 | 26477.66 | 12479.15 |
| | Chai Buri | 6.64E-05 | 1.76E-05 | 1.52E-05 | 1.96E-05 | 1.34E-06 | 1.81E-05 | 1.42E-06 | 3.08E-05 | 1.95E-05 | 1.78E-05 | 4.63E-05 | 1.81E-05 | 30977.23 | 8205.24 | 7091.98 | 9138.86 | 626.51 | 8441.50 | 662.06 | 14354.03 | 9102.67 | 8299.86 | 21587.02 | 8462.13 |
| | Vibhavadi | 7.67E-05 | 1.56E-05 | 1.13E-05 | 2.08E-05 | 3.88E-06 | 3.69E-05 | 7.17E-06 | 6.03E-05 | 3.21E-05 | 3.31E-05 | 7.03E-05 | 3.27E-05 | 38040.98 | 7745.93 | 5585.64 | 10299.51 | 1925.53 | 18323.32 | 3558.05 | 29891.67 | 15932.84 | 16431.38 | 34882.12 | 16223.67 |
| RANONG | Mueang Ranong | 2.93E-05 | 7.78E-06 | 1.08E-05 | 8.05E-06 | 2.36E-06 | 2.21E-05 | 4.27E-06 | 2.94E-05 | 1.54E-05 | 1.35E-05 | 3.41E-05 | 2.34E-05 | 21763.90 | 5779.85 | 8043.88 | 5982.16 | 1753.71 | 16436.29 | 3172.86 | 21852.91 | 11414.14 | 9997.18 | 25332.52 | 17359.80 |
| | La-un | 3.39E-05 | 5.72E-06 | 1.88E-05 | 7.09E-06 | 2.2E-06 | 2.2E-05 | 4.56E-06 | 3.67E-05 | 1.83E-05 | 1.16E-05 | 4.76E-05 | 2.86E-05 | 18755.79 | 3166.85 | 10425.46 | 3923.78 | 1215.49 | 12155.91 | 2525.77 | 20307.59 | 10131.31 | 6416.89 | 26365.86 | 15840.79 |
| | Kapoe | 4.49E-05 | 1.1E-05 | 8.45E-06 | 1.22E-05 | 3.19E-06 | 2.86E-05 | 5.73E-06 | 3.68E-05 | 2.16E-05 | 1.98E-05 | 4.51E-05 | 2.75E-05 | 23222.84 | 5709.19 | 4374.12 | 6323.98 | 1653.88 | 14807.36 | 2964.16 | 19050.51 | 11176.71 | 10248.24 | 23329.59 | 14213.67 |
| | Kra Buri | 3E-05 | 2.28E-06 | 3.51E-05 | 4.14E-06 | 1.42E-06 | 2.02E-05 | 4.73E-06 | 4E-05 | 1.82E-05 | 7.07E-06 | 5.91E-05 | 3.31E-05 | 28706.57 | 2183.56 | 33558.55 | 3960.73 | 1357.37 | 19318.17 | 4522.13 | 38266.70 | 17405.65 | 6763.27 | 56511.70 | 31615.17 |
| | Suk Samran | 4.74E-05 | 1.41E-05 | 1.02E-05 | 1.46E-05 | 4.55E-06 | 3.06E-05 | 6.98E-06 | 3.43E-05 | 2.25E-05 | 2.08E-05 | 4.58E-05 | 2.91E-05 | 21485.54 | 6396.56 | 4610.91 | 6637.32 | 2060.89 | 13881.75 | 3167.19 | 15558.91 | 10221.39 | 9429.65 | 20775.80 | 13173.68 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 3E-05 | 7.73E-06 | 4.79E-05 | 8.36E-06 | 5.02E-06 | 2.28E-05 | 8.55E-06 | 4.09E-05 | 2.05E-05 | 1.22E-05 | 5.62E-05 | 3.48E-05 | 23904.35 | 6161.57 | 38177.29 | 6660.56 | 4000.76 | 18153.69 | 6815.93 | 32606.61 | 16312.28 | 9698.23 | 44761.23 | 27707.26 |
| | Tha Sae | 1.58E-05 | 1.46E-06 | 3.23E-05 | 1.64E-06 | 1E-06 | 1.14E-05 | 2.44E-06 | 2.47E-05 | 1.07E-05 | 3.74E-06 | 3.74E-05 | 2.13E-05 | 23328.68 | 2157.59 | 47785.52 | 2420.38 | 1480.40 | 16876.03 | 3610.22 | 36520.76 | 15851.52 | 5528.89 | 55303.81 | 31476.07 |
| | Pathio | 2E-05 | 1.51E-06 | 5.24E-05 | 1.49E-06 | 1.15E-06 | 1.45E-05 | 2.06E-06 | 3.44E-05 | 1.39E-05 | 4.52E-06 | 5.21E-05 | 2.95E-05 | 15205.45 | 1148.97 | 39913.03 | 1135.98 | 873.37 | 11048.87 | 1571.52 | 26243.21 | 10620.30 | 3444.06 | 39681.42 | 22449.65 |
| | Lang Suan | 2.72E-05 | 7.83E-06 | 1.58E-05 | 8.48E-06 | 4.53E-06 | 1.91E-05 | 5.94E-06 | 3.07E-05 | 1.62E-05 | 1.12E-05 | 3.81E-05 | 2.21E-05 | 15975.14 | 4599.46 | 9267.14 | 4981.60 | 2657.51 | 11235.93 | 3487.24 | 18007.95 | 9535.19 | 6596.08 | 22361.37 | 12987.82 |
| | Lamae | 3.91E-05 | 1.15E-05 | 1.59E-05 | 1.23E-05 | 6.04E-06 | 2.67E-05 | 8.33E-06 | 4.27E-05 | 2.32E-05 | 1.7E-05 | 5.16E-05 | 2.9E-05 | 14400.55 | 4233.47 | 5848.85 | 4536.30 | 2224.53 | 9845.09 | 3069.39 | 15725.83 | 8535.83 | 6277.61 | 18991.94 | 10678.19 |
| | Phato | 2.4E-05 | 4.19E-06 | 6.5E-06 | 5.02E-06 | 1.17E-06 | 1.45E-05 | 2.56E-06 | 2.27E-05 | 1.21E-05 | 8.75E-06 | 2.83E-05 | 1.71E-05 | 21041.65 | 3672.78 | 5693.43 | 4395.64 | 1022.02 | 12672.65 | 2239.96 | 19921.85 | 10581.02 | 7661.64 | 24834.63 | 14939.87 |
| | Sawi | 2.24E-05 | 4.99E-06 | 2.49E-05 | 5.89E-06 | 3.08E-06 | 1.6E-05 | 5.21E-06 | 2.81E-05 | 1.4E-05 | 8.27E-06 | 3.8E-05 | 2.27E-05 | 18790.05 | 4185.48 | 20926.94 | 4940.32 | 2584.70 | 13454.65 | 4371.32 | 23588.70 | 11731.73 | 6934.56 | 31901.26 | 19081.93 |
| | Thung Tako | 4.01E-05 | 1.17E-05 | 3.41E-05 | 1.27E-05 | 7.07E-06 | 2.95E-05 | 9.81E-06 | 4.76E-05 | 2.48E-05 | 1.69E-05 | 6.06E-05 | 3.66E-05 | 11601.78 | 3387.05 | 9852.74 | 3673.46 | 2044.55 | 8525.97 | 2836.80 | 13760.82 | 7179.13 | 4877.90 | 17525.86 | 10578.50 |
| SONGKHLA | Mueang Songkhla | 9.98E-06 | 1.22E-05 | 2.82E-05 | 1.78E-05 | 7.48E-06 | 4.15E-06 | 1.16E-05 | 6.81E-06 | 7.01E-06 | 2.08E-05 | 2.29E-05 | 3.87E-05 | 2038.64 | 2484.35 | 5751.94 | 3635.09 | 1527.41 | 848.11 | 2362.01 | 1390.98 | 1432.24 | 4242.60 | 4683.21 | 7900.36 |
| | Sathing Phra | 6.55E-05 | 4.34E-05 | 4.85E-05 | 3.8E-05 | 1.63E-05 | 1.66E-05 | 1.6E-05 | 2.91E-05 | 1.83E-05 | 4.08E-05 | 4.29E-05 | 4.98E-05 | 13017.34 | 8616.71 | 9635.98 | 7553.17 | 3235.89 | 3297.61 | 3171.82 | 5772.17 | 3634.18 | 8110.85 | 8531.23 | 9894.38 |
| | Chana | 2.67E-05 | 1.42E-05 | 2.28E-05 | 1.35E-05 | 3.54E-06 | 3.23E-06 | 2.59E-06 | 5.24E-06 | 7.54E-06 | 5.99E-06 | 6.83E-06 | 1.3E-05 | 16810.65 | 8972.96 | 14383.30 | 8489.64 | 2231.42 | 2036.51 | 1634.13 | 3304.32 | 4749.65 | 3772.63 | 4304.07 | 8166.04 |
| | Na Thawi | 3.34E-05 | 1.64E-05 | 2.53E-05 | 1.4E-05 | 2.94E-06 | 3.46E-06 | 1.06E-06 | 5.89E-06 | 8.62E-06 | 2.93E-06 | 4.85E-06 | 9.02E-06 | 26007.36 | 12746.66 | 19730.42 | 10889.60 | 2285.84 | 2694.75 | 829.10 | 4585.44 | 6711.75 | 2280.65 | 3773.83 | 7023.55 |
| | Thepha | 2.7E-05 | 1.59E-05 | 2.96E-05 | 1.83E-05 | 5.46E-06 | 4.07E-06 | 4.43E-06 | 5.99E-06 | 1.01E-05 | 5.72E-06 | 6.44E-06 | 1.37E-05 | 17853.82 | 10565.53 | 19623.92 | 12097.05 | 3614.84 | 2694.51 | 2933.71 | 3967.66 | 6699.82 | 3790.97 | 4267.56 | 9089.22 |
| | Saba Yoi | 2.17E-05 | 1.17E-05 | 2.33E-05 | 1.21E-05 | 3.19E-06 | 2.89E-06 | 2.35E-06 | 4.6E-06 | 7.7E-06 | 3.8E-06 | 4.79E-06 | 7.91E-06 | 20542.53 | 11022.42 | 22011.31 | 11425.70 | 3017.07 | 2737.30 | 2220.41 | 4351.79 | 7284.96 | 3591.37 | 4532.78 | 7480.41 |
| | Ranot | 4.71E-05 | 2.72E-05 | 2.17E-05 | 2.16E-05 | 7E-06 | 1.01E-05 | 7.28E-06 | 2.01E-05 | 1.12E-05 | 1.54E-05 | 2.06E-05 | 2.16E-05 | 20811.74 | 12015.50 | 9567.09 | 9526.90 | 3090.67 | 4472.76 | 3215.40 | 8866.90 | 4963.49 | 6786.49 | 9109.72 | 9546.23 |
| | Krasae Sin | 5.23E-05 | 2.54E-05 | 2.13E-05 | 1.83E-05 | 3.64E-06 | 5.39E-06 | 4.92E-06 | 2.07E-05 | 9.45E-06 | 1.68E-05 | 1.96E-05 | 2.3E-05 | 16143.87 | 7828.70 | 6578.74 | 5640.37 | 1122.72 | 1662.54 | 1517.63 | 6376.73 | 2916.25 | 5181.12 | 6055.77 | 7086.62 |
| | Rattaphum | 1.51E-06 | 8.67E-07 | 8.27E-06 | 2.58E-06 | 1.93E-06 | 1.27E-06 | 2.1E-06 | 1.37E-06 | 1.29E-06 | 2.04E-05 | 1.21E-05 | 1.36E-05 | 1001.90 | 576.22 | 5500.28 | 1716.08 | 1283.27 | 842.36 | 1394.50 | 910.90 | 859.17 | 13545.00 | 8058.85 | 9060.61 |
| | Sadao | 1.81E-05 | 8.49E-06 | 1.72E-05 | 8.21E-06 | 2.32E-06 | 2.31E-06 | 1.33E-06 | 3.94E-06 | 5.49E-06 | 1.01E-05 | 7.98E-06 | 1.11E-05 | 18685.81 | 8778.41 | 17839.13 | 8486.74 | 2400.56 | 2387.69 | 1376.66 | 4074.23 | 5679.27 | 10442.02 | 8257.24 | 11471.71 |
| | Hat Yai | 1.08E-05 | 6.3E-06 | 1.48E-05 | 7.25E-06 | 2.93E-06 | 2.16E-06 | 2.88E-06 | 3.09E-06 | 3.86E-06 | 1.51E-05 | 1.11E-05 | 1.54E-05 | 8541.02 | 4994.48 | 11717.59 | 5748.17 | 2321.30 | 1711.75 | 2286.39 | 2448.27 | 3058.83 | 11961.39 | 8786.46 | 12170.15 |
| | Na Mom | 3.27E-05 | 1.84E-05 | 3.39E-05 | 1.92E-05 | 5.96E-06 | 4.71E-06 | 5.54E-06 | 7.49E-06 | 1.03E-05 | 1.78E-05 | 1.58E-05 | 2.62E-05 | 4632.14 | 2613.38 | 4803.36 | 2721.85 | 843.91 | 668.04 | 784.77 | 1061.62 | 1461.66 | 2519.08 | 2236.92 | 3708.45 |
| | Khuan Niang | 8.77E-06 | 5.99E-06 | 1.85E-05 | 8.51E-06 | 4.52E-06 | 3.29E-06 | 5.25E-06 | 4.85E-06 | 4.01E-06 | 3.29E-05 | 2.15E-05 | 2.54E-05 | 2176.54 | 1484.82 | 4600.08 | 2109.98 | 1120.78 | 815.16 | 1301.49 | 1202.79 | 993.72 | 8168.03 | 5342.91 | 6305.90 |
| | Bang Klam | 1.46E-05 | 9.06E-06 | 2.6E-05 | 1.2E-05 | 5.59E-06 | 3.92E-06 | 6.34E-06 | 5.88E-06 | 5.99E-06 | 3.77E-05 | 2.56E-05 | 3.25E-05 | 2118.62 | 1312.13 | 3761.29 | 1736.86 | 808.65 | 567.83 | 918.01 | 851.22 | 866.61 | 5460.21 | 3710.75 | 4705.26 |
| | Singhanakhon | 2E-05 | 1.71E-05 | 3.14E-05 | 2.01E-05 | 9.27E-06 | 6.94E-06 | 1.14E-05 | 1.06E-05 | 8.72E-06 | 3.04E-05 | 2.81E-05 | 3.89E-05 | 4841.83 | 4146.60 | 7595.69 | 4868.28 | 2241.55 | 1678.11 | 2752.51 | 2553.90 | 2110.11 | 7363.39 | 6801.39 | 9404.20 |
| | Khlong Hoi Khong | 1E-05 | 4.99E-06 | 1.65E-05 | 6.46E-06 | 3.13E-06 | 2.13E-06 | 2.7E-06 | 3.09E-06 | 4.1E-06 | 2.24E-05 | 1.47E-05 | 1.92E-05 | 3043.59 | 1512.41 | 4987.17 | 1956.50 | 947.94 | 645.52 | 816.51 | 934.53 | 1241.62 | 6774.44 | 4455.29 | 5823.23 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 6.8E-06 | 3.21E-06 | 1.12E-05 | 5.4E-06 | 2.33E-06 | 2.26E-06 | 2.29E-06 | 2.87E-06 | 3.74E-06 | 1.77E-05 | 1.22E-05 | 1.9E-05 | 6630.00 | 3132.38 | 10965.01 | 5270.25 | 2269.36 | 2204.03 | 2230.28 | 2795.69 | 3644.54 | 17271.58 | 11874.19 | 18562.32 |
| | Khuan Don | 5.29E-06 | 2.23E-06 | 2.31E-05 | 6.56E-06 | 5.11E-06 | 2.75E-06 | 4.63E-06 | 3.58E-06 | 4.7E-06 | 4.61E-05 | 2.91E-05 | 3.77E-05 | 1169.05 | 492.04 | 5104.99 | 1449.20 | 1128.43 | 606.41 | 1021.96 | 790.59 | 1036.81 | 10185.02 | 6427.74 | 8314.60 |
| | Khuan Kalong | 4.07E-06 | 2.18E-06 | 1.66E-05 | 5.54E-06 | 3.92E-06 | 2.3E-06 | 4.04E-06 | 2.76E-06 | 3.04E-06 | 3.64E-05 | 2.4E-05 | 3.22E-05 | 2166.14 | 1159.76 | 8841.98 | 2945.81 | 2084.18 | 1221.87 | 2151.69 | 1468.07 | 1619.12 | 19383.18 | 12773.75 | 17106.96 |
| | Tha Phae | 3.35E-06 | 2.1E-06 | 1.49E-05 | 6.03E-06 | 3.67E-06 | 2.19E-06 | 3.84E-06 | 2.5E-06 | 2.88E-06 | 3.34E-05 | 2.19E-05 | 3.86E-05 | 754.59 | 472.75 | 3341.01 | 1356.22 | 825.83 | 492.16 | 864.52 | 563.45 | 648.91 | 7514.17 | 4923.85 | 8682.09 |
| | La-ngu | 9.94E-07 | 1.09E-06 | 8.82E-06 | 3.71E-06 | 2.5E-06 | 1.39E-06 | 2.99E-06 | 1.5E-06 | 1.35E-06 | 2.27E-05 | 1.65E-05 | 2.67E-05 | 393.87 | 430.97 | 3493.62 | 1470.57 | 988.60 | 549.25 | 1184.27 | 593.91 | 534.00 | 9005.78 | 6520.76 | 10578.65 |
| | Thung Wa | 1.79E-06 | 1.32E-06 | 8.7E-06 | 3.43E-06 | 2.53E-06 | 1.44E-06 | 3.35E-06 | 1.87E-06 | 1.42E-06 | 2.26E-05 | 1.88E-05 | 2.34E-05 | 827.33 | 606.20 | 4009.10 | 1581.02 | 1164.55 | 661.50 | 1545.28 | 859.85 | 653.58 | 10440.04 | 8683.62 | 10779.28 |
| | Manang | 3.36E-06 | 2.17E-06 | 1.6E-05 | 5.98E-06 | 4.23E-06 | 2.42E-06 | 5.1E-06 | 3.04E-06 | 2.69E-06 | 3.96E-05 | 2.93E-05 | 3.87E-05 | 704.80 | 456.36 | 3357.58 | 1256.47 | 888.53 | 508.17 | 1070.51 | 638.39 | 564.65 | 8319.30 | 6148.52 | 8135.10 |
| TRANG | Mueang Trang | 4.31E-05 | 1.59E-05 | 1.8E-05 | 1.46E-05 | 1.39E-06 | 4.11E-06 | 2.17E-06 | 1.34E-05 | 1.13E-05 | 1.2E-05 | 1.78E-05 | 1.2E-05 | 18962.35 | 6978.29 | 7898.97 | 6429.30 | 610.49 | 1809.02 | 954.66 | 5903.26 | 4957.51 | 5293.15 | 7815.29 | 5273.85 |
| | Kantang | 2.1E-05 | 7.12E-06 | 1.19E-05 | 8.27E-06 | 2.08E-06 | 4.02E-06 | 2.63E-06 | 7.9E-06 | 6.37E-06 | 2.04E-05 | 1.87E-05 | 1.82E-05 | 13561.21 | 4607.16 | 7705.30 | 5352.95 | 1342.82 | 2600.36 | 1701.94 | 5111.24 | 4124.71 | 13219.98 | 12080.52 | 11793.07 |
| | Yan Ta Khao | 2.52E-05 | 9.94E-06 | 1.45E-05 | 9.92E-06 | 2.11E-06 | 2.52E-06 | 3.11E-06 | 8.81E-06 | 6.77E-06 | 1.89E-05 | 2.01E-05 | 1.9E-05 | 11181.75 | 4406.41 | 6424.35 | 4397.31 | 937.50 | 1118.43 | 1377.90 | 3904.67 | 3000.39 | 8360.02 | 8892.72 | 8440.81 |
| | Palian | 4.67E-06 | 2.35E-06 | 8.4E-06 | 3.88E-06 | 2.27E-06 | 1.46E-06 | 3.18E-06 | 2.63E-06 | 1.92E-06 | 1.97E-05 | 1.81E-05 | 2.08E-05 | 3801.78 | 1910.71 | 6835.41 | 3161.00 | 1845.59 | 1187.50 | 2589.00 | 2143.59 | 1563.19 | 16018.97 | 14733.43 | 16931.21 |
| | Sikao | 6.08E-05 | 1.68E-05 | 2.45E-05 | 1.8E-05 | 2.18E-06 | 1.3E-05 | 1.61E-06 | 1.67E-05 | 1.8E-05 | 1.93E-05 | 2.05E-05 | 1.51E-05 | 28058.11 | 7751.81 | 11314.18 | 8320.23 | 1008.15 | 5992.24 | 741.33 | 7716.96 | 8315.17 | 8922.31 | 9485.13 | 6990.72 |
| | Huai Yot | 4.57E-05 | 1.66E-05 | 1.71E-05 | 1.53E-05 | 1.15E-06 | 6.81E-06 | 1.92E-06 | 1.49E-05 | 1.22E-05 | 1.03E-05 | 1.88E-05 | 9.96E-06 | 35363.90 | 12826.45 | 13247.71 | 11864.82 | 888.55 | 5271.73 | 1484.00 | 11504.11 | 9452.86 | 7962.19 | 14513.67 | 7701.84 |
| | Wang Wiset | 6.42E-05 | 1.94E-05 | 2.37E-05 | 1.95E-05 | 1.81E-06 | 1.37E-05 | 1.63E-06 | 1.93E-05 | 1.86E-05 | 1.66E-05 | 2.36E-05 | 1.37E-05 | 32174.82 | 9730.42 | 11876.89 | 9781.07 | 904.69 | 6857.03 | 818.24 | 9675.58 | 9336.00 | 8338.45 | 11817.83 | 6843.53 |
| | Na Yong | 6.26E-05 | 2.47E-05 | 2.6E-05 | 2.15E-05 | 1.82E-06 | 3.21E-06 | 3.3E-06 | 1.98E-05 | 1.55E-05 | 1.47E-05 | 2.45E-05 | 1.62E-05 | 15411.34 | 6080.99 | 6415.10 | 5304.31 | 449.20 | 790.45 | 812.69 | 4875.41 | 3823.84 | 3627.47 | 6025.11 | 3999.50 |
| | Ratsada | 7.21E-05 | 2.85E-05 | 2.59E-05 | 2.72E-05 | 2.23E-06 | 1.58E-05 | 4.49E-06 | 2.64E-05 | 1.96E-05 | 1.73E-05 | 3.73E-05 | 1.63E-05 | 15833.86 | 6255.04 | 5682.46 | 5978.41 | 490.36 | 3477.35 | 986.70 | 5788.85 | 4294.10 | 3798.40 | 8197.91 | 3585.37 |
| | Hat Samran | 2.01E-05 | 8.53E-06 | 2.44E-05 | 1.32E-05 | 6.38E-06 | 5.42E-06 | 8.77E-06 | 1.08E-05 | 7.53E-06 | 5.89E-05 | 5.24E-05 | 6E-05 | 3680.29 | 1563.78 | 4475.83 | 2426.04 | 1169.59 | 992.46 | 1607.80 | 1972.50 | 1379.84 | 10797.77 | 9599.12 | 10984.65 |
| PHATTHALUNG | Mueang Phatthalung | 3.03E-05 | 1.38E-05 | 1.19E-05 | 1.01E-05 | 1.54E-06 | 2.65E-06 | 2.48E-06 | 1.16E-05 | 5.64E-06 | 1.04E-05 | 1.21E-05 | 1.3E-05 | 14662.47 | 6670.95 | 5765.65 | 4913.16 | 746.81 | 1284.03 | 1203.10 | 5625.43 | 2731.74 | 5041.55 | 5852.99 | 6278.86 |
| | Kong Ra | 3.16E-05 | 1.34E-05 | 1.89E-05 | 1.26E-05 | 2.85E-06 | 3.03E-06 | 4.2E-06 | 1.17E-05 | 7.76E-06 | 2.6E-05 | 2.54E-05 | 2.51E-05 | 9646.75 | 4085.02 | 5771.28 | 3828.53 | 868.41 | 925.13 | 1280.16 | 3563.55 | 2365.69 | 7939.38 | 7733.03 | 7649.85 |
| | Khao Chaison | 2.22E-05 | 1.03E-05 | 1.12E-05 | 8.16E-06 | 1.8E-06 | 2.17E-06 | 2.49E-06 | 8.64E-06 | 4.45E-06 | 1.3E-05 | 1.24E-05 | 1.34E-05 | 7448.43 | 3448.83 | 3766.75 | 2738.63 | 604.44 | 728.45 | 834.52 | 2900.95 | 1495.67 | 4352.00 | 4160.38 | 4484.93 |
| | Tamot | 1.14E-05 | 5.11E-06 | 1.38E-05 | 6.37E-06 | 2.83E-06 | 2.12E-06 | 3.63E-06 | 5.22E-06 | 3.47E-06 | 2.9E-05 | 2.14E-05 | 2.31E-05 | 3160.32 | 1412.70 | 3815.36 | 1763.80 | 781.74 | 585.55 | 1004.78 | 1443.53 | 960.95 | 8022.86 | 5933.19 | 6383.22 |
| | Khuan Khanun | 3.16E-05 | 1.56E-05 | 1.29E-05 | 1.26E-05 | 2.62E-06 | 4.85E-06 | 3.35E-06 | 1.24E-05 | 7.27E-06 | 9.19E-06 | 1.34E-05 | 1.18E-05 | 17095.91 | 8413.78 | 6978.32 | 6791.01 | 1418.67 | 2621.39 | 1808.47 | 6681.53 | 3930.60 | 4967.24 | 7258.03 | 6358.47 |
| | Pak Phayun | 1.38E-05 | 8.25E-06 | 1.42E-05 | 8.35E-06 | 3.74E-06 | 3.34E-06 | 4.11E-06 | 6.51E-06 | 4.05E-06 | 2.19E-05 | 1.63E-05 | 1.82E-05 | 6688.13 | 3987.64 | 6864.25 | 4032.50 | 1809.36 | 1613.44 | 1984.12 | 3145.15 | 1955.35 | 10571.72 | 7854.40 | 8786.53 |
| | Si Banphot | 6.57E-05 | 2.71E-05 | 2.66E-05 | 2.32E-05 | 2.2E-06 | 4.51E-06 | 3.84E-06 | 2.16E-05 | 1.61E-05 | 1.41E-05 | 2.54E-05 | 1.63E-05 | 15771.02 | 6500.64 | 6377.85 | 5576.13 | 528.65 | 1081.54 | 921.43 | 5192.46 | 3857.21 | 3389.03 | 6084.33 | 3918.40 |
| | Pa Bon | 3.22E-06 | 1.55E-06 | 8.76E-06 | 3.07E-06 | 1.99E-06 | 1.42E-06 | 2.29E-06 | 2.11E-06 | 1.54E-06 | 2.19E-05 | 1.35E-05 | 1.45E-05 | 1563.01 | 754.52 | 4252.58 | 1491.28 | 964.66 | 690.09 | 1109.68 | 1024.42 | 749.56 | 10606.05 | 6539.81 | 7029.06 |
| | Bang Kaeo | 2.94E-05 | 1.41E-05 | 1.89E-05 | 1.23E-05 | 3.56E-06 | 3.68E-06 | 4.51E-06 | 1.2E-05 | 6.53E-06 | 2.62E-05 | 2.17E-05 | 2.34E-05 | 4560.58 | 2192.21 | 2922.39 | 1900.85 | 551.03 | 570.99 | 698.68 | 1855.11 | 1012.22 | 4065.18 | 3365.40 | 3634.01 |
| | Pa Phayom | 6.24E-05 | 2.72E-05 | 2.46E-05 | 2.39E-05 | 3.22E-06 | 9.18E-06 | 4.83E-06 | 2.22E-05 | 1.58E-05 | 1.47E-05 | 2.69E-05 | 1.66E-05 | 18839.51 | 8211.97 | 7435.87 | 7230.85 | 973.26 | 2772.99 | 1458.06 | 6716.92 | 4782.70 | 4434.23 | 8130.00 | 5005.16 |
| | Srinagarindra | 4.74E-05 | 1.92E-05 | 2.06E-05 | 1.66E-05 | 1.73E-06 | 2.97E-06 | 3.13E-06 | 1.58E-05 | 1.13E-05 | 1.54E-05 | 2.15E-05 | 1.63E-05 | 11961.03 | 4859.25 | 5197.96 | 4187.22 | 435.92 | 750.00 | 789.26 | 3994.51 | 2843.20 | 3880.76 | 5418.04 | 4114.69 |

**Table F-2** Fifty percent of $NO_2$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 6.63E-05 | 4.78E-05 | 9.36E-05 | 5.88E-05 | 2.19E-05 | 1.37E-05 | 1.91E-05 | 1.61E-05 | 3.2E-05 | 1.91E-05 | 1.85E-05 | 4.12E-05 | 6245.69 | 4504.93 | 8821.53 | 5539.55 | 2062.40 | 1287.19 | 1802.52 | 1519.40 | 3018.65 | 1801.62 | 1740.62 | 3881.49 |
| | Khok Pho | 4.26E-05 | 3.03E-05 | 6.35E-05 | 4.24E-05 | 1.46E-05 | 8.85E-06 | 1.31E-05 | 1.15E-05 | 2.19E-05 | 1.43E-05 | 1.3E-05 | 3.09E-05 | 12888.01 | 9162.74 | 19217.10 | 12812.66 | 4416.07 | 2677.12 | 3948.92 | 3479.81 | 6629.49 | 4320.76 | 3940.73 | 9330.19 |
| | Nong Chik | 5.98E-05 | 4.28E-05 | 8.82E-05 | 5.85E-05 | 2.05E-05 | 1.25E-05 | 1.83E-05 | 1.59E-05 | 3.04E-05 | 1.96E-05 | 1.81E-05 | 4.27E-05 | 14209.29 | 10172.97 | 20947.65 | 13906.77 | 4867.57 | 2957.36 | 4346.01 | 3778.19 | 7225.67 | 4666.50 | 4308.28 | 10149.66 |
| | Panare | 5.97E-05 | 5.62E-05 | 8.73E-05 | 5.24E-05 | 2.78E-05 | 1.62E-05 | 2.33E-05 | 1.18E-05 | 2.93E-05 | 1.35E-05 | 1.46E-05 | 3.16E-05 | 8580.30 | 8080.92 | 12555.16 | 7532.41 | 3993.34 | 2324.45 | 3347.19 | 1691.39 | 4217.03 | 1941.31 | 2099.66 | 4545.15 |
| | Mayo | 3.92E-05 | 3.19E-05 | 5.57E-05 | 3.21E-05 | 1.48E-05 | 9.09E-06 | 1.25E-05 | 8.18E-06 | 1.85E-05 | 9.4E-06 | 9.88E-06 | 2.02E-05 | 7921.76 | 6448.78 | 11266.95 | 6496.24 | 2988.45 | 1837.76 | 2523.99 | 1652.93 | 3746.09 | 1899.88 | 1997.56 | 4074.51 |
| | Thung Yang Daeng | 3.57E-05 | 3.02E-05 | 5.21E-05 | 2.88E-05 | 1.41E-05 | 8.68E-06 | 1.17E-05 | 7.09E-06 | 1.67E-05 | 8.3E-06 | 8.94E-06 | 1.74E-05 | 4964.21 | 4200.39 | 7252.38 | 4004.89 | 1963.27 | 1209.19 | 1628.43 | 987.29 | 2331.24 | 1155.33 | 1244.96 | 2423.99 |
| | Sai Buri | 4.83E-05 | 4.64E-05 | 7.06E-05 | 4.26E-05 | 2.31E-05 | 1.33E-05 | 1.94E-05 | 9.36E-06 | 2.38E-05 | 1.06E-05 | 1.16E-05 | 2.54E-05 | 9843.65 | 9469.12 | 14396.00 | 8682.53 | 4706.98 | 2716.59 | 3947.24 | 1908.13 | 4853.87 | 2165.74 | 2374.65 | 5177.86 |
| | Mai Kaen | 0.000133 | 0.000117 | 0.0002 | 0.000106 | 5.49E-05 | 3.4E-05 | 4.38E-05 | 2.5E-05 | 6.04E-05 | 2.97E-05 | 3.29E-05 | 6.21E-05 | 7700.42 | 6773.93 | 11599.20 | 6154.82 | 3187.13 | 1975.04 | 2542.59 | 1451.58 | 3506.83 | 1723.30 | 1909.25 | 3605.65 |
| | Yaring | 4.11E-05 | 3.3E-05 | 5.76E-05 | 3.41E-05 | 1.53E-05 | 9.35E-06 | 1.3E-05 | 8.76E-06 | 1.94E-05 | 9.96E-06 | 1.04E-05 | 2.18E-05 | 8880.04 | 7137.96 | 12454.70 | 7385.46 | 3303.32 | 2023.04 | 2807.44 | 1894.26 | 4202.15 | 2153.07 | 2242.12 | 4722.39 |
| | Yarang | 6.06E-05 | 4.31E-05 | 8.44E-05 | 4.93E-05 | 1.89E-05 | 1.22E-05 | 1.64E-05 | 1.38E-05 | 2.84E-05 | 1.61E-05 | 1.6E-05 | 3.3E-05 | 13232.71 | 9405.16 | 18421.45 | 10760.27 | 4136.11 | 2665.89 | 3571.28 | 3014.26 | 6199.54 | 3506.37 | 3503.41 | 7202.14 |
| | Kapho | 8.58E-05 | 7.48E-05 | 0.000126 | 6.91E-05 | 3.52E-05 | 2.15E-05 | 2.89E-05 | 1.64E-05 | 3.99E-05 | 1.9E-05 | 2.11E-05 | 4.06E-05 | 7096.50 | 6192.59 | 10455.60 | 5712.88 | 2912.65 | 1776.45 | 2393.15 | 1360.31 | 3302.51 | 1568.98 | 1742.87 | 3358.82 |
| | Mae Lan | 7.43E-05 | 5.18E-05 | 0.000106 | 6.67E-05 | 2.37E-05 | 1.49E-05 | 2.09E-05 | 1.86E-05 | 3.64E-05 | 2.25E-05 | 2.12E-05 | 4.71E-05 | 5801.69 | 4043.24 | 8314.59 | 5208.79 | 1847.41 | 1165.17 | 1629.06 | 1454.16 | 2844.69 | 1757.30 | 1658.36 | 3681.58 |
| YALA | Mueang Yala | 4.22E-05 | 2.62E-05 | 5.57E-05 | 2.91E-05 | 1.01E-05 | 7.4E-06 | 8.76E-06 | 9.35E-06 | 1.88E-05 | 1.09E-05 | 1.1E-05 | 1.95E-05 | 13473.00 | 8362.01 | 17811.50 | 9309.01 | 3228.13 | 2365.01 | 2800.79 | 2988.93 | 6006.21 | 3477.30 | 3501.68 | 6242.30 |
| | Betong | 1.5E-05 | 9.35E-06 | 2.34E-05 | 7.28E-06 | 1.38E-06 | 1.47E-06 | 8.3E-07 | 3.51E-06 | 3.76E-06 | 6.82E-06 | 6.53E-06 | 2.75E-06 | 19819.39 | 12338.85 | 30919.82 | 9599.56 | 1815.55 | 1944.10 | 1095.06 | 4625.59 | 4957.97 | 8993.62 | 8613.27 | 3628.12 |
| | Bannang Sata | 3.06E-05 | 1.39E-05 | 3.69E-05 | 1.02E-05 | 2.26E-06 | 3.66E-06 | 1.92E-06 | 5.82E-06 | 1.15E-05 | 8.03E-06 | 8.17E-06 | 5.54E-06 | 17766.98 | 8053.22 | 21406.90 | 5909.44 | 1312.08 | 2121.48 | 1115.89 | 3373.05 | 6658.60 | 4657.70 | 4737.65 | 3209.46 |
| | Than To | 3.15E-05 | 1.59E-05 | 4.14E-05 | 1.14E-05 | 2.17E-06 | 3.37E-06 | 1.48E-06 | 6.36E-06 | 1.01E-05 | 1.06E-05 | 1.05E-05 | 5.01E-06 | 21197.75 | 10744.48 | 27926.68 | 7679.65 | 1464.52 | 2273.87 | 996.80 | 4288.37 | 6833.78 | 7159.02 | 7076.76 | 3377.36 |
| | Yaha | 4.57E-05 | 2.15E-05 | 5.13E-05 | 1.91E-05 | 5.14E-06 | 6.34E-06 | 4.55E-06 | 9.41E-06 | 1.87E-05 | 1.12E-05 | 1.12E-05 | 1.32E-05 | 21482.57 | 10125.46 | 24122.92 | 8958.75 | 2416.86 | 2979.41 | 2137.04 | 4421.28 | 8799.39 | 5256.15 | 5241.73 | 6216.98 |
| | Raman | 2.44E-05 | 1.58E-05 | 3.45E-05 | 1.46E-05 | 5.82E-06 | 4.37E-06 | 4.7E-06 | 4.56E-06 | 1.01E-05 | 5.38E-06 | 6.12E-06 | 8.09E-06 | 11805.71 | 7665.28 | 16712.68 | 7068.41 | 2822.32 | 2119.03 | 2280.68 | 2211.49 | 4880.77 | 2608.43 | 2964.84 | 3922.96 |
| | Kabang | 2.78E-05 | 1.25E-05 | 2.95E-05 | 1.02E-05 | 2.13E-06 | 3.34E-06 | 1.64E-06 | 5.6E-06 | 1.01E-05 | 5.81E-06 | 6.55E-06 | 6.51E-06 | 12333.24 | 5549.45 | 13110.12 | 4536.10 | 945.74 | 1482.27 | 727.85 | 2487.23 | 4496.87 | 2582.34 | 2908.22 | 2889.72 |
| | Krong Pinang | 5.28E-05 | 2.57E-05 | 6.31E-05 | 2.19E-05 | 6.18E-06 | 7.3E-06 | 5.43E-06 | 1.05E-05 | 2.13E-05 | 1.29E-05 | 1.33E-05 | 1.38E-05 | 9712.29 | 4730.79 | 11605.58 | 4024.50 | 1136.21 | 1340.74 | 998.71 | 1934.38 | 3907.80 | 2369.64 | 2435.68 | 2528.86 |
| NARATHIWAT | Mueang Narathiwat | 3.09E-05 | 2.8E-05 | 6.02E-05 | 2.04E-05 | 1.23E-05 | 9.97E-06 | 5.82E-06 | 5E-06 | 1E-05 | 9.77E-06 | 9.45E-06 | 1.15E-05 | 9740.29 | 8831.33 | 18971.66 | 6420.92 | 3874.29 | 3139.81 | 1834.00 | 1575.12 | 3153.54 | 3076.14 | 2977.48 | 3634.58 |
| | Tak Bai | 1.68E-05 | 2.73E-05 | 5.26E-05 | 1.79E-05 | 1.56E-05 | 1.24E-05 | 4.78E-06 | 2.39E-06 | 2.95E-06 | 9.97E-06 | 7.37E-06 | 1.36E-05 | 4706.70 | 7647.59 | 14722.56 | 4995.55 | 4364.94 | 3471.29 | 1337.53 | 668.13 | 823.78 | 2788.45 | 2061.12 | 3796.75 |
| | Bacho | 5.19E-05 | 4.12E-05 | 7.9E-05 | 3.69E-05 | 1.79E-05 | 1.19E-05 | 1.38E-05 | 9.4E-06 | 2.19E-05 | 1.11E-05 | 1.29E-05 | 2.06E-05 | 9489.99 | 7535.02 | 14447.57 | 6756.01 | 3278.16 | 2176.64 | 2517.34 | 1719.97 | 4008.78 | 2032.44 | 2356.30 | 3762.66 |
| | Yi-ngo | 4.29E-05 | 2.76E-05 | 6.81E-05 | 2.17E-05 | 9.11E-06 | 7.79E-06 | 5.52E-06 | 6.74E-06 | 1.48E-05 | 8.95E-06 | 1.11E-05 | 9.23E-06 | 7965.62 | 5132.44 | 12642.42 | 4033.04 | 1691.50 | 1446.80 | 1025.46 | 1251.30 | 2746.91 | 1661.74 | 2059.82 | 1715.45 |
| | Ra-ngae | 2.98E-05 | 1.77E-05 | 4.84E-05 | 1.27E-05 | 4.66E-06 | 4.88E-06 | 2.38E-06 | 4.6E-06 | 9.63E-06 | 6.45E-06 | 7.93E-06 | 4.19E-06 | 13111.98 | 7777.48 | 21320.43 | 5600.75 | 2053.07 | 2150.16 | 1049.96 | 2024.41 | 4241.32 | 2842.55 | 3491.73 | 1846.23 |
| | Rueso | 2.15E-05 | 1.13E-05 | 3.16E-05 | 9.41E-06 | 2.72E-06 | 2.69E-06 | 1.96E-06 | 3.41E-06 | 7.46E-06 | 3.53E-06 | 5.14E-06 | 3.26E-06 | 10250.36 | 5368.87 | 15018.42 | 4478.47 | 1293.42 | 1277.97 | 932.99 | 1621.58 | 3548.51 | 1680.78 | 2442.71 | 1548.96 |
| | Si Sakhon | 2.92E-05 | 1.39E-05 | 4.25E-05 | 1.03E-05 | 2.14E-06 | 3E-06 | 1.3E-06 | 4.53E-06 | 9.44E-06 | 5.97E-06 | 7.76E-06 | 2.37E-06 | 15267.01 | 7291.54 | 22220.07 | 5383.98 | 1121.44 | 1568.05 | 682.93 | 2370.96 | 4941.83 | 3125.50 | 4059.61 | 1241.48 |
| | Waeng | 2.02E-05 | 1.71E-05 | 3.89E-05 | 6.64E-06 | 3.53E-06 | 6.49E-06 | 2.41E-06 | 5.69E-06 | 8.67E-06 | 1.05E-05 | 7.13E-06 | 3.1E-06 | 5701.76 | 4831.74 | 10972.81 | 1874.20 | 996.56 | 1832.93 | 679.82 | 1607.28 | 2448.64 | 2971.06 | 2012.26 | 874.40 |
| | Sukhirin | 1.96E-05 | 1.29E-05 | 3E-05 | 5.42E-06 | 2.42E-06 | 3.76E-06 | 1.37E-06 | 3.95E-06 | 7.81E-06 | 1.17E-05 | 8.73E-06 | 2.14E-06 | 10112.35 | 6642.22 | 15462.99 | 2797.33 | 1249.56 | 1940.94 | 708.49 | 2037.28 | 4031.16 | 6033.76 | 4506.08 | 1105.93 |
| | Su-ngai Kolok | 1.87E-05 | 2.18E-05 | 4.5E-05 | 1.21E-05 | 9.23E-06 | 9.2E-06 | 3.74E-06 | 4.11E-06 | 6.19E-06 | 9.36E-06 | 6.72E-06 | 8.04E-06 | 2551.83 | 2974.13 | 6150.12 | 1660.30 | 1261.30 | 1257.98 | 511.17 | 561.14 | 845.93 | 1279.85 | 918.49 | 1098.72 |
| | Su-ngai Padi | 1.42E-05 | 1.47E-05 | 3.13E-05 | 8.55E-06 | 6.05E-06 | 5.87E-06 | 2.43E-06 | 2.79E-06 | 4.62E-06 | 6.75E-06 | 5.19E-06 | 5.3E-06 | 5430.91 | 5622.10 | 11967.60 | 3267.57 | 2312.70 | 2243.13 | 928.14 | 1065.75 | 1767.15 | 2579.89 | 1983.99 | 2023.69 |
| | Chanae | 1.72E-05 | 9.71E-06 | 2.49E-05 | 5.07E-06 | 1.68E-06 | 2.47E-06 | 9.24E-07 | 3E-06 | 6.32E-06 | 7.93E-06 | 6.69E-06 | 1.63E-06 | 9901.18 | 5599.58 | 14336.92 | 2922.70 | 970.94 | 1425.18 | 532.93 | 1733.37 | 3643.10 | 4572.15 | 3859.90 | 937.69 |
| | Cho-airong | 2.37E-05 | 2.35E-05 | 5.11E-05 | 1.54E-05 | 1.04E-05 | 9.07E-06 | 4E-06 | 3.87E-06 | 6.98E-06 | 9.36E-06 | 8.12E-06 | 9.18E-06 | 4601.31 | 4566.40 | 9919.08 | 2992.43 | 2023.02 | 1760.66 | 777.57 | 751.69 | 1355.11 | 1816.88 | 1576.35 | 1783.14 |

# APPENDIX G

# FIFTY PERCENT OF $NO_x$ MAXIMUM EMISSION LOAD FOR THE SOUTHERN REGION OF THAILAND

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 7.15E-05 | 2.05E-05 | 2.15E-05 | 2.27E-05 | 1.32E-06 | 2.23E-05 | 1.08E-06 | 2.47E-05 | 1.6E-05 | 2.87E-05 | 3.82E-05 | 1.63E-05 | 64706.05 | 18544.44 | 19499.48 | 20533.24 | 1194.45 | 20224.05 | 978.48 | 22386.83 | 14510.40 | 25949.13 | 34616.19 | 14796.53 |
| | Khao Phanom | 7.92E-05 | 2.35E-05 | 1.97E-05 | 2.39E-05 | 1.29E-06 | 2.23E-05 | 1.4E-06 | 3.26E-05 | 2.22E-05 | 2.13E-05 | 4.81E-05 | 1.88E-05 | 67289.71 | 19976.37 | 16706.27 | 20304.90 | 1096.29 | 18972.55 | 1185.97 | 27692.63 | 18845.15 | 18131.38 | 40838.48 | 15954.62 |
| | Ko Lanta | 0.000117 | 3.96E-05 | 4.88E-05 | 4.18E-05 | 9.71E-06 | 4.83E-05 | 8.14E-06 | 5.07E-05 | 4.22E-05 | 5.7E-05 | 5.62E-05 | 4.35E-05 | 39425.10 | 13297.82 | 16399.75 | 14062.16 | 3262.88 | 16231.99 | 2737.14 | 17031.98 | 14173.99 | 19144.91 | 18884.71 | 14615.42 |
| | Khlong Thom | 7E-05 | 2.19E-05 | 2.24E-05 | 2.16E-05 | 2.06E-06 | 2E-05 | 1.72E-06 | 2.5E-05 | 2.1E-05 | 1.89E-05 | 3.14E-05 | 1.54E-05 | 78247.22 | 24525.52 | 25077.90 | 24130.11 | 2298.82 | 22378.74 | 1922.71 | 27947.03 | 23463.32 | 21068.87 | 35129.00 | 17191.23 |
| | Ao Luek | 7.09E-05 | 1.64E-05 | 1.81E-05 | 1.96E-05 | 1.05E-06 | 1.98E-05 | 1.01E-06 | 3.01E-05 | 1.78E-05 | 2.97E-05 | 4.59E-05 | 1.77E-05 | 56016.78 | 12922.30 | 14280.71 | 15445.42 | 830.88 | 15603.79 | 796.64 | 23743.42 | 14043.42 | 23482.85 | 36282.10 | 13960.13 |
| | Plai Phraya | 9.34E-05 | 2.1E-05 | 2.55E-05 | 2.54E-05 | 1.42E-06 | 2.4E-05 | 1.42E-06 | 4.51E-05 | 2.61E-05 | 3.2E-05 | 7.14E-05 | 2.79E-05 | 49424.84 | 11121.44 | 13469.97 | 13425.75 | 751.59 | 12723.43 | 752.19 | 23875.47 | 13813.50 | 16933.28 | 37787.84 | 14783.88 |
| | Lam Thap | 0.000138 | 4.67E-05 | 3.52E-05 | 4.2E-05 | 2.2E-06 | 3.88E-05 | 2.71E-06 | 5.45E-05 | 4.13E-05 | 2.91E-05 | 7.53E-05 | 2.86E-05 | 38822.70 | 13158.64 | 9908.11 | 11825.99 | 620.21 | 10917.30 | 763.08 | 15336.85 | 11625.29 | 8201.27 | 21196.91 | 8065.60 |
| | Nuea Khlong | 8.26E-05 | 2.59E-05 | 2.55E-05 | 2.67E-05 | 2.45E-06 | 2.72E-05 | 2.09E-06 | 3.14E-05 | 2.25E-05 | 2.8E-05 | 4.3E-05 | 1.98E-05 | 42431.89 | 13306.37 | 13117.49 | 13732.89 | 1261.57 | 13965.78 | 1075.21 | 16143.51 | 11549.43 | 14367.23 | 22103.62 | 10191.58 |

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PHANGNGA | Mueang Phangnga | 8.33E-05 | 1.68E-05 | 1.77E-05 | 2.21E-05 | 1.05E-06 | 2.47E-05 | 1.24E-06 | 3.88E-05 | 1.97E-05 | 4.69E-05 | 5.2E-05 | 1.85E-05 | 54464.54 | 11004.34 | 11542.79 | 14463.18 | 683.97 | 16181.44 | 813.36 | 25384.82 | 12863.46 | 30666.23 | 34025.15 | 12077.12 |
| | Ko Yao | 7.11E-05 | 1.58E-05 | 1.67E-05 | 1.91E-05 | 4.14E-06 | 2.42E-05 | 3.9E-06 | 2.91E-05 | 1.95E-05 | 4.31E-05 | 3.86E-05 | 1.61E-05 | 74031.70 | 16408.37 | 17382.18 | 19900.22 | 4315.50 | 25202.44 | 4057.49 | 30318.83 | 20356.62 | 44909.38 | 40202.31 | 16777.45 |
| | Kapong | 7.15E-05 | 1.49E-05 | 1.49E-05 | 1.88E-05 | 1.12E-06 | 2.29E-05 | 1.45E-06 | 4.22E-05 | 2.05E-05 | 3.93E-05 | 5.12E-05 | 1.82E-05 | 43378.58 | 9035.34 | 9059.14 | 11423.37 | 677.05 | 13917.52 | 878.42 | 25586.91 | 12422.43 | 23836.91 | 31063.63 | 11044.25 |
| | Takua Thung | 7.66E-05 | 1.14E-05 | 1.19E-05 | 1.61E-05 | 1.2E-06 | 2.11E-05 | 1.22E-06 | 3.07E-05 | 1.8E-05 | 4.89E-05 | 4.25E-05 | 1.31E-05 | 50002.53 | 7415.23 | 7772.21 | 10492.63 | 785.90 | 13744.96 | 797.94 | 20056.14 | 11772.55 | 31935.62 | 27743.92 | 8546.54 |
| | Takua Pa | 6.61E-05 | 1.43E-05 | 1.36E-05 | 1.68E-05 | 1.38E-06 | 2.21E-05 | 1.65E-06 | 4.49E-05 | 2.21E-05 | 3.79E-05 | 5.16E-05 | 1.77E-05 | 39733.19 | 8620.86 | 8165.48 | 10124.60 | 828.70 | 13286.26 | 994.62 | 27003.23 | 13256.86 | 22764.70 | 30989.07 | 10652.44 |
| | Khura Buri | 3.51E-05 | 1.59E-05 | 1.36E-05 | 1.5E-05 | 7.07E-06 | 2.54E-05 | 5.82E-06 | 2.98E-05 | 1.83E-05 | 3.03E-05 | 3.32E-05 | 1.68E-05 | 36104.24 | 16306.67 | 13994.39 | 15374.39 | 7263.16 | 26111.76 | 5975.75 | 30631.00 | 18752.96 | 31160.79 | 34112.09 | 17288.68 |
| | Thap Put | 0.000106 | 2.22E-05 | 2.47E-05 | 2.82E-05 | 1.37E-06 | 3.03E-05 | 1.59E-06 | 5.12E-05 | 2.71E-05 | 5E-05 | 7.21E-05 | 2.68E-05 | 31629.72 | 6630.63 | 7388.06 | 8436.45 | 408.67 | 9073.71 | 476.41 | 15330.39 | 8121.48 | 14956.48 | 21573.10 | 8028.53 |
| | Thai Mueang | 8.45E-05 | 1.72E-05 | 1.74E-05 | 2.27E-05 | 1.18E-06 | 2.63E-05 | 1.45E-06 | 4.08E-05 | 2E-05 | 5.08E-05 | 5.27E-05 | 1.86E-05 | 51632.79 | 10485.79 | 10638.35 | 13848.87 | 722.62 | 16076.25 | 888.64 | 24963.82 | 12200.59 | 31072.42 | 32207.38 | 11371.24 |
| PHUKET | Mueang Phuket | 7.14E-05 | 1.77E-05 | 1.82E-05 | 2.12E-05 | 9.83E-06 | 2.74E-05 | 9.65E-06 | 3.29E-05 | 2.42E-05 | 5.01E-05 | 4.07E-05 | 1.89E-05 | 12902.02 | 3202.16 | 3283.99 | 3833.92 | 1776.02 | 4946.99 | 1743.52 | 5946.36 | 4364.44 | 9048.08 | 7344.93 | 3419.43 |
| | Kathu | 0.00017 | 3.13E-05 | 3.23E-05 | 4.05E-05 | 1.28E-05 | 5.58E-05 | 1.25E-05 | 7.08E-05 | 4.89E-05 | 0.000117 | 9.16E-05 | 3.47E-05 | 13430.87 | 2474.80 | 2550.45 | 3202.45 | 1012.10 | 4409.09 | 985.17 | 5600.98 | 3863.83 | 9251.75 | 7240.69 | 2741.43 |
| | Thalang | 0.000116 | 1.28E-05 | 1.33E-05 | 1.99E-05 | 2.38E-06 | 3.09E-05 | 2.25E-06 | 4.3E-05 | 2.81E-05 | 8.13E-05 | 5.95E-05 | 1.62E-05 | 33615.65 | 3693.04 | 3835.16 | 5736.03 | 688.03 | 8920.07 | 650.13 | 12431.18 | 8119.13 | 23497.77 | 17202.52 | 4679.91 |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 6.42E-05 | 3.1E-05 | 2.23E-05 | 3.09E-05 | 1.02E-05 | 2.38E-05 | 1.11E-05 | 3.42E-05 | 1.98E-05 | 1.95E-05 | 3.67E-05 | 2.29E-05 | 35719.80 | 17282.47 | 12387.64 | 17209.77 | 5654.24 | 13234.13 | 6177.97 | 19033.23 | 11006.16 | 10874.70 | 20422.37 | 12730.70 |
| | Phrom Khiri | 0.000152 | 5.52E-05 | 2.88E-05 | 4.57E-05 | 1E-05 | 4.19E-05 | 1.21E-05 | 7.7E-05 | 4.23E-05 | 2.89E-05 | 7.21E-05 | 3.28E-05 | 37358.92 | 13609.45 | 7095.72 | 11274.95 | 2467.95 | 10331.75 | 2984.99 | 18981.43 | 10415.01 | 7118.85 | 17780.23 | 8089.72 |
| | Lan Saka | 0.000118 | 4.63E-05 | 2.95E-05 | 4.19E-05 | 8.17E-06 | 3.41E-05 | 1.06E-05 | 5.69E-05 | 3.34E-05 | 2.64E-05 | 6.21E-05 | 2.88E-05 | 40525.89 | 15944.01 | 10166.53 | 14427.60 | 2817.30 | 11739.87 | 3665.53 | 19602.81 | 11514.23 | 9106.40 | 21408.24 | 9938.81 |
| | Chawang | 9.26E-05 | 3E-05 | 1.71E-05 | 2.87E-05 | 3.67E-06 | 2.52E-05 | 4.66E-06 | 4.45E-05 | 2.81E-05 | 1.72E-05 | 5.58E-05 | 2.21E-05 | 40101.23 | 13012.01 | 7413.85 | 12417.43 | 1591.97 | 10910.95 | 2018.11 | 19275.78 | 12175.11 | 7458.92 | 24165.36 | 9560.23 |
| | Phipun | 9.46E-05 | 3.18E-05 | 1.74E-05 | 2.89E-05 | 5.37E-06 | 2.62E-05 | 6.39E-06 | 4.73E-05 | 2.82E-05 | 1.76E-05 | 5.5E-05 | 2.25E-05 | 46701.72 | 15710.59 | 8607.16 | 14287.73 | 2649.79 | 12917.28 | 3155.56 | 23359.68 | 13942.53 | 8686.35 | 27143.26 | 11102.78 |
| | Chian Yai | 6.33E-05 | 4.88E-05 | 3.24E-05 | 4.32E-05 | 1.96E-05 | 3.03E-05 | 1.89E-05 | 3.4E-05 | 2.21E-05 | 2.72E-05 | 3.75E-05 | 3.68E-05 | 20355.70 | 15689.10 | 10436.01 | 13909.13 | 6320.83 | 9753.23 | 6079.65 | 10948.21 | 7120.34 | 8745.36 | 12060.41 | 11840.25 |
| | Cha-uat | 4.86E-05 | 2.62E-05 | 2.03E-05 | 2.35E-05 | 6.18E-06 | 1.37E-05 | 7.22E-06 | 2.09E-05 | 1.36E-05 | 1.49E-05 | 2.57E-05 | 1.79E-05 | 36470.14 | 19699.93 | 15273.45 | 17645.82 | 4638.14 | 10252.79 | 5416.61 | 15665.38 | 10238.95 | 11164.57 | 19317.01 | 13403.24 |
| | Tha Sala | 9.64E-05 | 3.38E-05 | 2.06E-05 | 3.24E-05 | 8.98E-06 | 2.87E-05 | 9.91E-06 | 4.87E-05 | 2.84E-05 | 2.06E-05 | 5.79E-05 | 2.61E-05 | 40256.62 | 14139.33 | 8620.00 | 13529.33 | 3750.38 | 12001.29 | 4138.55 | 20350.88 | 11853.43 | 8606.28 | 24194.89 | 10900.68 |
| | Thung Song | 6.34E-05 | 2.47E-05 | 2.05E-05 | 2.4E-05 | 1.68E-06 | 1.61E-05 | 4.01E-06 | 2.51E-05 | 1.74E-05 | 1.53E-05 | 3.67E-05 | 1.44E-05 | 57711.50 | 22518.00 | 18692.70 | 21794.06 | 1524.81 | 14691.28 | 3647.54 | 22856.73 | 15830.80 | 13966.09 | 33408.78 | 13131.90 |
| | Na Bon | 0.000145 | 5.14E-05 | 3.67E-05 | 4.86E-05 | 4.04E-06 | 3.87E-05 | 6.99E-06 | 6.22E-05 | 4.2E-05 | 3.11E-05 | 8.35E-05 | 3.27E-05 | 30207.15 | 10688.43 | 7634.08 | 10099.56 | 839.88 | 8049.85 | 1453.04 | 12933.11 | 8717.36 | 6462.86 | 17347.48 | 6793.25 |
| | Thung Yai | 8.38E-05 | 2.67E-05 | 1.78E-05 | 2.56E-05 | 1.6E-06 | 2.29E-05 | 2.18E-06 | 3.63E-05 | 2.52E-05 | 1.7E-05 | 5E-05 | 1.9E-05 | 50352.86 | 16013.15 | 10697.00 | 15356.14 | 958.56 | 13775.22 | 1312.54 | 21800.44 | 15125.10 | 10195.45 | 30066.00 | 11407.31 |
| | Pak Phanang | 5.87E-05 | 3.93E-05 | 2.97E-05 | 3.95E-05 | 1.64E-05 | 2.79E-05 | 1.66E-05 | 3.33E-05 | 2.01E-05 | 2.49E-05 | 3.61E-05 | 3.12E-05 | 31138.30 | 20875.65 | 15750.25 | 20954.39 | 8689.70 | 14802.61 | 8819.43 | 17666.35 | 10659.23 | 13229.23 | 19167.53 | 16567.64 |
| | Ron Phibun | 7.66E-05 | 3.61E-05 | 2.85E-05 | 3.5E-05 | 6.85E-06 | 2.36E-05 | 9.45E-06 | 3.36E-05 | 2.19E-05 | 2.22E-05 | 4.52E-05 | 2.3E-05 | 32879.07 | 15520.39 | 12246.29 | 15010.25 | 2940.93 | 10115.69 | 4058.13 | 14449.57 | 9390.95 | 9523.19 | 19414.92 | 9892.58 |
| | Sichon | 4.37E-05 | 7.81E-06 | 4.3E-06 | 8.89E-06 | 3.21E-06 | 1E-05 | 2.8E-06 | 1.83E-05 | 1.28E-05 | 6.36E-06 | 3.84E-05 | 1.2E-05 | 30054.42 | 5366.94 | 2953.60 | 6114.39 | 2203.65 | 6897.36 | 1925.66 | 12604.09 | 8818.62 | 4372.48 | 26378.53 | 8257.58 |
| | Khanom | 6.01E-05 | 2.15E-05 | 1.76E-05 | 2.53E-05 | 1.4E-05 | 2.12E-05 | 1.21E-05 | 3.3E-05 | 2.71E-05 | 1.53E-05 | 7E-05 | 2.92E-05 | 18718.73 | 6679.01 | 5465.34 | 7874.07 | 4361.97 | 6598.24 | 3774.58 | 10280.90 | 8442.18 | 4758.71 | 21787.47 | 9077.48 |
| | Hua Sai | 6.66E-05 | 5.07E-05 | 3.45E-05 | 4.42E-05 | 1.99E-05 | 2.98E-05 | 1.9E-05 | 3.47E-05 | 2.25E-05 | 2.77E-05 | 3.8E-05 | 3.82E-05 | 29129.61 | 22174.30 | 15067.81 | 19317.29 | 8701.21 | 13051.67 | 8320.71 | 15177.40 | 9851.62 | 12113.37 | 16626.62 | 16711.11 |
| | Bang Khan | 9.16E-05 | 3.17E-05 | 2.7E-05 | 2.97E-05 | 1.73E-06 | 2.27E-05 | 2.9E-06 | 3.43E-05 | 2.64E-05 | 2E-05 | 4.72E-05 | 1.91E-05 | 43008.26 | 14866.97 | 12703.17 | 13930.76 | 811.01 | 10661.65 | 1362.67 | 16120.84 | 12387.06 | 9410.93 | 22177.86 | 8963.40 |
| | Tham Phannara | 0.000141 | 4.05E-05 | 2.21E-05 | 4.25E-05 | 3.28E-06 | 3.73E-05 | 3.98E-06 | 6.7E-05 | 4.46E-05 | 2.5E-05 | 9.29E-05 | 3.55E-05 | 24868.41 | 7137.73 | 3895.67 | 7504.56 | 579.37 | 6582.29 | 702.55 | 11820.32 | 7875.15 | 4404.29 | 16396.78 | 6257.77 |
| | Chulabhom | 0.000129 | 5.65E-05 | 4.75E-05 | 5.5E-05 | 6.16E-06 | 3.43E-05 | 1.19E-05 | 5.16E-05 | 3.48E-05 | 3.5E-05 | 7.67E-05 | 3.35E-05 | 29733.32 | 13027.57 | 10944.31 | 12666.56 | 1420.81 | 7899.53 | 2747.24 | 11898.43 | 8028.72 | 8068.44 | 17682.45 | 7728.89 |
| | Phra Phrom | 0.000134 | 6.53E-05 | 4.75E-05 | 6.32E-05 | 1.78E-05 | 4.67E-05 | 2.05E-05 | 6.66E-05 | 4.04E-05 | 3.99E-05 | 7.68E-05 | 4.52E-05 | 19709.03 | 9604.83 | 6981.98 | 9292.16 | 2621.31 | 6862.62 | 3018.70 | 9788.02 | 5941.42 | 5866.10 | 11288.85 | 6639.82 |
| | Nopphitam | 7.87E-05 | 2.57E-05 | 1.52E-05 | 2.48E-05 | 6.57E-06 | 2.28E-05 | 7.06E-06 | 4E-05 | 2.44E-05 | 1.53E-05 | 5.3E-05 | 2.14E-05 | 56819.83 | 18518.05 | 10936.80 | 17923.50 | 4742.96 | 16464.24 | 5095.52 | 28866.79 | 17605.70 | 11043.03 | 38285.42 | 15466.75 |
| | Chang Klang | 0.0001 | 3.63E-05 | 2.35E-05 | 3.36E-05 | 4.53E-06 | 2.77E-05 | 6.52E-06 | 4.63E-05 | 2.88E-05 | 2.11E-05 | 5.59E-05 | 2.32E-05 | 27331.70 | 9890.45 | 6399.51 | 9157.57 | 1234.89 | 7543.27 | 1778.75 | 12637.74 | 7853.19 | 5759.11 | 15245.13 | 6323.22 |
| | Chaloem Phra Kiat | 0.000123 | 7.75E-05 | 5.53E-05 | 7.16E-05 | 2.63E-05 | 4.95E-05 | 2.74E-05 | 6.22E-05 | 3.93E-05 | 4.54E-05 | 7.2E-05 | 5.65E-05 | 22288.06 | 14026.01 | 9995.29 | 12960.21 | 4763.50 | 8960.46 | 4964.62 | 11245.86 | 7105.01 | 8212.69 | 13023.72 | 10228.69 |

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 0.000111 | 6.53E-05 | 5.68E-05 | 7.44E-05 | 3.04E-05 | 6.37E-05 | 3.32E-05 | 9.26E-05 | 6.01E-05 | 4.47E-05 | 0.000135 | 6.6E-05 | 37067.94 | 21832.28 | 19011.94 | 24906.69 | 10178.45 | 21296.19 | 11092.11 | 30989.03 | 20116.08 | 14945.66 | 45197.71 | 22090.92 |
| | Kanchanadit | 4.23E-05 | 1.73E-05 | 1.36E-05 | 1.95E-05 | 8.37E-06 | 1.74E-05 | 8.82E-06 | 2.77E-05 | 1.92E-05 | 1.19E-05 | 4.67E-05 | 1.98E-05 | 45438.13 | 18562.97 | 14580.97 | 20938.16 | 9004.37 | 18661.37 | 9486.23 | 29790.63 | 20620.99 | 12848.00 | 50270.07 | 21238.56 |
| | Don Sak | 5.99E-05 | 2.32E-05 | 1.88E-05 | 2.72E-05 | 1.5E-05 | 2.25E-05 | 1.4E-05 | 3.62E-05 | 2.89E-05 | 1.66E-05 | 7.25E-05 | 3.07E-05 | 21787.88 | 8428.82 | 6838.79 | 9903.58 | 5437.41 | 8193.80 | 5074.18 | 13176.71 | 10523.81 | 6028.80 | 26366.27 | 11176.80 |
| | Ko Samui | 4.91E-05 | 3.4E-05 | 3.92E-05 | 3.69E-05 | 2.39E-05 | 3.33E-05 | 1.74E-05 | 3.74E-05 | 3.34E-05 | 2.27E-05 | 7.41E-05 | 4.35E-05 | 13514.19 | 9354.40 | 10791.61 | 10175.11 | 6571.08 | 9164.67 | 4788.69 | 10313.09 | 9192.07 | 6251.35 | 20423.23 | 11993.25 |
| | Ko Pha-ngan | 0.00011 | 8.48E-05 | 0.000128 | 8.57E-05 | 5.42E-05 | 0.000101 | 3.79E-05 | 0.000117 | 8.67E-05 | 6.23E-05 | 0.000187 | 0.000122 | 13436.80 | 10384.43 | 15697.56 | 10494.96 | 6641.06 | 12344.06 | 4639.12 | 14368.17 | 10617.86 | 7627.29 | 22928.53 | 14891.72 |
| | Chaiya | 6.11E-05 | 2.09E-05 | 1.36E-05 | 2.22E-05 | 9.59E-06 | 3.83E-05 | 1.54E-05 | 6.46E-05 | 3.77E-05 | 3.01E-05 | 7.64E-05 | 3.78E-05 | 40211.78 | 13750.25 | 8959.07 | 14625.52 | 6309.91 | 25186.84 | 10152.42 | 42519.05 | 24783.09 | 19821.73 | 50228.13 | 24883.51 |
| | Tha Chana | 5.88E-05 | 1.72E-05 | 1.46E-05 | 1.88E-05 | 7.9E-06 | 3.74E-05 | 1.24E-05 | 6.06E-05 | 3.44E-05 | 2.73E-05 | 7.22E-05 | 3.78E-05 | 59141.79 | 17319.71 | 14706.18 | 18892.34 | 7936.45 | 37617.97 | 12455.41 | 60937.52 | 34531.45 | 27391.26 | 72557.01 | 37973.56 |
| | Khiri Rat Nikhom | 9.08E-05 | 1.84E-05 | 1.67E-05 | 2.6E-05 | 3.59E-06 | 3.7E-05 | 5.56E-06 | 6.21E-05 | 3.09E-05 | 3.61E-05 | 7.23E-05 | 3.13E-05 | 69286.45 | 14044.41 | 12748.29 | 19809.29 | 2735.84 | 28240.33 | 4239.51 | 47373.92 | 23594.26 | 27531.03 | 55129.55 | 23854.15 |
| | Ban Ta Khun | 5.99E-05 | 1.13E-05 | 9.81E-06 | 1.5E-05 | 1.62E-06 | 2.47E-05 | 2.99E-06 | 4.21E-05 | 2.14E-05 | 2.68E-05 | 4.87E-05 | 2.11E-05 | 87178.95 | 16468.24 | 14268.97 | 21862.64 | 2350.31 | 35899.64 | 4352.60 | 61300.79 | 31158.56 | 38921.15 | 70780.11 | 30700.16 |
| | Phanom | 5.33E-05 | 1.06E-05 | 1.09E-05 | 1.39E-05 | 9.02E-07 | 1.72E-05 | 1.36E-06 | 3.23E-05 | 1.63E-05 | 2.31E-05 | 4.04E-05 | 1.54E-05 | 65024.06 | 12901.65 | 13346.08 | 16927.78 | 1100.35 | 20962.00 | 1654.72 | 39446.37 | 19844.14 | 28201.83 | 49232.51 | 18829.70 |
| | Tha Chang | 7.59E-05 | 1.86E-05 | 1.22E-05 | 2.3E-05 | 6.47E-06 | 4.11E-05 | 1.11E-05 | 6.68E-05 | 3.74E-05 | 3.35E-05 | 7.96E-05 | 3.84E-05 | 82801.94 | 20295.19 | 13324.52 | 25067.97 | 7060.47 | 44872.21 | 12104.77 | 72868.85 | 40867.72 | 36610.23 | 86894.70 | 41930.26 |
| | Ban Na San | 5.34E-05 | 2.14E-05 | 1.61E-05 | 2.39E-05 | 6.98E-06 | 2.04E-05 | 7.34E-06 | 3.25E-05 | 2.1E-05 | 1.4E-05 | 4.74E-05 | 2.06E-05 | 41006.37 | 16451.87 | 12384.82 | 18351.94 | 5366.63 | 15714.54 | 5640.06 | 24943.04 | 16123.59 | 10745.49 | 36407.27 | 15831.83 |
| | Ban Na Doem | 0.000133 | 7.18E-05 | 6.32E-05 | 8.34E-05 | 3.04E-05 | 6.83E-05 | 3.16E-05 | 9.85E-05 | 6.36E-05 | 4.78E-05 | 0.000146 | 6.97E-05 | 24827.90 | 13353.17 | 11758.29 | 15527.21 | 5662.35 | 12717.61 | 5878.83 | 18327.96 | 11835.06 | 8889.63 | 27190.14 | 12965.55 |
| | Khian Sa | 6.56E-05 | 1.97E-05 | 1.64E-05 | 2.34E-05 | 4.29E-06 | 2.22E-05 | 4.69E-06 | 3.74E-05 | 2.26E-05 | 1.92E-05 | 5.28E-05 | 2.21E-05 | 49360.57 | 14851.25 | 12325.10 | 17587.18 | 3227.33 | 16708.88 | 3526.48 | 28149.27 | 16976.68 | 14469.45 | 39721.02 | 16621.53 |
| | Wiang Sa | 7.16E-05 | 2.01E-05 | 1.05E-05 | 2.19E-05 | 2.07E-06 | 1.92E-05 | 2.28E-06 | 3.5E-05 | 2.33E-05 | 1.24E-05 | 4.93E-05 | 1.89E-05 | 27538.33 | 7742.98 | 4044.24 | 8412.36 | 795.75 | 7400.55 | 876.34 | 13457.49 | 8958.04 | 4770.95 | 18969.67 | 7274.06 |
| | Phrasaeng | 0.000122 | 3.24E-05 | 2.51E-05 | 3.66E-05 | 3.13E-06 | 3.37E-05 | 3.44E-06 | 5.98E-05 | 3.78E-05 | 3.01E-05 | 8.76E-05 | 3.44E-05 | 86587.97 | 22975.61 | 17784.43 | 25980.72 | 2222.51 | 23938.89 | 2437.34 | 42452.24 | 26820.35 | 21348.45 | 62161.20 | 24378.55 |
| | Phunphin | 4.35E-05 | 1.85E-05 | 1.6E-05 | 2.19E-05 | 7.36E-06 | 2.17E-05 | 8.45E-06 | 3.34E-05 | 2E-05 | 1.7E-05 | 4.5E-05 | 2.12E-05 | 41483.28 | 17689.52 | 15237.46 | 20914.28 | 7022.47 | 20699.75 | 8061.05 | 31842.55 | 19042.89 | 16217.50 | 42893.80 | 20216.22 |
| | Chai Buri | 0.000108 | 2.85E-05 | 2.46E-05 | 3.17E-05 | 2.18E-06 | 2.93E-05 | 2.3E-06 | 4.98E-05 | 3.16E-05 | 2.88E-05 | 7.5E-05 | 2.94E-05 | 50183.11 | 13292.50 | 11489.01 | 14804.96 | 1014.95 | 13675.23 | 1072.54 | 23253.53 | 14746.32 | 13445.77 | 34970.98 | 13708.65 |
| | Vibhavadi | 0.000124 | 2.53E-05 | 1.82E-05 | 3.36E-05 | 6.29E-06 | 5.98E-05 | 1.16E-05 | 9.76E-05 | 5.2E-05 | 5.37E-05 | 0.000114 | 5.3E-05 | 61626.38 | 12548.40 | 9048.73 | 16685.21 | 3119.36 | 29683.77 | 5764.03 | 48424.50 | 25811.20 | 26618.84 | 56509.03 | 26282.35 |
| RANONG | Mueang Ranong | 4.74E-05 | 1.26E-05 | 1.75E-05 | 1.3E-05 | 3.82E-06 | 3.58E-05 | 6.92E-06 | 4.76E-05 | 2.49E-05 | 2.18E-05 | 5.52E-05 | 3.78E-05 | 35257.51 | 9363.36 | 13031.08 | 9691.10 | 2841.01 | 26626.80 | 5140.03 | 35401.71 | 18490.91 | 16195.42 | 41038.68 | 28122.87 |
| | La-un | 5.49E-05 | 9.27E-06 | 3.05E-05 | 1.15E-05 | 3.56E-06 | 3.56E-05 | 7.39E-06 | 5.94E-05 | 2.97E-05 | 1.88E-05 | 7.72E-05 | 4.64E-05 | 30384.38 | 5130.29 | 16889.24 | 6356.53 | 1969.09 | 19692.58 | 4091.75 | 32898.30 | 16412.72 | 10395.37 | 42712.70 | 25662.08 |
| | Kapoe | 7.27E-05 | 1.79E-05 | 1.37E-05 | 1.98E-05 | 5.18E-06 | 4.63E-05 | 9.28E-06 | 5.96E-05 | 3.5E-05 | 3.21E-05 | 7.3E-05 | 4.45E-05 | 37621.00 | 9248.89 | 7086.08 | 10244.84 | 2679.28 | 23987.93 | 4801.95 | 30861.82 | 18106.26 | 16602.15 | 37793.94 | 23026.15 |
| | Kra Buri | 4.86E-05 | 3.7E-06 | 5.68E-05 | 6.71E-06 | 2.3E-06 | 3.27E-05 | 7.66E-06 | 6.48E-05 | 2.95E-05 | 1.15E-05 | 9.57E-05 | 5.35E-05 | 46504.64 | 3537.37 | 54364.85 | 6416.39 | 2198.94 | 31295.44 | 7325.85 | 61992.06 | 28197.15 | 10956.50 | 91548.95 | 51216.58 |
| | Suk Samran | 7.68E-05 | 2.29E-05 | 1.65E-05 | 2.37E-05 | 7.36E-06 | 4.96E-05 | 1.13E-05 | 5.56E-05 | 3.65E-05 | 3.37E-05 | 7.42E-05 | 4.71E-05 | 34806.57 | 10362.43 | 7469.68 | 10752.45 | 3338.65 | 22488.44 | 5130.85 | 25205.44 | 16558.65 | 15276.04 | 33656.80 | 21341.37 |

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 4.86E-05 | 1.25E-05 | 7.76E-05 | 1.35E-05 | 8.13E-06 | 3.69E-05 | 1.39E-05 | 6.63E-05 | 3.32E-05 | 1.97E-05 | 9.1E-05 | 5.63E-05 | 38725.05 | 9981.74 | 61847.21 | 10790.10 | 6481.23 | 29408.98 | 11041.80 | 52822.71 | 26425.90 | 15711.13 | 72513.19 | 44885.75 |
| | Tha Sae | 2.56E-05 | 2.37E-06 | 5.24E-05 | 2.65E-06 | 1.62E-06 | 1.85E-05 | 3.96E-06 | 4E-05 | 1.74E-05 | 6.06E-06 | 6.06E-05 | 3.45E-05 | 37792.47 | 3495.30 | 77412.54 | 3921.02 | 2398.25 | 27339.17 | 5848.55 | 59163.62 | 25679.46 | 8956.81 | 89592.17 | 50991.24 |
| | Pathio | 3.23E-05 | 2.44E-06 | 8.49E-05 | 2.42E-06 | 1.86E-06 | 2.35E-05 | 3.34E-06 | 5.58E-05 | 2.26E-05 | 7.32E-06 | 8.44E-05 | 4.77E-05 | 24632.84 | 1861.34 | 64659.11 | 1840.29 | 1414.86 | 17899.16 | 2545.86 | 42514.00 | 17204.89 | 5579.38 | 64283.89 | 36368.43 |
| | Lang Suan | 4.41E-05 | 1.27E-05 | 2.56E-05 | 1.37E-05 | 7.33E-06 | 3.1E-05 | 9.62E-06 | 4.97E-05 | 2.63E-05 | 1.82E-05 | 6.17E-05 | 3.58E-05 | 25879.72 | 7451.12 | 15012.77 | 8070.19 | 4305.17 | 18202.21 | 5649.33 | 29172.88 | 15447.01 | 10685.66 | 36225.42 | 21040.27 |
| | Lamae | 6.33E-05 | 1.86E-05 | 2.57E-05 | 2E-05 | 9.78E-06 | 4.33E-05 | 1.35E-05 | 6.92E-05 | 3.75E-05 | 2.76E-05 | 8.35E-05 | 4.7E-05 | 23328.89 | 6858.22 | 9475.14 | 7348.81 | 3603.74 | 15949.04 | 4972.42 | 25475.84 | 13828.04 | 10169.73 | 30766.95 | 17298.66 |
| | Phato | 3.89E-05 | 6.79E-06 | 1.05E-05 | 8.13E-06 | 1.89E-06 | 2.34E-05 | 4.14E-06 | 3.68E-05 | 1.96E-05 | 1.42E-05 | 4.59E-05 | 2.76E-05 | 34087.47 | 5949.91 | 9223.36 | 7120.93 | 1655.68 | 20529.69 | 3628.74 | 32273.39 | 17141.26 | 12411.85 | 40232.10 | 24202.59 |
| | Sawi | 3.63E-05 | 8.08E-06 | 4.04E-05 | 9.54E-06 | 4.99E-06 | 2.6E-05 | 8.44E-06 | 4.56E-05 | 2.27E-05 | 1.34E-05 | 6.16E-05 | 3.69E-05 | 30439.88 | 6780.48 | 33901.65 | 8003.33 | 4187.22 | 21796.54 | 7081.54 | 38213.70 | 19005.41 | 11233.99 | 51680.04 | 30912.72 |
| | Thung Tako | 6.5E-05 | 1.9E-05 | 5.52E-05 | 2.06E-05 | 1.15E-05 | 4.78E-05 | 1.59E-05 | 7.71E-05 | 4.02E-05 | 2.73E-05 | 9.82E-05 | 5.93E-05 | 18794.89 | 5487.03 | 15961.45 | 5951.00 | 3312.17 | 13812.08 | 4595.62 | 22292.53 | 11630.20 | 7902.19 | 28391.90 | 17137.17 |
| SONGKHLA | Mueang Songkhla | 1.62E-05 | 1.97E-05 | 4.56E-05 | 2.88E-05 | 1.21E-05 | 6.73E-06 | 1.87E-05 | 1.1E-05 | 1.14E-05 | 3.36E-05 | 3.71E-05 | 6.27E-05 | 3302.59 | 4024.65 | 9318.14 | 5888.85 | 2474.40 | 1373.94 | 3826.46 | 2253.39 | 2320.23 | 6873.01 | 7586.81 | 12798.59 |
| | Sathing Phra | 0.000106 | 7.03E-05 | 7.86E-05 | 6.16E-05 | 2.64E-05 | 2.69E-05 | 2.59E-05 | 4.71E-05 | 2.96E-05 | 6.61E-05 | 6.96E-05 | 8.07E-05 | 21088.09 | 13959.07 | 15610.28 | 12236.14 | 5242.14 | 5342.13 | 5138.35 | 9350.92 | 5887.38 | 13139.58 | 13820.59 | 16028.90 |
| | Chana | 4.32E-05 | 2.31E-05 | 3.7E-05 | 2.18E-05 | 5.74E-06 | 5.24E-06 | 4.2E-06 | 8.5E-06 | 1.22E-05 | 9.7E-06 | 1.11E-05 | 2.1E-05 | 27233.25 | 14536.19 | 23300.95 | 13753.21 | 3614.90 | 3299.15 | 2647.30 | 5352.99 | 7694.44 | 6111.67 | 6972.59 | 13228.98 |
| | Na Thawi | 5.41E-05 | 2.65E-05 | 4.11E-05 | 2.27E-05 | 4.76E-06 | 5.61E-06 | 1.73E-06 | 9.54E-06 | 1.4E-05 | 4.75E-06 | 7.85E-06 | 1.46E-05 | 42131.92 | 20649.59 | 31963.28 | 17641.15 | 3703.06 | 4365.49 | 1343.15 | 7428.42 | 10873.04 | 3694.65 | 6113.60 | 11378.15 |
| | Thepha | 4.37E-05 | 2.58E-05 | 4.8E-05 | 2.96E-05 | 8.84E-06 | 6.59E-06 | 7.17E-06 | 9.7E-06 | 1.64E-05 | 9.27E-06 | 1.04E-05 | 2.22E-05 | 28923.19 | 17116.16 | 31790.75 | 19597.22 | 5856.05 | 4365.11 | 4752.61 | 6427.61 | 10853.71 | 6141.37 | 6913.45 | 14724.53 |
| | Saba Yoi | 3.52E-05 | 1.89E-05 | 3.77E-05 | 1.96E-05 | 5.17E-06 | 4.69E-06 | 3.8E-06 | 7.45E-06 | 1.25E-05 | 6.15E-06 | 7.76E-06 | 1.28E-05 | 33278.90 | 17856.32 | 35658.33 | 18509.64 | 4887.65 | 4434.43 | 3597.07 | 7049.90 | 11801.64 | 5818.01 | 7343.11 | 12118.26 |
| | Ranot | 7.63E-05 | 4.41E-05 | 3.51E-05 | 3.49E-05 | 1.13E-05 | 1.64E-05 | 1.18E-05 | 3.25E-05 | 1.82E-05 | 2.49E-05 | 3.34E-05 | 3.5E-05 | 33715.02 | 19465.11 | 15498.69 | 15433.57 | 5006.89 | 7245.87 | 5208.94 | 14364.38 | 8040.85 | 10994.11 | 14757.74 | 15464.89 |
| | Krasae Sin | 8.47E-05 | 4.11E-05 | 3.45E-05 | 2.96E-05 | 5.89E-06 | 8.73E-06 | 7.96E-06 | 3.35E-05 | 1.53E-05 | 2.72E-05 | 3.18E-05 | 3.72E-05 | 26153.07 | 12682.49 | 10657.56 | 9137.40 | 1818.80 | 2693.31 | 2458.56 | 10330.31 | 4724.33 | 8393.41 | 9810.35 | 11480.33 |
| | Rattaphum | 2.44E-06 | 1.4E-06 | 1.34E-05 | 4.18E-06 | 3.13E-06 | 2.05E-06 | 3.4E-06 | 2.22E-06 | 2.09E-06 | 3.3E-05 | 1.96E-05 | 2.21E-05 | 1623.07 | 933.48 | 8910.45 | 2780.05 | 2078.91 | 1364.63 | 2259.09 | 1475.67 | 1391.85 | 21942.90 | 13055.34 | 14678.19 |
| | Sadao | 2.93E-05 | 1.38E-05 | 2.79E-05 | 1.33E-05 | 3.76E-06 | 3.74E-06 | 2.16E-06 | 6.38E-06 | 8.9E-06 | 1.64E-05 | 1.29E-05 | 1.8E-05 | 30271.01 | 14221.02 | 28899.39 | 13748.52 | 3888.91 | 3868.06 | 2230.19 | 6600.26 | 9200.42 | 16916.06 | 13376.73 | 18584.18 |
| | Hat Yai | 1.75E-05 | 1.02E-05 | 2.4E-05 | 1.17E-05 | 4.74E-06 | 3.5E-06 | 4.67E-06 | 5E-06 | 6.25E-06 | 2.44E-05 | 1.8E-05 | 2.49E-05 | 13836.46 | 8091.05 | 18982.49 | 9312.04 | 3760.51 | 2773.04 | 3703.95 | 3966.19 | 4955.30 | 19377.45 | 14234.07 | 19715.65 |
| | Na Mom | 5.3E-05 | 2.99E-05 | 5.49E-05 | 3.11E-05 | 9.65E-06 | 7.64E-06 | 8.97E-06 | 1.21E-05 | 1.67E-05 | 2.88E-05 | 2.56E-05 | 4.24E-05 | 7504.07 | 4233.68 | 7781.44 | 4409.39 | 1367.13 | 1082.23 | 1271.32 | 1719.82 | 2367.89 | 4080.90 | 3623.81 | 6007.69 |
| | Khuan Niang | 1.42E-05 | 9.7E-06 | 3E-05 | 1.38E-05 | 7.32E-06 | 5.32E-06 | 8.5E-06 | 7.85E-06 | 6.49E-06 | 5.33E-05 | 3.49E-05 | 4.12E-05 | 3525.99 | 2405.41 | 7452.12 | 3418.16 | 1815.66 | 1320.56 | 2108.42 | 1948.53 | 1609.83 | 13232.22 | 8655.51 | 10215.55 |
| | Bang Klam | 2.37E-05 | 1.47E-05 | 4.21E-05 | 1.94E-05 | 9.05E-06 | 6.35E-06 | 1.03E-05 | 9.52E-06 | 9.7E-06 | 6.11E-05 | 4.15E-05 | 5.27E-05 | 3432.17 | 2125.65 | 6093.29 | 2813.71 | 1310.02 | 919.88 | 1487.17 | 1378.98 | 1403.92 | 8845.54 | 6011.42 | 7622.52 |
| | Singhanakhon | 3.24E-05 | 2.78E-05 | 5.09E-05 | 3.26E-05 | 1.5E-05 | 1.12E-05 | 1.84E-05 | 1.71E-05 | 1.41E-05 | 4.93E-05 | 4.56E-05 | 6.3E-05 | 7843.77 | 6717.50 | 12305.01 | 7886.61 | 3631.31 | 2718.54 | 4459.06 | 4137.32 | 3418.38 | 11928.69 | 11018.25 | 15234.80 |
| | Khlong Hoi Khong | 1.63E-05 | 8.09E-06 | 2.67E-05 | 1.05E-05 | 5.07E-06 | 3.45E-06 | 4.37E-06 | 5E-06 | 6.64E-06 | 3.62E-05 | 2.38E-05 | 3.11E-05 | 4930.62 | 2450.11 | 8079.21 | 3169.53 | 1535.66 | 1045.74 | 1322.74 | 1513.93 | 2011.43 | 10974.60 | 7217.57 | 9433.63 |

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%*q* (g/s-m$^2$) | | | | | | | | | | | | 50%*q* (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 1.1E-05 | 5.2E-06 | 1.82E-05 | 8.76E-06 | 3.77E-06 | 3.66E-06 | 3.71E-06 | 4.64E-06 | 6.05E-06 | 2.87E-05 | 1.97E-05 | 3.08E-05 | 10740.60 | 5074.45 | 17763.32 | 8537.81 | 3676.36 | 3570.53 | 3613.05 | 4529.02 | 5904.16 | 27979.97 | 19236.19 | 30070.96 |
| | Khuan Don | 8.58E-06 | 3.61E-06 | 3.75E-05 | 1.06E-05 | 8.28E-06 | 4.45E-06 | 7.5E-06 | 5.8E-06 | 7.61E-06 | 7.47E-05 | 4.72E-05 | 6.1E-05 | 1893.85 | 797.11 | 8270.08 | 2347.71 | 1828.06 | 982.39 | 1655.57 | 1280.75 | 1679.63 | 16499.72 | 10412.94 | 13469.65 |
| | Khuan Kalong | 6.6E-06 | 3.53E-06 | 2.69E-05 | 8.97E-06 | 6.35E-06 | 3.72E-06 | 6.55E-06 | 4.47E-06 | 4.93E-06 | 5.9E-05 | 3.89E-05 | 5.21E-05 | 3509.15 | 1878.81 | 14324.00 | 4772.21 | 3376.37 | 1979.43 | 3485.74 | 2378.27 | 2622.97 | 31400.75 | 20693.47 | 27713.27 |
| | Tha Phae | 5.43E-06 | 3.4E-06 | 2.41E-05 | 9.77E-06 | 5.95E-06 | 3.54E-06 | 6.23E-06 | 4.06E-06 | 4.67E-06 | 5.41E-05 | 3.55E-05 | 6.25E-05 | 1222.43 | 765.86 | 5412.43 | 2197.08 | 1337.85 | 797.30 | 1400.52 | 912.80 | 1051.23 | 12172.95 | 7976.64 | 14064.99 |
| | La-ngu | 1.61E-06 | 1.76E-06 | 1.43E-05 | 6.01E-06 | 4.04E-06 | 2.25E-06 | 4.84E-06 | 2.43E-06 | 2.18E-06 | 3.68E-05 | 2.67E-05 | 4.33E-05 | 638.07 | 698.18 | 5659.66 | 2382.32 | 1601.53 | 889.78 | 1918.52 | 962.13 | 865.09 | 14589.36 | 10563.63 | 17137.41 |
| | Thung Wa | 2.91E-06 | 2.13E-06 | 1.41E-05 | 5.56E-06 | 4.09E-06 | 2.32E-06 | 5.43E-06 | 3.02E-06 | 2.3E-06 | 3.67E-05 | 3.05E-05 | 3.79E-05 | 1340.27 | 982.04 | 6494.75 | 2561.25 | 1886.57 | 1071.64 | 2503.35 | 1392.95 | 1058.81 | 16912.87 | 14067.47 | 17462.43 |
| | Manang | 5.44E-06 | 3.52E-06 | 2.59E-05 | 9.69E-06 | 6.85E-06 | 3.92E-06 | 8.26E-06 | 4.92E-06 | 4.35E-06 | 6.42E-05 | 4.74E-05 | 6.27E-05 | 1141.77 | 739.30 | 5439.27 | 2035.49 | 1439.41 | 823.24 | 1734.23 | 1034.19 | 914.73 | 13477.26 | 9960.60 | 13178.85 |
| TRANG | Mueang Trang | 6.98E-05 | 2.57E-05 | 2.91E-05 | 2.37E-05 | 2.25E-06 | 6.66E-06 | 3.52E-06 | 2.17E-05 | 1.83E-05 | 1.95E-05 | 2.88E-05 | 1.94E-05 | 30719.00 | 11304.83 | 12796.33 | 10415.47 | 989.00 | 2930.61 | 1546.55 | 9563.28 | 8031.16 | 8574.91 | 12660.77 | 8543.64 |
| | Kantang | 3.39E-05 | 1.15E-05 | 1.93E-05 | 1.34E-05 | 3.36E-06 | 6.51E-06 | 4.26E-06 | 1.28E-05 | 1.03E-05 | 3.31E-05 | 3.02E-05 | 2.95E-05 | 21969.16 | 7463.61 | 12482.58 | 8671.79 | 2175.37 | 4212.59 | 2757.14 | 8280.21 | 6682.03 | 21416.37 | 19570.44 | 19104.78 |
| | Yan Ta Khao | 4.09E-05 | 1.61E-05 | 2.35E-05 | 1.61E-05 | 3.43E-06 | 4.09E-06 | 5.03E-06 | 1.43E-05 | 1.1E-05 | 3.05E-05 | 3.25E-05 | 3.08E-05 | 18114.44 | 7138.39 | 10407.44 | 7123.65 | 1518.74 | 1811.85 | 2232.20 | 6325.57 | 4860.63 | 13543.23 | 14406.21 | 13674.11 |
| | Palian | 7.57E-06 | 3.8E-06 | 1.36E-05 | 6.29E-06 | 3.67E-06 | 2.36E-06 | 5.15E-06 | 4.27E-06 | 3.11E-06 | 3.19E-05 | 2.93E-05 | 3.37E-05 | 6158.88 | 3095.35 | 11073.36 | 5120.81 | 2989.85 | 1923.76 | 4194.18 | 3472.61 | 2532.37 | 25950.73 | 23868.15 | 27428.56 |
| | Sikao | 9.85E-05 | 2.72E-05 | 3.97E-05 | 2.92E-05 | 3.54E-06 | 2.1E-05 | 2.6E-06 | 2.71E-05 | 2.92E-05 | 3.13E-05 | 3.33E-05 | 2.45E-05 | 45454.14 | 12557.93 | 18328.97 | 13478.77 | 1633.21 | 9707.43 | 1200.96 | 12501.48 | 13470.57 | 14454.14 | 15365.91 | 11324.97 |
| | Huai Yot | 7.41E-05 | 2.69E-05 | 2.77E-05 | 2.48E-05 | 1.86E-06 | 1.1E-05 | 3.11E-06 | 2.41E-05 | 1.98E-05 | 1.67E-05 | 3.04E-05 | 1.61E-05 | 57289.52 | 20778.86 | 21461.30 | 19221.00 | 1439.46 | 8540.21 | 2404.08 | 18636.66 | 15313.63 | 12898.75 | 23512.15 | 12476.98 |
| | Wang Wiset | 0.000104 | 3.15E-05 | 3.84E-05 | 3.16E-05 | 2.92E-06 | 2.22E-05 | 2.64E-06 | 3.13E-05 | 3.02E-05 | 2.7E-05 | 3.82E-05 | 2.21E-05 | 52123.21 | 15763.28 | 19240.56 | 15845.33 | 1465.60 | 11108.39 | 1325.55 | 15674.44 | 15124.32 | 13508.29 | 19144.89 | 11086.51 |
| | Na Yong | 0.000101 | 4E-05 | 4.22E-05 | 3.49E-05 | 2.95E-06 | 5.2E-06 | 5.34E-06 | 3.21E-05 | 2.51E-05 | 2.39E-05 | 3.96E-05 | 2.63E-05 | 24966.36 | 9851.20 | 10392.46 | 8592.99 | 727.70 | 1280.53 | 1316.56 | 7898.16 | 6194.62 | 5876.50 | 9760.68 | 6479.18 |
| | Ratsada | 0.000117 | 4.62E-05 | 4.19E-05 | 4.41E-05 | 3.62E-06 | 2.57E-05 | 7.28E-06 | 4.27E-05 | 3.17E-05 | 2.8E-05 | 6.05E-05 | 2.65E-05 | 25650.85 | 10133.17 | 9205.59 | 9685.03 | 794.38 | 5633.30 | 1598.45 | 9377.93 | 6956.44 | 6153.41 | 13280.61 | 5808.30 |
| | Hat Samran | 3.25E-05 | 1.38E-05 | 3.96E-05 | 2.14E-05 | 1.03E-05 | 8.77E-06 | 1.42E-05 | 1.74E-05 | 1.22E-05 | 9.55E-05 | 8.49E-05 | 9.71E-05 | 5962.07 | 2533.32 | 7250.85 | 3930.18 | 1894.74 | 1607.78 | 2604.64 | 3195.45 | 2235.34 | 17492.39 | 15550.57 | 17795.14 |
| PHATTHALUNG | Mueang Phatthalung | 4.9E-05 | 2.23E-05 | 1.93E-05 | 1.64E-05 | 2.5E-06 | 4.29E-06 | 4.02E-06 | 1.88E-05 | 9.13E-06 | 1.69E-05 | 1.96E-05 | 2.1E-05 | 23753.20 | 10806.94 | 9340.35 | 7959.33 | 1209.83 | 2080.12 | 1949.03 | 9113.20 | 4425.41 | 8167.32 | 9481.84 | 10171.75 |
| | Kong Ra | 5.12E-05 | 2.17E-05 | 3.07E-05 | 2.03E-05 | 4.61E-06 | 4.91E-06 | 6.8E-06 | 1.89E-05 | 1.26E-05 | 4.22E-05 | 4.11E-05 | 4.06E-05 | 15627.74 | 6617.74 | 9349.47 | 6202.22 | 1406.83 | 1498.71 | 2073.87 | 5772.95 | 3832.41 | 12861.80 | 12527.51 | 12392.76 |
| | Khao Chaison | 3.59E-05 | 1.66E-05 | 1.82E-05 | 1.32E-05 | 2.92E-06 | 3.51E-06 | 4.03E-06 | 1.4E-05 | 7.22E-06 | 2.1E-05 | 2.01E-05 | 2.16E-05 | 12066.45 | 5587.10 | 6102.14 | 4436.58 | 979.19 | 1180.10 | 1351.92 | 4699.54 | 2422.99 | 7050.24 | 6739.82 | 7265.59 |
| | Tamot | 1.85E-05 | 8.27E-06 | 2.23E-05 | 1.03E-05 | 4.58E-06 | 3.43E-06 | 5.88E-06 | 8.45E-06 | 5.63E-06 | 4.7E-05 | 3.47E-05 | 3.74E-05 | 5119.73 | 2288.58 | 6180.88 | 2857.36 | 1266.42 | 948.58 | 1627.75 | 2338.52 | 1556.74 | 12997.03 | 9611.76 | 10340.81 |
| | Khuan Khanun | 5.12E-05 | 2.52E-05 | 2.09E-05 | 2.04E-05 | 4.25E-06 | 7.86E-06 | 5.42E-06 | 2E-05 | 1.18E-05 | 1.49E-05 | 2.18E-05 | 1.91E-05 | 27695.38 | 13630.33 | 11304.87 | 11001.43 | 2298.24 | 4246.65 | 2929.72 | 10824.08 | 6367.57 | 8046.92 | 11758.00 | 10300.73 |
| | Pak Phayun | 2.24E-05 | 1.34E-05 | 2.3E-05 | 1.35E-05 | 6.07E-06 | 5.41E-06 | 6.65E-06 | 1.05E-05 | 6.56E-06 | 3.54E-05 | 2.63E-05 | 2.95E-05 | 10834.77 | 6459.97 | 11120.09 | 6532.65 | 2931.16 | 2613.77 | 3214.27 | 5095.14 | 3167.66 | 17126.18 | 12724.13 | 14234.18 |
| | Si Banphot | 0.000106 | 4.39E-05 | 4.31E-05 | 3.76E-05 | 3.57E-06 | 7.3E-06 | 6.22E-06 | 3.51E-05 | 2.6E-05 | 2.29E-05 | 4.11E-05 | 2.65E-05 | 25549.05 | 10531.03 | 10332.11 | 9033.33 | 856.41 | 1752.09 | 1492.72 | 8411.79 | 6248.68 | 5490.23 | 9856.62 | 6347.80 |
| | Pa Bon | 5.22E-06 | 2.52E-06 | 1.42E-05 | 4.98E-06 | 3.22E-06 | 2.3E-06 | 3.7E-06 | 3.42E-06 | 2.5E-06 | 3.54E-05 | 2.18E-05 | 2.35E-05 | 2532.07 | 1222.32 | 6889.18 | 2415.87 | 1562.74 | 1117.94 | 1797.68 | 1659.55 | 1214.29 | 17181.81 | 10594.49 | 11387.08 |
| | Bang Kaeo | 4.77E-05 | 2.29E-05 | 3.05E-05 | 1.99E-05 | 5.76E-06 | 5.97E-06 | 7.3E-06 | 1.94E-05 | 1.06E-05 | 4.25E-05 | 3.52E-05 | 3.8E-05 | 7388.13 | 3551.38 | 4734.27 | 3079.38 | 892.67 | 925.00 | 1131.86 | 3005.28 | 1639.80 | 6585.60 | 5451.94 | 5887.09 |
| | Pa Phayom | 0.000101 | 4.4E-05 | 3.99E-05 | 3.88E-05 | 5.22E-06 | 1.49E-05 | 7.82E-06 | 3.6E-05 | 2.56E-05 | 2.38E-05 | 4.36E-05 | 2.68E-05 | 30520.00 | 13303.39 | 12046.10 | 11713.97 | 1576.69 | 4492.24 | 2362.06 | 10881.41 | 7747.98 | 7183.46 | 13170.61 | 8108.36 |
| | Srinagarindra | 7.67E-05 | 3.12E-05 | 3.33E-05 | 2.69E-05 | 2.8E-06 | 4.81E-06 | 5.06E-06 | 2.56E-05 | 1.82E-05 | 2.49E-05 | 3.48E-05 | 2.64E-05 | 19376.87 | 7871.98 | 8420.70 | 6783.29 | 706.19 | 1215.01 | 1278.60 | 6471.10 | 4605.99 | 6286.83 | 8777.22 | 6665.80 |

**Table G-1** Fifty percent of $NO_x$ maximum emission load from box model for the Southern Region of each month in 2010 (Cont.)

| Province | District | 50%q (g/s-m$^2$) | | | | | | | | | | | | 50%q (g/s) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 0.000107 | 7.74E-05 | 0.000152 | 9.52E-05 | 3.55E-05 | 2.21E-05 | 3.1E-05 | 2.61E-05 | 5.19E-05 | 3.1E-05 | 2.99E-05 | 6.67E-05 | 10118.01 | 7297.98 | 14290.89 | 8974.08 | 3341.08 | 2085.25 | 2920.08 | 2461.44 | 4890.22 | 2918.63 | 2819.81 | 6288.02 |
| | Khok Pho | 6.9E-05 | 4.91E-05 | 0.000103 | 6.86E-05 | 2.37E-05 | 1.43E-05 | 2.12E-05 | 1.86E-05 | 3.55E-05 | 2.31E-05 | 2.11E-05 | 5E-05 | 20878.58 | 14843.63 | 31131.70 | 20756.51 | 7154.03 | 4336.94 | 6397.26 | 5637.29 | 10739.78 | 6999.62 | 6383.98 | 15114.91 |
| | Nong Chik | 9.69E-05 | 6.94E-05 | 0.000143 | 9.49E-05 | 3.32E-05 | 2.02E-05 | 2.96E-05 | 2.58E-05 | 4.93E-05 | 3.18E-05 | 2.94E-05 | 6.92E-05 | 23019.06 | 16480.20 | 33935.19 | 22528.97 | 7885.46 | 4790.93 | 7040.54 | 6120.67 | 11705.59 | 7559.73 | 6979.42 | 16442.45 |
| | Panare | 9.67E-05 | 9.11E-05 | 0.000141 | 8.49E-05 | 4.5E-05 | 2.62E-05 | 3.77E-05 | 1.91E-05 | 4.75E-05 | 2.19E-05 | 2.37E-05 | 5.12E-05 | 13900.09 | 13091.09 | 20339.36 | 12202.50 | 6469.21 | 3765.61 | 5422.44 | 2740.05 | 6831.59 | 3144.92 | 3401.46 | 7363.14 |
| | Mayo | 6.35E-05 | 5.17E-05 | 9.03E-05 | 5.21E-05 | 2.4E-05 | 1.47E-05 | 2.02E-05 | 1.32E-05 | 3E-05 | 1.52E-05 | 1.6E-05 | 3.27E-05 | 12833.25 | 10447.02 | 18252.45 | 10523.92 | 4841.29 | 2977.18 | 4088.86 | 2677.75 | 6068.67 | 3077.80 | 3236.04 | 6600.70 |
| | Thung Yang Daeng | 5.78E-05 | 4.89E-05 | 8.44E-05 | 4.66E-05 | 2.28E-05 | 1.41E-05 | 1.89E-05 | 1.15E-05 | 2.71E-05 | 1.34E-05 | 1.45E-05 | 2.82E-05 | 8042.02 | 6804.64 | 11748.86 | 6487.91 | 3180.50 | 1958.88 | 2638.05 | 1599.41 | 3776.61 | 1871.64 | 2016.83 | 3926.87 |
| | Sai Buri | 7.82E-05 | 7.52E-05 | 0.000114 | 6.9E-05 | 3.74E-05 | 2.16E-05 | 3.14E-05 | 1.52E-05 | 3.86E-05 | 1.72E-05 | 1.89E-05 | 4.11E-05 | 15946.71 | 15339.98 | 23321.53 | 14065.69 | 7625.31 | 4400.87 | 6394.54 | 3091.17 | 7863.26 | 3508.50 | 3846.93 | 8388.13 |
| | Mai Kaen | 0.000215 | 0.000189 | 0.000324 | 0.000172 | 8.89E-05 | 5.51E-05 | 7.09E-05 | 4.05E-05 | 9.78E-05 | 4.81E-05 | 5.33E-05 | 0.000101 | 12474.68 | 10973.77 | 18790.70 | 9970.81 | 5163.15 | 3199.57 | 4119.00 | 2351.56 | 5681.07 | 2791.75 | 3092.99 | 5841.15 |
| | Yaring | 6.65E-05 | 5.35E-05 | 9.33E-05 | 5.53E-05 | 2.47E-05 | 1.52E-05 | 2.1E-05 | 1.42E-05 | 3.15E-05 | 1.61E-05 | 1.68E-05 | 3.54E-05 | 14385.66 | 11563.49 | 20176.62 | 11964.45 | 5351.38 | 3277.32 | 4548.06 | 3068.70 | 6807.49 | 3487.97 | 3632.24 | 7650.28 |
| | Yarang | 9.82E-05 | 6.98E-05 | 0.000137 | 7.98E-05 | 3.07E-05 | 1.98E-05 | 2.65E-05 | 2.24E-05 | 4.6E-05 | 2.6E-05 | 2.6E-05 | 5.34E-05 | 21436.98 | 15236.36 | 29842.75 | 17431.64 | 6700.50 | 4318.74 | 5785.47 | 4883.11 | 10043.25 | 5680.32 | 5675.52 | 11667.46 |
| | Kapho | 0.000139 | 0.000121 | 0.000205 | 0.000112 | 5.7E-05 | 3.48E-05 | 4.69E-05 | 2.66E-05 | 6.47E-05 | 3.07E-05 | 3.41E-05 | 6.58E-05 | 11496.33 | 10031.99 | 16938.07 | 9254.86 | 4718.49 | 2877.85 | 3876.90 | 2203.70 | 5350.07 | 2541.75 | 2823.45 | 5441.29 |
| | Mae Lan | 0.00012 | 8.39E-05 | 0.000172 | 0.000108 | 3.83E-05 | 2.42E-05 | 3.38E-05 | 3.02E-05 | 5.9E-05 | 3.65E-05 | 3.44E-05 | 7.64E-05 | 9398.73 | 6550.05 | 13469.63 | 8438.23 | 2992.80 | 1887.57 | 2639.08 | 2355.73 | 4608.39 | 2846.83 | 2686.54 | 5964.16 |
| YALA | Mueang Yala | 6.83E-05 | 4.24E-05 | 9.03E-05 | 4.72E-05 | 1.64E-05 | 1.2E-05 | 1.42E-05 | 1.51E-05 | 3.04E-05 | 1.76E-05 | 1.77E-05 | 3.16E-05 | 21826.25 | 13546.45 | 28854.64 | 15080.60 | 5229.57 | 3831.32 | 4537.27 | 4842.06 | 9730.06 | 5633.23 | 5672.73 | 10112.52 |
| | Betong | 2.43E-05 | 1.52E-05 | 3.8E-05 | 1.18E-05 | 2.23E-06 | 2.39E-06 | 1.34E-06 | 5.68E-06 | 6.09E-06 | 1.1E-05 | 1.06E-05 | 4.46E-06 | 32107.42 | 19988.94 | 50090.10 | 15551.28 | 2941.19 | 3149.45 | 1773.99 | 7493.45 | 8031.91 | 14569.67 | 13953.51 | 5877.55 |
| | Bannang Sata | 4.96E-05 | 2.25E-05 | 5.98E-05 | 1.65E-05 | 3.67E-06 | 5.93E-06 | 3.12E-06 | 9.43E-06 | 1.86E-05 | 1.3E-05 | 1.32E-05 | 8.97E-06 | 28782.50 | 13046.21 | 34679.18 | 9573.30 | 2125.57 | 3436.79 | 1807.74 | 5464.34 | 10786.93 | 7545.47 | 7675.00 | 5199.32 |
| | Than To | 5.1E-05 | 2.58E-05 | 6.71E-05 | 1.85E-05 | 3.52E-06 | 5.47E-06 | 2.4E-06 | 1.03E-05 | 1.64E-05 | 1.72E-05 | 1.7E-05 | 8.12E-06 | 34340.36 | 17406.05 | 45241.22 | 12441.03 | 2372.53 | 3683.67 | 1614.82 | 6947.16 | 11070.72 | 11597.61 | 11464.35 | 5471.32 |
| | Yaha | 7.41E-05 | 3.49E-05 | 8.32E-05 | 3.09E-05 | 8.33E-06 | 1.03E-05 | 7.37E-06 | 1.52E-05 | 3.03E-05 | 1.81E-05 | 1.81E-05 | 2.14E-05 | 34801.76 | 16403.24 | 39079.13 | 14513.17 | 3915.31 | 4826.65 | 3462.00 | 7162.47 | 14255.02 | 8514.96 | 8491.60 | 10071.51 |
| | Raman | 3.94E-05 | 2.56E-05 | 5.58E-05 | 2.36E-05 | 9.43E-06 | 7.08E-06 | 7.62E-06 | 7.39E-06 | 1.63E-05 | 8.72E-06 | 9.91E-06 | 1.31E-05 | 19125.25 | 12417.76 | 27074.54 | 11450.83 | 4572.17 | 3432.83 | 3694.71 | 3582.61 | 7906.84 | 4225.66 | 4803.04 | 6355.20 |
| | Kabang | 4.5E-05 | 2.02E-05 | 4.78E-05 | 1.65E-05 | 3.45E-06 | 5.41E-06 | 2.65E-06 | 9.07E-06 | 1.64E-05 | 9.42E-06 | 1.06E-05 | 1.05E-05 | 19979.85 | 8990.11 | 21238.39 | 7348.48 | 1532.10 | 2401.27 | 1179.12 | 4029.32 | 7284.92 | 4183.40 | 4711.32 | 4681.35 |
| | Krong Pinang | 8.56E-05 | 4.17E-05 | 0.000102 | 3.55E-05 | 1E-05 | 1.18E-05 | 8.8E-06 | 1.71E-05 | 3.44E-05 | 2.09E-05 | 2.15E-05 | 2.23E-05 | 15733.90 | 7663.88 | 18801.04 | 6519.69 | 1840.66 | 2172.00 | 1617.91 | 3133.69 | 6330.64 | 3838.82 | 3945.80 | 4096.75 |
| NARATHIWAT | Mueang Narathiwat | 5.01E-05 | 4.54E-05 | 9.76E-05 | 3.3E-05 | 1.99E-05 | 1.61E-05 | 9.43E-06 | 8.1E-06 | 1.62E-05 | 1.58E-05 | 1.53E-05 | 1.87E-05 | 15779.27 | 14306.75 | 30734.09 | 10401.89 | 6276.35 | 5086.50 | 2971.08 | 2551.70 | 5108.73 | 4983.34 | 4823.51 | 5888.02 |
| | Tak Bai | 2.73E-05 | 4.43E-05 | 8.53E-05 | 2.89E-05 | 2.53E-05 | 2.01E-05 | 7.75E-06 | 3.87E-06 | 4.77E-06 | 1.62E-05 | 1.19E-05 | 2.2E-05 | 7624.86 | 12389.09 | 23850.54 | 8092.79 | 7071.21 | 5623.49 | 2166.79 | 1082.38 | 1334.53 | 4517.29 | 3339.01 | 6150.73 |
| | Bacho | 8.4E-05 | 6.67E-05 | 0.000128 | 5.98E-05 | 2.9E-05 | 1.93E-05 | 2.23E-05 | 1.52E-05 | 3.55E-05 | 1.8E-05 | 2.09E-05 | 3.33E-05 | 15373.78 | 12206.74 | 23405.07 | 10944.74 | 5310.62 | 3526.15 | 4078.08 | 2786.36 | 6494.22 | 3292.56 | 3817.20 | 6095.51 |
| | Yi-ngo | 6.95E-05 | 4.48E-05 | 0.00011 | 3.52E-05 | 1.48E-05 | 1.26E-05 | 8.94E-06 | 1.09E-05 | 2.4E-05 | 1.45E-05 | 1.8E-05 | 1.5E-05 | 12904.30 | 8314.56 | 20480.73 | 6533.53 | 2740.23 | 2343.82 | 1661.25 | 2027.10 | 4450.00 | 2692.01 | 3336.90 | 2779.02 |
| | Ra-ngae | 4.82E-05 | 2.86E-05 | 7.84E-05 | 2.06E-05 | 7.55E-06 | 7.91E-06 | 3.86E-06 | 7.45E-06 | 1.56E-05 | 1.05E-05 | 1.28E-05 | 6.79E-06 | 21241.40 | 12599.52 | 34539.10 | 9073.22 | 3325.98 | 3483.26 | 1700.94 | 3279.55 | 6870.94 | 4604.93 | 5656.60 | 2990.89 |
| | Rueso | 3.49E-05 | 1.83E-05 | 5.11E-05 | 1.53E-05 | 4.4E-06 | 4.35E-06 | 3.18E-06 | 5.52E-06 | 1.21E-05 | 5.72E-06 | 8.32E-06 | 5.28E-06 | 16605.58 | 8697.57 | 24329.85 | 7255.12 | 2095.35 | 2070.31 | 1511.44 | 2626.96 | 5748.58 | 2722.86 | 3957.20 | 2509.31 |
| | Si Sakhon | 4.73E-05 | 2.26E-05 | 6.88E-05 | 1.67E-05 | 3.47E-06 | 4.85E-06 | 2.11E-06 | 7.34E-06 | 1.53E-05 | 9.67E-06 | 1.26E-05 | 3.84E-06 | 24732.56 | 11812.30 | 35996.51 | 8722.04 | 1816.74 | 2540.25 | 1106.34 | 3840.95 | 8005.76 | 5063.31 | 6576.58 | 2011.21 |
| | Waeng | 3.27E-05 | 2.77E-05 | 6.29E-05 | 1.08E-05 | 5.72E-06 | 1.05E-05 | 3.9E-06 | 9.22E-06 | 1.4E-05 | 1.7E-05 | 1.15E-05 | 5.02E-06 | 9236.85 | 7827.42 | 17775.95 | 3036.20 | 1614.42 | 2969.34 | 1101.30 | 2603.80 | 3966.79 | 4813.11 | 3259.86 | 1416.53 |
| | Sukhirin | 3.18E-05 | 2.09E-05 | 4.86E-05 | 8.78E-06 | 3.92E-06 | 6.09E-06 | 2.22E-06 | 6.4E-06 | 1.27E-05 | 1.89E-05 | 1.41E-05 | 3.47E-06 | 16382.00 | 10760.40 | 25050.05 | 4531.68 | 2024.28 | 3144.33 | 1147.75 | 3300.39 | 6530.47 | 9774.69 | 7299.86 | 1791.60 |
| | Su-ngai Kolok | 3.02E-05 | 3.52E-05 | 7.29E-05 | 1.97E-05 | 1.49E-05 | 1.49E-05 | 6.06E-06 | 6.65E-06 | 1E-05 | 1.52E-05 | 1.09E-05 | 1.3E-05 | 4133.96 | 4818.08 | 9963.19 | 2689.68 | 2043.31 | 2037.93 | 828.09 | 909.05 | 1370.40 | 2073.36 | 1487.95 | 1779.93 |
| | Su-ngai Padi | 2.3E-05 | 2.38E-05 | 5.07E-05 | 1.39E-05 | 9.8E-06 | 9.51E-06 | 3.93E-06 | 4.52E-06 | 7.49E-06 | 1.09E-05 | 8.41E-06 | 8.58E-06 | 8798.07 | 9107.81 | 19387.52 | 5293.46 | 3746.57 | 3633.87 | 1503.59 | 1726.51 | 2862.79 | 4179.42 | 3214.07 | 3278.37 |
| | Chanae | 2.78E-05 | 1.57E-05 | 4.03E-05 | 8.21E-06 | 2.73E-06 | 4E-06 | 1.5E-06 | 4.87E-06 | 1.02E-05 | 1.28E-05 | 1.08E-05 | 2.63E-06 | 16039.91 | 9071.32 | 23225.82 | 4734.78 | 1572.92 | 2308.79 | 863.35 | 2808.05 | 5901.82 | 7406.89 | 6253.05 | 1519.06 |
| | Cho-airong | 3.84E-05 | 3.81E-05 | 8.28E-05 | 2.5E-05 | 1.69E-05 | 1.47E-05 | 6.49E-06 | 6.27E-06 | 1.13E-05 | 1.52E-05 | 1.32E-05 | 1.49E-05 | 7454.12 | 7397.56 | 16068.91 | 4847.74 | 3277.30 | 2852.27 | 1259.66 | 1217.74 | 2195.27 | 2943.34 | 2553.69 | 2888.69 |

# APPENDIX H

# $SO_2$ AND $NO_2$ CONCENTRATION FOR THE SOUTHERN REGION OF THAILAND

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 611.20 | 221.10 | 279.70 | 335.90 | 12.22 | 144.70 | 7.00 | 126.80 | 95.33 | 357.60 | 517.80 | 165.40 |
| | Khao Phanom | 677.00 | 253.70 | 255.30 | 353.80 | 11.95 | 144.60 | 9.04 | 167.00 | 131.90 | 266.20 | 650.70 | 189.90 |
| | Ko Lanta | 1003.00 | 426.90 | 633.60 | 619.50 | 89.92 | 312.80 | 52.75 | 259.70 | 250.80 | 710.60 | 760.70 | 439.90 |
| | Khlong Thom | 598.60 | 236.80 | 291.40 | 319.70 | 19.05 | 129.70 | 11.14 | 128.20 | 124.80 | 235.20 | 425.60 | 155.60 |
| | Ao Luek | 606.40 | 176.60 | 234.80 | 289.60 | 9.75 | 128.00 | 6.53 | 154.10 | 105.70 | 370.90 | 622.00 | 178.80 |
| | Plai Phraya | 798.60 | 226.80 | 330.60 | 375.70 | 13.16 | 155.80 | 9.21 | 231.30 | 155.20 | 399.20 | 967.00 | 282.70 |
| | Lam Thap | 1179.00 | 504.30 | 456.90 | 621.80 | 20.40 | 251.10 | 17.55 | 279.10 | 245.50 | 363.30 | 1019.00 | 289.80 |
| | Nuea Khlong | 705.80 | 279.40 | 331.40 | 395.60 | 22.74 | 176.00 | 13.55 | 161.00 | 133.60 | 348.70 | 582.30 | 200.60 |

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PHANGNGA | Mueang Phangnga | 2470.00 | 499.10 | 523.50 | 655.90 | 22.92 | 286.30 | 17.59 | 369.80 | 305.60 | 1391.00 | 1543.00 | 504.20 |
| | Ko Yao | 2108.00 | 467.20 | 494.90 | 566.60 | 90.77 | 279.90 | 55.10 | 277.30 | 303.60 | 1279.00 | 1145.00 | 439.70 |
| | Kapong | 2121.00 | 441.80 | 443.00 | 558.60 | 24.46 | 265.50 | 20.49 | 401.90 | 318.20 | 1166.00 | 1519.00 | 497.10 |
| | Takua Thung | 2272.00 | 337.00 | 353.20 | 476.80 | 26.38 | 243.70 | 17.30 | 292.80 | 280.20 | 1451.00 | 1261.00 | 357.50 |
| | Takua Pa | 1960.00 | 425.30 | 402.90 | 499.50 | 30.21 | 255.70 | 23.41 | 428.00 | 342.60 | 1123.00 | 1529.00 | 483.80 |
| | Khura Buri | 1042.00 | 470.80 | 404.00 | 443.90 | 154.90 | 294.10 | 82.29 | 284.10 | 283.60 | 899.60 | 984.80 | 459.40 |
| | Thap Put | 3134.00 | 657.00 | 732.10 | 836.00 | 29.92 | 350.80 | 22.52 | 488.00 | 421.50 | 1482.00 | 2138.00 | 732.30 |
| | Thai Mueang | 2505.00 | 508.70 | 516.10 | 671.80 | 25.90 | 304.20 | 20.56 | 389.00 | 310.00 | 1507.00 | 1562.00 | 507.80 |
| PHUKET | Mueang Phuket | 1058.00 | 289.60 | 331.00 | 579.50 | 268.50 | 498.60 | 186.30 | 410.80 | 439.90 | 1486.00 | 954.70 | 256.40 |
| | Kathu | 2516.00 | 511.30 | 587.20 | 1106.00 | 349.50 | 1015.00 | 240.50 | 883.80 | 889.60 | 3471.00 | 2150.00 | 469.50 |
| | Thalang | 1723.00 | 208.80 | 241.60 | 542.00 | 65.01 | 562.00 | 43.43 | 536.80 | 511.60 | 2412.00 | 1398.00 | 219.30 |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 1903.00 | 920.70 | 659.90 | 916.80 | 301.20 | 705.00 | 329.10 | 1014.00 | 586.30 | 579.30 | 667.70 | 338.60 |
| | Phrom Khiri | 4495.00 | 1637.00 | 853.70 | 1356.00 | 296.90 | 1243.00 | 359.10 | 2284.00 | 1253.00 | 856.40 | 1313.00 | 485.90 |
| | Lan Saka | 3487.00 | 1372.00 | 874.80 | 1241.00 | 242.40 | 1010.00 | 315.40 | 1687.00 | 990.70 | 783.50 | 1131.00 | 427.00 |
| | Chawang | 2745.00 | 890.80 | 507.50 | 850.10 | 109.00 | 746.90 | 138.20 | 1320.00 | 833.50 | 510.60 | 1015.00 | 326.80 |
| | Phipun | 2804.00 | 943.40 | 516.80 | 858.00 | 159.10 | 775.70 | 189.50 | 1403.00 | 837.20 | 521.60 | 1000.00 | 332.90 |
| | Chian Yai | 1876.00 | 1446.00 | 961.80 | 1282.00 | 582.60 | 898.90 | 560.30 | 1009.00 | 656.20 | 806.00 | 682.20 | 544.80 |
| | Cha-uat | 1441.00 | 778.40 | 603.50 | 697.20 | 183.30 | 405.10 | 214.00 | 619.00 | 404.60 | 441.10 | 468.50 | 264.40 |
| | Tha Sala | 2858.00 | 1004.00 | 611.90 | 960.40 | 266.20 | 851.90 | 293.80 | 1445.00 | 841.40 | 610.90 | 1054.00 | 386.30 |
| | Thung Song | 1881.00 | 734.00 | 609.30 | 710.40 | 49.70 | 478.90 | 118.90 | 745.00 | 516.00 | 455.20 | 668.40 | 213.70 |
| | Na Bon | 4311.00 | 1526.00 | 1090.00 | 1442.00 | 119.90 | 1149.00 | 207.40 | 1846.00 | 1244.00 | 922.40 | 1520.00 | 484.10 |
| | Thung Yai | 2486.00 | 790.50 | 528.10 | 758.10 | 47.32 | 680.00 | 64.80 | 1076.00 | 746.70 | 503.30 | 911.00 | 281.20 |
| | Pak Phanang | 1740.00 | 1167.00 | 880.30 | 1171.00 | 485.70 | 827.30 | 492.90 | 987.40 | 595.70 | 739.40 | 657.50 | 462.30 |
| | Ron Phibun | 2271.00 | 1072.00 | 845.80 | 1037.00 | 203.10 | 698.60 | 280.30 | 997.90 | 648.60 | 657.70 | 823.00 | 341.10 |
| | Sichon | 1297.00 | 231.50 | 127.40 | 263.80 | 95.07 | 297.60 | 83.08 | 543.80 | 380.40 | 188.60 | 698.50 | 177.90 |
| | Khanom | 1783.00 | 636.20 | 520.60 | 750.00 | 415.50 | 628.50 | 359.50 | 979.30 | 804.10 | 453.30 | 1274.00 | 431.70 |
| | Hua Sai | 1975.00 | 1504.00 | 1022.00 | 1310.00 | 590.10 | 885.10 | 564.30 | 1029.00 | 668.10 | 821.50 | 692.00 | 565.80 |
| | Bang Khan | 2716.00 | 938.70 | 802.10 | 879.60 | 51.21 | 673.20 | 86.04 | 1018.00 | 782.10 | 594.20 | 859.50 | 282.60 |
| | Tham Phannara | 4180.00 | 1200.00 | 654.80 | 1261.00 | 97.38 | 1106.00 | 118.10 | 1987.00 | 1324.00 | 740.30 | 1692.00 | 525.20 |
| | Chulabhorn | 3825.00 | 1676.00 | 1408.00 | 1630.00 | 182.80 | 1016.00 | 353.50 | 1531.00 | 1033.00 | 1038.00 | 1396.00 | 496.50 |
| | Phra Phrom | 3976.00 | 1938.00 | 1409.00 | 1875.00 | 528.90 | 1385.00 | 609.00 | 1975.00 | 1199.00 | 1184.00 | 1398.00 | 668.90 |
| | Nopphitam | 2335.00 | 760.90 | 449.40 | 736.40 | 194.90 | 676.50 | 209.40 | 1186.00 | 723.40 | 453.70 | 965.50 | 317.30 |
| | Chang Klang | 2972.00 | 1075.00 | 695.80 | 995.70 | 134.30 | 820.20 | 193.40 | 1374.00 | 853.90 | 626.20 | 1017.00 | 343.30 |
| | Chaloem Phra Kiat | 3654.00 | 2299.00 | 1639.00 | 2125.00 | 780.90 | 1469.00 | 813.90 | 1844.00 | 1165.00 | 1346.00 | 1310.00 | 837.30 |

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 730.90 | 394.50 | 389.30 | 803.40 | 328.30 | 473.10 | 246.40 | 660.30 | 514.00 | 631.90 | 1367.00 | 512.80 |
| | Kanchanadit | 278.80 | 104.40 | 92.90 | 210.10 | 90.36 | 129.00 | 65.56 | 197.50 | 163.90 | 169.00 | 472.90 | 153.40 |
| | Don Sak | 395.30 | 140.10 | 128.80 | 293.90 | 161.40 | 167.50 | 103.70 | 258.30 | 247.40 | 234.50 | 733.50 | 238.70 |
| | Ko Samui | 323.60 | 205.30 | 268.40 | 398.60 | 257.40 | 247.20 | 129.20 | 266.80 | 285.30 | 321.00 | 750.00 | 338.10 |
| | Ko Pha-ngan | 724.00 | 512.70 | 878.40 | 925.10 | 585.40 | 749.30 | 281.60 | 836.60 | 741.50 | 881.30 | 1895.00 | 944.70 |
| | Chaiya | 403.30 | 126.40 | 93.30 | 239.90 | 103.50 | 284.50 | 114.70 | 460.70 | 322.10 | 426.20 | 772.40 | 293.80 |
| | Tha Chana | 388.10 | 104.20 | 100.20 | 202.80 | 85.20 | 278.10 | 92.09 | 432.10 | 293.70 | 385.50 | 730.20 | 293.40 |
| | Khiri Rat Nikhom | 599.10 | 111.30 | 114.50 | 280.20 | 38.70 | 275.10 | 41.30 | 442.60 | 264.40 | 510.40 | 731.00 | 242.80 |
| | Ban Ta Khun | 395.40 | 68.45 | 67.21 | 162.20 | 17.44 | 183.40 | 22.24 | 300.40 | 183.20 | 378.50 | 492.30 | 163.90 |
| | Phanom | 351.80 | 63.96 | 74.98 | 149.80 | 9.74 | 127.80 | 10.08 | 230.60 | 139.10 | 327.10 | 408.40 | 119.90 |
| | Tha Chang | 500.50 | 112.40 | 83.64 | 247.90 | 69.81 | 305.60 | 82.43 | 475.90 | 320.10 | 474.50 | 805.50 | 298.40 |
| | Ban Na San | 352.00 | 129.40 | 110.40 | 257.70 | 75.35 | 152.00 | 54.54 | 231.30 | 179.40 | 197.80 | 479.20 | 160.00 |
| | Ban Na Doem | 880.30 | 433.80 | 432.90 | 900.50 | 328.40 | 508.00 | 234.80 | 702.10 | 543.80 | 675.80 | 1478.00 | 541.20 |
| | Khian Sa | 432.90 | 119.40 | 112.30 | 252.30 | 46.30 | 165.10 | 34.84 | 266.80 | 193.00 | 272.10 | 534.20 | 171.60 |
| | Wiang Sa | 472.40 | 121.70 | 72.05 | 236.10 | 22.33 | 143.00 | 16.94 | 249.40 | 199.10 | 175.50 | 499.00 | 146.90 |
| | Phrasaeng | 805.10 | 195.80 | 171.70 | 395.20 | 33.81 | 250.80 | 25.53 | 426.50 | 323.20 | 425.60 | 886.40 | 266.90 |
| | Phunphin | 287.00 | 112.10 | 109.50 | 236.70 | 79.46 | 161.30 | 62.82 | 238.00 | 170.70 | 240.50 | 455.00 | 164.60 |
| | Chai Buri | 709.70 | 172.30 | 168.70 | 342.50 | 23.48 | 217.90 | 17.09 | 355.30 | 270.30 | 407.70 | 758.40 | 228.20 |
| | Vibhavadi | 819.60 | 152.90 | 125.00 | 363.00 | 67.87 | 444.80 | 86.37 | 695.90 | 444.90 | 759.10 | 1153.00 | 411.50 |
| RANONG | Mueang Ranong | 1407.00 | 373.60 | 519.90 | 386.70 | 113.40 | 1062.00 | 205.10 | 1413.00 | 737.80 | 646.20 | 1637.00 | 1122.00 |
| | La-un | 1628.00 | 274.90 | 905.00 | 340.60 | 105.50 | 1055.00 | 219.20 | 1763.00 | 879.40 | 557.00 | 2289.00 | 1375.00 |
| | Kapoe | 2155.00 | 529.80 | 405.90 | 586.90 | 153.50 | 1374.00 | 275.10 | 1768.00 | 1037.00 | 951.00 | 2165.00 | 1319.00 |
| | Kra Buri | 1442.00 | 109.70 | 1685.00 | 198.90 | 68.17 | 970.30 | 227.10 | 1922.00 | 874.20 | 339.70 | 2838.00 | 1588.00 |
| | Suk Samran | 2276.00 | 677.70 | 488.50 | 703.30 | 218.40 | 1471.00 | 335.60 | 1649.00 | 1083.00 | 999.10 | 2201.00 | 1396.00 |

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 836.70 | 228.00 | 1336.00 | 277.90 | 166.90 | 602.80 | 226.30 | 1030.00 | 680.60 | 584.60 | 1656.00 | 702.60 |
| | Tha Sae | 440.40 | 43.05 | 902.10 | 54.46 | 33.31 | 302.20 | 64.65 | 621.90 | 356.70 | 179.80 | 1104.00 | 430.50 |
| | Pathio | 556.70 | 44.47 | 1461.00 | 49.58 | 38.12 | 383.70 | 54.58 | 866.80 | 463.50 | 217.20 | 1536.00 | 595.50 |
| | Lang Suan | 758.90 | 231.00 | 440.20 | 282.10 | 150.50 | 506.30 | 157.20 | 771.70 | 540.00 | 539.70 | 1123.00 | 447.00 |
| | Lamae | 1091.00 | 338.90 | 442.90 | 409.50 | 200.80 | 707.20 | 220.50 | 1074.00 | 770.60 | 818.80 | 1520.00 | 585.90 |
| | Phato | 670.00 | 123.60 | 181.30 | 166.80 | 38.79 | 382.80 | 67.66 | 572.30 | 401.60 | 420.20 | 835.90 | 344.70 |
| | Sawi | 624.90 | 147.10 | 695.90 | 195.80 | 102.50 | 424.40 | 137.90 | 707.70 | 465.10 | 397.20 | 1121.00 | 459.70 |
| | Thung Tako | 1119.00 | 345.30 | 950.30 | 422.30 | 235.10 | 780.00 | 259.50 | 1197.00 | 825.40 | 810.30 | 1787.00 | 739.20 |
| SONGKHLA | Mueang Songkhla | 78.60 | 102.40 | 271.30 | 229.10 | 126.50 | 68.05 | 173.50 | 94.32 | 108.20 | 389.30 | 302.20 | 334.90 |
| | Sathing Phra | 516.00 | 365.10 | 467.30 | 489.50 | 275.50 | 272.00 | 239.60 | 402.40 | 282.30 | 765.20 | 566.10 | 431.30 |
| | Chana | 210.10 | 119.90 | 219.90 | 173.50 | 59.91 | 52.97 | 38.92 | 72.64 | 116.30 | 112.20 | 90.05 | 112.20 |
| | Na Thawi | 263.00 | 137.80 | 244.10 | 180.10 | 49.67 | 56.72 | 15.98 | 81.57 | 133.00 | 54.90 | 63.89 | 78.11 |
| | Thepha | 212.20 | 134.30 | 285.40 | 235.10 | 92.31 | 66.66 | 66.46 | 82.96 | 156.10 | 107.30 | 84.92 | 118.80 |
| | Saba Yoi | 171.00 | 98.10 | 224.20 | 155.50 | 53.96 | 47.43 | 35.23 | 63.72 | 118.90 | 71.16 | 63.17 | 68.48 |
| | Ranot | 371.00 | 229.00 | 208.70 | 277.70 | 118.40 | 165.90 | 109.20 | 278.00 | 173.40 | 288.00 | 271.90 | 187.10 |
| | Krasae Sin | 411.80 | 213.50 | 205.30 | 235.20 | 61.53 | 88.27 | 73.78 | 286.10 | 145.80 | 314.60 | 258.60 | 198.80 |
| | Rattaphum | 11.87 | 7.30 | 79.68 | 33.23 | 32.65 | 20.76 | 31.47 | 18.97 | 19.94 | 381.80 | 159.80 | 118.00 |
| | Sadao | 142.30 | 71.45 | 166.20 | 105.60 | 39.26 | 37.84 | 19.97 | 54.56 | 84.74 | 189.20 | 105.20 | 96.04 |
| | Hat Yai | 176.60 | 103.30 | 298.80 | 213.90 | 86.36 | 51.81 | 63.28 | 57.90 | 92.58 | 535.60 | 368.60 | 310.30 |
| | Na Mom | 257.40 | 155.20 | 326.50 | 247.30 | 100.70 | 77.26 | 83.10 | 103.80 | 159.20 | 333.20 | 208.10 | 226.60 |
| | Khuan Niang | 69.09 | 50.39 | 178.60 | 109.50 | 76.43 | 53.85 | 78.73 | 67.15 | 61.82 | 617.10 | 283.90 | 220.10 |
| | Bang Klam | 115.20 | 76.30 | 250.30 | 154.50 | 94.49 | 64.28 | 95.15 | 81.43 | 92.38 | 706.90 | 337.90 | 281.40 |
| | Singhanakhon | 157.60 | 144.30 | 302.50 | 259.10 | 156.80 | 113.70 | 170.80 | 146.20 | 134.60 | 570.60 | 370.70 | 336.70 |
| | Khlong Hoi Khong | 79.14 | 42.04 | 158.60 | 83.17 | 52.95 | 34.93 | 40.46 | 42.74 | 63.27 | 419.20 | 193.90 | 166.50 |

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 89.63 | 58.11 | 331.60 | 259.70 | 111.80 | 108.60 | 109.90 | 137.70 | 179.60 | 851.00 | 585.00 | 332.80 |
| | Khuan Don | 69.79 | 40.31 | 681.80 | 315.30 | 245.50 | 131.90 | 222.40 | 172.00 | 225.60 | 2216.00 | 1399.00 | 658.30 |
| | Khuan Kalong | 53.67 | 39.43 | 490.00 | 266.00 | 188.20 | 110.30 | 194.30 | 132.60 | 146.20 | 1750.00 | 1153.00 | 562.10 |
| | Tha Phae | 44.22 | 38.02 | 438.00 | 289.70 | 176.40 | 105.10 | 184.60 | 120.30 | 138.60 | 1605.00 | 1052.00 | 674.70 |
| | La-ngu | 13.11 | 19.68 | 260.10 | 178.40 | 119.90 | 66.62 | 143.60 | 72.04 | 64.77 | 1092.00 | 790.90 | 466.90 |
| | Thung Wa | 23.66 | 23.79 | 256.50 | 164.80 | 121.40 | 68.94 | 161.10 | 89.62 | 68.12 | 1088.00 | 905.00 | 408.80 |
| | Manang | 44.23 | 39.30 | 471.30 | 287.40 | 203.20 | 116.20 | 244.80 | 146.00 | 129.10 | 1903.00 | 1406.00 | 677.00 |
| TRANG | Mueang Trang | 582.20 | 238.00 | 393.80 | 646.30 | 66.67 | 197.60 | 104.30 | 644.70 | 541.40 | 578.00 | 630.50 | 185.00 |
| | Kantang | 283.00 | 106.80 | 261.20 | 365.80 | 99.69 | 193.10 | 126.40 | 379.50 | 306.20 | 981.50 | 662.60 | 281.20 |
| | Yan Ta Khao | 340.60 | 149.10 | 317.80 | 438.60 | 101.60 | 121.20 | 149.30 | 423.10 | 325.10 | 905.80 | 711.80 | 293.80 |
| | Palian | 63.09 | 35.23 | 184.20 | 171.70 | 108.90 | 70.09 | 152.80 | 126.50 | 92.27 | 945.50 | 642.40 | 321.00 |
| | Sikao | 820.90 | 252.00 | 537.60 | 797.00 | 104.90 | 623.60 | 77.15 | 803.10 | 865.40 | 928.50 | 729.20 | 233.70 |
| | Huai Yot | 617.40 | 248.80 | 375.60 | 678.20 | 55.18 | 327.40 | 92.16 | 714.40 | 587.00 | 494.50 | 665.80 | 153.60 |
| | Wang Wiset | 867.10 | 291.40 | 519.80 | 863.10 | 86.73 | 657.30 | 78.44 | 927.50 | 895.00 | 799.40 | 836.90 | 210.70 |
| | Na Yong | 844.90 | 370.40 | 571.10 | 952.10 | 87.59 | 154.10 | 158.50 | 950.70 | 745.60 | 707.30 | 867.90 | 250.50 |
| | Ratsada | 974.20 | 427.60 | 567.80 | 1204.00 | 107.30 | 761.00 | 215.90 | 1267.00 | 939.70 | 831.30 | 1325.00 | 252.00 |
| | Hat Samran | 271.30 | 128.10 | 535.80 | 585.50 | 306.70 | 260.20 | 421.60 | 517.20 | 361.80 | 2831.00 | 1859.00 | 925.20 |
| PHATTHALUNG | Mueang Phatthalung | 1454.00 | 661.40 | 571.70 | 487.20 | 74.05 | 127.30 | 119.30 | 557.80 | 270.90 | 499.90 | 356.20 | 310.80 |
| | Kong Ra | 1520.00 | 643.50 | 909.10 | 603.10 | 136.80 | 145.70 | 201.70 | 561.30 | 372.60 | 1251.00 | 747.60 | 601.60 |
| | Khao Chaison | 1066.00 | 493.50 | 539.00 | 391.90 | 86.50 | 104.20 | 119.40 | 415.10 | 214.00 | 622.80 | 365.40 | 320.40 |
| | Tamot | 548.70 | 245.30 | 662.50 | 306.20 | 135.70 | 101.70 | 174.50 | 250.60 | 166.90 | 1393.00 | 632.30 | 553.40 |
| | Khuan Khanun | 1520.00 | 747.90 | 620.30 | 603.70 | 126.10 | 233.00 | 160.80 | 593.90 | 349.40 | 441.60 | 396.00 | 282.20 |
| | Pak Phayun | 665.00 | 396.50 | 682.50 | 401.00 | 179.90 | 160.40 | 197.30 | 312.70 | 194.40 | 1051.00 | 479.30 | 436.20 |
| | Si Banphot | 3157.00 | 1301.00 | 1277.00 | 1116.00 | 105.80 | 216.50 | 184.50 | 1039.00 | 772.20 | 678.50 | 747.60 | 391.70 |
| | Pa Bon | 154.80 | 74.70 | 421.00 | 147.60 | 95.51 | 68.32 | 109.90 | 101.40 | 74.21 | 1050.00 | 397.40 | 347.50 |
| | Bang Kaeo | 1414.00 | 679.50 | 905.90 | 589.20 | 170.80 | 177.00 | 216.60 | 575.00 | 313.80 | 1260.00 | 640.30 | 562.40 |
| | Pa Phayom | 2996.00 | 1306.00 | 1182.00 | 1150.00 | 154.80 | 440.90 | 231.90 | 1068.00 | 760.50 | 705.10 | 793.50 | 397.40 |
| | Srinagarindra | 2276.00 | 924.50 | 988.90 | 796.60 | 82.93 | 142.70 | 150.20 | 760.00 | 540.90 | 738.30 | 632.70 | 390.90 |

**Table H-1** $SO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 917.90 | 662.00 | 1445.00 | 1143.00 | 550.70 | 343.70 | 438.30 | 325.80 | 673.80 | 563.70 | 515.20 | 720.00 |
| | Khok Pho | 590.30 | 419.60 | 980.70 | 824.00 | 367.50 | 222.80 | 299.20 | 232.60 | 461.20 | 421.30 | 363.50 | 539.40 |
| | Nong Chik | 828.50 | 593.20 | 1361.00 | 1139.00 | 515.70 | 313.30 | 419.30 | 321.50 | 639.90 | 579.30 | 506.00 | 747.00 |
| | Panare | 826.60 | 778.50 | 1348.00 | 1019.00 | 699.00 | 406.90 | 533.50 | 237.80 | 617.10 | 398.20 | 407.40 | 552.70 |
| | Mayo | 542.80 | 441.90 | 860.20 | 625.00 | 372.00 | 228.80 | 286.10 | 165.30 | 389.90 | 277.20 | 275.70 | 352.40 |
| | Thung Yang Daeng | 493.80 | 417.80 | 803.80 | 559.40 | 354.80 | 218.50 | 268.00 | 143.30 | 352.20 | 244.70 | 249.40 | 304.30 |
| | Sai Buri | 668.60 | 643.20 | 1090.00 | 828.10 | 580.90 | 335.30 | 443.60 | 189.10 | 500.80 | 313.20 | 324.90 | 443.90 |
| | Mai Kaen | 1647.00 | 1449.00 | 2741.00 | 1760.00 | 1158.00 | 717.40 | 846.30 | 430.00 | 1078.00 | 726.20 | 763.70 | 954.70 |
| | Yaring | 568.70 | 457.10 | 888.70 | 664.10 | 384.40 | 235.40 | 297.50 | 177.00 | 408.70 | 293.60 | 289.20 | 381.70 |
| | Yarang | 839.30 | 596.50 | 1302.00 | 958.30 | 476.60 | 307.20 | 374.80 | 279.00 | 597.20 | 473.50 | 447.50 | 576.60 |
| | Kapho | 1188.00 | 1037.00 | 1950.00 | 1343.00 | 885.90 | 540.30 | 662.80 | 332.30 | 839.70 | 559.20 | 587.60 | 709.70 |
| | Mae Lan | 1029.00 | 717.00 | 1643.00 | 1297.00 | 595.30 | 375.40 | 478.00 | 376.30 | 766.20 | 663.50 | 592.30 | 824.10 |
| YALA | Mueang Yala | 790.10 | 457.40 | 1126.00 | 732.90 | 335.90 | 302.70 | 333.20 | 355.60 | 667.00 | 413.70 | 342.50 | 341.40 |
| | Betong | 281.60 | 163.50 | 473.70 | 183.10 | 45.76 | 60.30 | 31.57 | 133.30 | 133.40 | 259.30 | 204.10 | 48.08 |
| | Bannang Sata | 574.40 | 242.90 | 746.30 | 256.50 | 75.26 | 149.70 | 73.20 | 221.30 | 407.70 | 305.50 | 255.50 | 96.78 |
| | Than To | 589.70 | 278.80 | 837.60 | 286.80 | 72.28 | 138.10 | 56.26 | 242.00 | 360.00 | 404.00 | 328.40 | 87.63 |
| | Yaha | 856.90 | 376.70 | 1038.00 | 479.80 | 171.00 | 259.40 | 173.00 | 357.80 | 664.70 | 425.40 | 348.80 | 231.30 |
| | Raman | 456.40 | 276.40 | 696.70 | 366.90 | 193.60 | 178.80 | 178.90 | 173.50 | 357.30 | 204.60 | 191.20 | 141.50 |
| | Kabang | 520.40 | 218.40 | 596.50 | 257.00 | 70.80 | 136.50 | 62.31 | 212.90 | 359.30 | 221.10 | 204.70 | 113.70 |
| | Krong Pinang | 990.50 | 450.00 | 1276.00 | 551.10 | 205.60 | 298.50 | 206.60 | 400.30 | 754.70 | 490.30 | 414.30 | 240.60 |
| NARATHIWAT | Mueang Narathiwat | 579.50 | 490.10 | 1217.00 | 512.90 | 409.00 | 407.80 | 221.40 | 190.10 | 355.30 | 371.30 | 295.50 | 201.70 |
| | Tak Bai | 315.40 | 478.00 | 1064.00 | 449.50 | 519.00 | 507.80 | 181.90 | 90.85 | 104.50 | 379.20 | 230.40 | 237.30 |
| | Bacho | 972.40 | 720.20 | 1596.00 | 929.50 | 596.00 | 486.90 | 523.40 | 357.60 | 777.90 | 422.50 | 402.70 | 359.60 |
| | Yi-ngo | 803.70 | 483.00 | 1375.00 | 546.30 | 302.80 | 318.70 | 209.90 | 256.20 | 524.80 | 340.20 | 346.70 | 161.40 |
| | Ra-ngae | 557.90 | 308.70 | 978.20 | 320.00 | 155.00 | 199.70 | 90.64 | 174.80 | 341.70 | 245.40 | 247.80 | 73.27 |
| | Rueso | 403.90 | 197.30 | 638.10 | 236.90 | 90.41 | 109.90 | 74.58 | 129.60 | 264.80 | 134.40 | 160.50 | 56.92 |
| | Si Sakhon | 546.70 | 243.50 | 858.00 | 258.90 | 71.25 | 122.60 | 49.62 | 172.30 | 335.10 | 227.10 | 242.50 | 41.47 |
| | Waeng | 378.40 | 299.10 | 785.20 | 167.00 | 117.30 | 265.50 | 91.54 | 216.40 | 307.70 | 400.00 | 222.80 | 54.13 |
| | Sukhirin | 367.40 | 225.10 | 605.70 | 136.40 | 80.54 | 153.90 | 52.22 | 150.20 | 277.30 | 444.70 | 273.00 | 37.47 |
| | Su-ngai Kolok | 349.90 | 380.40 | 909.30 | 305.70 | 306.80 | 376.50 | 142.20 | 156.10 | 219.60 | 356.10 | 210.10 | 140.50 |
| | Su-ngai Padi | 266.40 | 257.20 | 632.90 | 215.20 | 201.20 | 240.20 | 92.36 | 106.10 | 164.10 | 256.70 | 162.30 | 92.57 |
| | Chanae | 321.70 | 169.70 | 502.30 | 127.50 | 55.97 | 101.10 | 35.13 | 114.30 | 224.20 | 301.40 | 209.20 | 28.42 |
| | Cho-airong | 444.20 | 411.10 | 1032.00 | 387.80 | 346.50 | 371.00 | 152.30 | 147.20 | 247.70 | 355.80 | 253.80 | 160.50 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| NAKHON SI THAMMARAT | Mueang Nakhon Si Thammarat | 719.50 | 348.10 | 249.50 | 346.70 | 113.90 | 266.60 | 124.40 | 383.40 | 221.70 | 219.10 | 252.50 | 128.00 |
| | Phrom Khiri | 1700.00 | 619.10 | 322.80 | 512.90 | 112.30 | 470.00 | 135.80 | 863.50 | 473.80 | 323.90 | 496.50 | 183.70 |
| | Lan Saka | 1319.00 | 518.80 | 330.80 | 469.40 | 91.66 | 382.00 | 119.30 | 637.80 | 473.80 | 296.30 | 427.50 | 161.50 |
| | Chawang | 1038.00 | 336.80 | 191.90 | 321.40 | 41.21 | 282.40 | 52.24 | 499.00 | 315.20 | 193.10 | 383.90 | 123.60 |
| | Phipun | 1060.00 | 356.70 | 195.40 | 324.40 | 60.17 | 293.30 | 71.65 | 530.40 | 316.60 | 197.20 | 378.30 | 125.90 |
| | Chian Yai | 709.40 | 546.80 | 363.70 | 484.70 | 220.30 | 339.90 | 211.90 | 381.60 | 248.20 | 304.80 | 258.00 | 206.00 |
| | Cha-uat | 544.90 | 294.30 | 228.20 | 263.70 | 69.30 | 153.20 | 80.93 | 234.10 | 153.00 | 166.80 | 177.20 | 99.99 |
| | Tha Sala | 1081.00 | 379.50 | 231.40 | 363.20 | 100.70 | 322.10 | 111.10 | 546.30 | 318.20 | 231.00 | 398.60 | 146.10 |
| | Thung Song | 711.30 | 277.50 | 230.40 | 268.60 | 18.79 | 181.10 | 44.96 | 281.70 | 195.10 | 172.10 | 252.70 | 80.81 |
| | Na Bon | 1630.00 | 576.90 | 412.00 | 545.10 | 45.33 | 434.50 | 78.42 | 698.00 | 470.50 | 348.80 | 574.70 | 183.10 |
| | Thung Yai | 940.00 | 298.90 | 199.70 | 286.70 | 17.89 | 257.10 | 24.50 | 407.00 | 282.30 | 190.30 | 344.50 | 106.30 |
| | Pak Phanang | 658.10 | 441.20 | 332.90 | 442.90 | 183.60 | 312.80 | 186.40 | 373.40 | 225.30 | 279.60 | 248.60 | 174.80 |
| | Ron Phibun | 858.70 | 405.30 | 319.80 | 392.00 | 76.80 | 264.20 | 106.00 | 377.40 | 245.30 | 248.70 | 311.20 | 129.00 |
| | Sichon | 490.30 | 87.55 | 48.18 | 99.75 | 35.95 | 112.50 | 31.41 | 205.60 | 143.90 | 71.33 | 264.10 | 67.26 |
| | Khanom | 674.20 | 240.60 | 196.90 | 283.60 | 157.10 | 237.70 | 136.00 | 370.30 | 304.10 | 171.40 | 481.70 | 163.20 |
| | Hua Sai | 747.00 | 568.60 | 386.40 | 495.40 | 223.10 | 334.70 | 213.40 | 389.20 | 252.60 | 310.60 | 261.70 | 214.00 |
| | Bang Khan | 1027.00 | 355.00 | 303.30 | 332.60 | 19.36 | 254.60 | 32.53 | 384.90 | 295.70 | 224.70 | 325.00 | 106.90 |
| | Tham Phannara | 1581.00 | 453.70 | 247.60 | 477.00 | 36.82 | 418.40 | 44.65 | 751.30 | 500.50 | 279.90 | 639.60 | 198.60 |
| | Chulabhorn | 1447.00 | 633.80 | 532.40 | 616.20 | 69.12 | 384.30 | 133.70 | 578.90 | 390.60 | 392.50 | 528.00 | 187.70 |
| | Phra Phrom | 1504.00 | 732.80 | 532.70 | 708.90 | 200.00 | 523.60 | 230.30 | 746.70 | 453.30 | 447.50 | 528.60 | 252.90 |
| | Nopphitam | 882.80 | 287.70 | 169.90 | 278.50 | 73.69 | 255.80 | 79.17 | 448.50 | 273.50 | 171.60 | 365.10 | 120.00 |
| | Chang Klang | 1124.00 | 406.60 | 263.10 | 376.50 | 50.77 | 310.10 | 73.13 | 519.60 | 322.90 | 236.80 | 384.70 | 129.80 |
| | Chaloem Phra Kiat | 1382.00 | 869.50 | 619.60 | 803.40 | 295.30 | 555.50 | 307.80 | 697.20 | 440.50 | 509.10 | 495.50 | 316.60 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| KRABI | Mueang Krabi | 231.10 | 83.60 | 105.80 | 127.00 | 4.62 | 54.73 | 2.65 | 47.94 | 36.05 | 135.20 | 195.80 | 62.53 |
| | Khao Phanom | 256.00 | 95.92 | 96.53 | 133.80 | 4.52 | 54.69 | 3.42 | 63.16 | 49.87 | 100.70 | 246.10 | 71.82 |
| | Ko Lanta | 379.20 | 161.40 | 239.60 | 234.20 | 34.00 | 118.30 | 19.95 | 98.21 | 94.82 | 268.70 | 287.70 | 166.30 |
| | Khlong Thom | 226.30 | 89.55 | 110.20 | 120.90 | 7.21 | 49.05 | 4.21 | 48.46 | 47.21 | 88.93 | 160.90 | 58.84 |
| | Ao Luek | 229.30 | 66.77 | 88.79 | 109.50 | 3.69 | 48.39 | 2.47 | 58.27 | 39.98 | 140.30 | 235.20 | 67.62 |
| | Plai Phraya | 302.00 | 85.77 | 125.00 | 142.10 | 4.98 | 58.90 | 3.48 | 87.46 | 58.70 | 151.00 | 365.70 | 106.90 |
| | Lam Thap | 445.70 | 190.70 | 172.80 | 235.10 | 7.72 | 94.96 | 6.64 | 105.60 | 92.83 | 137.40 | 385.40 | 109.60 |
| | Nuea Khlong | 266.90 | 105.60 | 125.30 | 149.60 | 8.60 | 66.56 | 5.12 | 60.88 | 50.53 | 131.90 | 220.20 | 75.85 |
| PHANGNGA | Mueang Phangnga | 934.00 | 188.70 | 198.00 | 248.00 | 8.67 | 108.30 | 6.65 | 139.80 | 115.50 | 525.90 | 583.50 | 190.60 |
| | Ko Yao | 797.10 | 176.70 | 187.10 | 214.30 | 34.32 | 105.90 | 20.84 | 104.90 | 114.80 | 483.50 | 432.80 | 166.30 |
| | Kapong | 802.10 | 167.10 | 167.50 | 211.20 | 9.25 | 105.90 | 7.75 | 152.00 | 120.30 | 440.70 | 574.40 | 188.00 |
| | Takua Thung | 859.30 | 127.40 | 133.60 | 180.30 | 9.98 | 92.14 | 6.54 | 110.70 | 106.00 | 548.80 | 476.80 | 135.20 |
| | Takua Pa | 741.30 | 160.80 | 152.30 | 188.90 | 11.42 | 96.70 | 8.85 | 161.80 | 129.50 | 424.70 | 578.20 | 182.90 |
| | Khura Buri | 394.10 | 178.00 | 152.80 | 167.80 | 58.58 | 111.20 | 31.12 | 107.40 | 107.20 | 340.20 | 372.40 | 173.70 |
| | Thap Put | 1185.00 | 248.50 | 276.80 | 316.10 | 11.31 | 132.60 | 8.52 | 184.50 | 159.40 | 560.40 | 808.40 | 276.90 |
| | Thai Mueang | 947.10 | 192.30 | 195.10 | 254.00 | 9.79 | 115.00 | 7.78 | 147.10 | 117.20 | 570.00 | 590.80 | 192.00 |
| PHUKET | Mueang Phuket | 400.00 | 109.50 | 125.20 | 219.10 | 101.50 | 188.60 | 70.45 | 155.30 | 166.30 | 561.90 | 361.00 | 96.95 |
| | Kathu | 951.20 | 193.30 | 222.00 | 418.10 | 132.10 | 383.90 | 90.94 | 334.20 | 336.40 | 1312.00 | 813.00 | 177.50 |
| | Thalang | 651.50 | 78.96 | 91.37 | 205.00 | 24.58 | 212.50 | 16.42 | 203.00 | 193.40 | 912.10 | 528.60 | 82.94 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SURAT THANI | Mueang Surat Thani | 276.40 | 149.20 | 147.20 | 303.80 | 124.10 | 178.90 | 93.17 | 249.70 | 194.40 | 238.90 | 516.80 | 193.90 |
| | Kanchanadit | 105.40 | 39.46 | 35.13 | 79.45 | 34.17 | 48.77 | 24.79 | 74.67 | 61.99 | 63.91 | 178.80 | 58.01 |
| | Don Sak | 149.50 | 52.99 | 48.72 | 111.10 | 61.02 | 63.33 | 39.22 | 97.68 | 93.56 | 88.68 | 277.40 | 90.27 |
| | Ko Samui | 122.40 | 77.62 | 101.50 | 150.70 | 97.33 | 93.49 | 48.85 | 100.90 | 107.90 | 121.40 | 283.60 | 127.90 |
| | Ko Pha-ngan | 273.80 | 193.90 | 332.20 | 349.80 | 221.40 | 283.40 | 106.50 | 316.30 | 280.40 | 333.20 | 716.40 | 357.20 |
| | Chaiya | 152.50 | 47.78 | 35.28 | 90.72 | 39.14 | 107.60 | 43.37 | 174.20 | 121.80 | 161.20 | 292.10 | 111.10 |
| | Tha Chana | 146.80 | 39.39 | 37.90 | 76.70 | 32.22 | 105.20 | 34.82 | 163.40 | 111.10 | 145.80 | 276.10 | 110.90 |
| | Khiri Rat Nikhom | 226.50 | 42.08 | 43.29 | 105.90 | 14.63 | 104.00 | 15.62 | 167.40 | 99.98 | 193.00 | 276.40 | 91.82 |
| | Ban Ta Khun | 149.50 | 25.88 | 25.42 | 61.34 | 6.59 | 69.37 | 8.41 | 113.60 | 69.26 | 143.10 | 186.20 | 61.99 |
| | Phanom | 133.00 | 24.18 | 28.35 | 56.65 | 3.68 | 48.31 | 3.81 | 87.19 | 52.61 | 123.70 | 154.40 | 45.35 |
| | Tha Chang | 189.30 | 42.51 | 31.63 | 93.73 | 26.40 | 115.50 | 31.17 | 180.00 | 121.10 | 179.40 | 304.60 | 112.80 |
| | Ban Na San | 133.10 | 48.93 | 41.75 | 97.44 | 28.49 | 57.46 | 20.62 | 87.48 | 67.82 | 74.78 | 181.20 | 60.50 |
| | Ban Na Doem | 332.90 | 164.00 | 163.70 | 340.50 | 124.20 | 192.10 | 88.79 | 265.50 | 205.60 | 255.50 | 559.00 | 204.60 |
| | Khian Sa | 163.70 | 45.13 | 42.45 | 95.41 | 17.51 | 62.43 | 13.18 | 100.90 | 72.96 | 102.90 | 202.00 | 64.90 |
| | Wiang Sa | 178.60 | 46.02 | 27.24 | 89.26 | 8.44 | 54.08 | 6.40 | 94.32 | 75.31 | 66.36 | 188.70 | 55.55 |
| | Phrasaeng | 304.50 | 74.02 | 64.94 | 149.40 | 12.78 | 94.82 | 9.66 | 161.30 | 122.20 | 161.00 | 335.20 | 100.90 |
| | Phunphin | 108.50 | 42.40 | 41.39 | 89.49 | 30.05 | 61.00 | 23.75 | 90.00 | 64.55 | 90.96 | 172.10 | 62.26 |
| | Chai Buri | 268.40 | 65.14 | 63.81 | 129.50 | 8.88 | 82.39 | 6.46 | 134.40 | 102.20 | 154.20 | 286.80 | 86.31 |
| | Vibhavadi | 309.90 | 57.83 | 47.26 | 137.30 | 25.66 | 168.20 | 32.66 | 263.20 | 168.20 | 287.10 | 435.80 | 155.60 |
| RANONG | Mueang Ranong | 532.00 | 141.30 | 196.60 | 146.20 | 42.87 | 401.70 | 77.55 | 534.10 | 279.00 | 244.40 | 619.20 | 424.30 |
| | La-un | 615.60 | 103.90 | 342.20 | 128.80 | 39.90 | 399.00 | 82.91 | 666.60 | 332.50 | 210.60 | 865.40 | 520.00 |
| | Kapoe | 814.90 | 200.30 | 153.50 | 221.90 | 58.04 | 519.60 | 104.00 | 668.50 | 392.20 | 359.60 | 818.70 | 498.80 |
| | Kra Buri | 545.20 | 41.47 | 637.30 | 75.22 | 25.78 | 366.90 | 85.88 | 726.80 | 330.60 | 128.40 | 1073.00 | 600.40 |
| | Suk Samran | 860.80 | 256.30 | 184.70 | 265.90 | 82.57 | 556.20 | 126.90 | 623.40 | 409.50 | 377.80 | 832.40 | 527.80 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| CHUMPHON | Mueang Chumphon | 316.40 | 86.21 | 505.30 | 105.10 | 63.12 | 227.90 | 85.58 | 389.30 | 257.40 | 221.10 | 626.30 | 265.70 |
| | Tha Sae | 166.50 | 16.28 | 341.10 | 20.60 | 12.60 | 114.30 | 24.45 | 235.20 | 134.90 | 67.97 | 417.30 | 162.80 |
| | Pathio | 210.50 | 16.82 | 552.60 | 18.75 | 14.41 | 145.10 | 20.64 | 327.80 | 175.30 | 82.12 | 580.70 | 225.20 |
| | Lang Suan | 287.00 | 87.34 | 166.50 | 106.70 | 56.91 | 191.50 | 59.42 | 291.80 | 204.20 | 204.10 | 424.60 | 169.00 |
| | Lamae | 412.40 | 128.20 | 167.50 | 154.90 | 75.94 | 267.40 | 83.38 | 406.20 | 291.40 | 309.60 | 574.90 | 221.50 |
| | Phato | 253.40 | 46.75 | 68.55 | 63.09 | 14.67 | 144.70 | 25.58 | 216.40 | 151.90 | 158.90 | 316.10 | 130.30 |
| | Sawi | 236.30 | 55.64 | 263.20 | 74.06 | 38.75 | 160.50 | 52.14 | 267.60 | 175.90 | 150.20 | 424.10 | 173.80 |
| | Thung Tako | 423.10 | 130.60 | 359.30 | 159.70 | 88.89 | 295.00 | 98.14 | 452.70 | 312.10 | 306.40 | 675.70 | 279.50 |
| SONGKHLA | Mueang Songkhla | 29.72 | 38.72 | 102.60 | 86.64 | 47.83 | 25.73 | 65.62 | 35.67 | 40.92 | 147.20 | 114.30 | 126.60 |
| | Sathing Phra | 195.10 | 138.10 | 176.70 | 185.10 | 104.20 | 102.90 | 90.60 | 152.20 | 106.80 | 289.40 | 214.10 | 163.10 |
| | Chana | 79.45 | 45.34 | 83.16 | 65.60 | 22.66 | 20.03 | 14.72 | 27.47 | 43.99 | 42.44 | 34.05 | 42.44 |
| | Na Thawi | 99.47 | 52.12 | 92.31 | 68.09 | 18.78 | 21.45 | 6.04 | 30.84 | 50.31 | 20.76 | 24.16 | 29.54 |
| | Thepha | 80.26 | 50.77 | 107.90 | 88.90 | 34.91 | 25.21 | 25.13 | 31.37 | 59.02 | 40.56 | 32.11 | 44.93 |
| | Saba Yoi | 64.67 | 37.10 | 84.77 | 58.81 | 20.40 | 17.93 | 13.32 | 24.10 | 44.94 | 26.91 | 23.89 | 25.89 |
| | Ranot | 140.30 | 86.59 | 78.90 | 105.00 | 44.76 | 62.75 | 41.31 | 105.10 | 65.57 | 108.90 | 102.80 | 70.76 |
| | Krasae Sin | 155.70 | 80.73 | 77.64 | 88.95 | 23.27 | 33.38 | 27.90 | 108.20 | 55.13 | 119.00 | 97.79 | 75.17 |
| | Rattaphum | 4.49 | 2.76 | 30.13 | 12.56 | 12.34 | 7.85 | 11.90 | 7.17 | 7.54 | 144.40 | 60.41 | 44.62 |
| | Sadao | 53.80 | 27.02 | 62.83 | 39.95 | 14.85 | 14.31 | 7.55 | 20.63 | 32.04 | 71.56 | 39.80 | 36.32 |
| | Hat Yai | 66.78 | 39.05 | 113.00 | 80.87 | 32.66 | 19.59 | 23.93 | 21.89 | 35.01 | 202.50 | 139.40 | 117.30 |
| | Na Mom | 97.33 | 58.70 | 123.50 | 93.50 | 38.09 | 29.21 | 31.42 | 39.23 | 60.19 | 126.00 | 78.68 | 85.68 |
| | Khuan Niang | 26.13 | 19.05 | 67.55 | 41.41 | 28.90 | 20.36 | 29.77 | 25.39 | 23.38 | 233.40 | 107.40 | 83.23 |
| | Bang Klam | 43.58 | 28.85 | 94.64 | 58.40 | 35.73 | 24.31 | 35.98 | 30.79 | 34.93 | 267.30 | 127.80 | 106.40 |
| | Singhanakhon | 59.61 | 54.57 | 114.40 | 97.99 | 59.28 | 43.00 | 64.58 | 55.30 | 50.91 | 215.80 | 140.20 | 127.30 |
| | Khlong Hoi Khong | 29.92 | 15.90 | 59.98 | 31.45 | 20.02 | 13.21 | 15.30 | 16.16 | 23.92 | 158.50 | 73.33 | 62.95 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m$^3$) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| SATUN | Mueang Satun | 33.89 | 21.97 | 125.40 | 98.19 | 42.28 | 41.06 | 41.55 | 52.09 | 67.90 | 321.80 | 221.20 | 125.80 |
| | Khuan Don | 26.39 | 15.24 | 257.80 | 119.20 | 92.85 | 49.89 | 84.09 | 65.05 | 85.31 | 838.00 | 528.90 | 248.90 |
| | Khuan Kalong | 20.29 | 14.91 | 185.30 | 100.60 | 71.16 | 41.72 | 73.47 | 50.13 | 55.28 | 661.80 | 436.10 | 212.50 |
| | Tha Phae | 16.72 | 14.38 | 165.60 | 109.50 | 66.70 | 39.75 | 69.82 | 45.51 | 52.41 | 606.90 | 397.70 | 255.10 |
| | La-ngu | 4.96 | 7.44 | 98.35 | 67.45 | 45.34 | 25.19 | 54.32 | 27.24 | 24.49 | 413.00 | 299.10 | 176.50 |
| | Thung Wa | 8.95 | 9.00 | 96.98 | 62.31 | 45.90 | 26.07 | 60.90 | 33.89 | 25.76 | 411.50 | 342.20 | 154.60 |
| | Manang | 16.72 | 14.86 | 178.20 | 108.70 | 76.84 | 43.95 | 92.58 | 55.21 | 48.83 | 719.50 | 531.70 | 256.00 |
| TRANG | Mueang Trang | 220.10 | 90.01 | 148.90 | 244.40 | 25.21 | 74.70 | 39.42 | 243.80 | 204.70 | 218.60 | 238.40 | 69.95 |
| | Kantang | 107.00 | 40.40 | 98.76 | 138.30 | 37.70 | 73.00 | 47.78 | 143.50 | 115.80 | 371.10 | 250.50 | 106.30 |
| | Yan Ta Khao | 128.80 | 56.39 | 120.20 | 165.80 | 38.41 | 45.82 | 56.45 | 160.00 | 122.90 | 342.50 | 269.20 | 111.10 |
| | Palian | 23.86 | 13.32 | 69.65 | 64.94 | 41.19 | 26.50 | 57.78 | 47.84 | 34.89 | 357.50 | 242.90 | 121.40 |
| | Sikao | 310.40 | 95.28 | 203.30 | 301.40 | 39.67 | 235.80 | 29.17 | 303.70 | 327.20 | 351.10 | 275.80 | 88.37 |
| | Huai Yot | 233.50 | 94.08 | 142.00 | 256.50 | 20.87 | 123.80 | 34.85 | 270.10 | 222.00 | 187.00 | 251.80 | 58.09 |
| | Wang Wiset | 327.90 | 110.20 | 196.60 | 326.40 | 32.80 | 248.60 | 29.66 | 350.70 | 338.40 | 302.30 | 316.50 | 79.69 |
| | Na Yong | 319.50 | 140.10 | 216.00 | 360.00 | 33.12 | 58.28 | 59.92 | 359.50 | 282.00 | 267.50 | 328.20 | 94.73 |
| | Ratsada | 368.40 | 161.70 | 214.70 | 455.40 | 40.58 | 287.80 | 81.65 | 479.00 | 355.40 | 314.30 | 501.20 | 95.30 |
| | Hat Samran | 102.60 | 48.43 | 202.60 | 221.40 | 116.00 | 98.40 | 159.40 | 195.60 | 136.80 | 1071.00 | 703.10 | 349.80 |
| PHATTHALUNG | Mueang Phatthalung | 549.80 | 250.10 | 216.20 | 184.20 | 28.00 | 48.14 | 45.11 | 210.90 | 102.40 | 189.00 | 134.70 | 117.50 |
| | Kong Ra | 574.60 | 243.30 | 343.80 | 228.00 | 51.73 | 55.11 | 76.25 | 212.30 | 140.90 | 472.90 | 282.70 | 227.50 |
| | Khao Chaison | 403.00 | 186.60 | 203.80 | 148.20 | 32.71 | 39.42 | 45.16 | 157.00 | 80.93 | 235.50 | 138.20 | 121.20 |
| | Tamot | 207.50 | 92.75 | 250.50 | 115.80 | 51.33 | 38.44 | 65.97 | 94.78 | 63.09 | 526.80 | 239.10 | 209.30 |
| | Khuan Khanun | 574.70 | 282.80 | 234.60 | 228.30 | 47.69 | 88.12 | 60.79 | 224.60 | 132.10 | 167.00 | 149.70 | 106.70 |
| | Pak Phayun | 251.50 | 149.90 | 258.10 | 151.60 | 68.03 | 60.66 | 74.60 | 118.30 | 73.52 | 397.50 | 181.30 | 164.90 |
| | Si Banphot | 1194.00 | 492.10 | 482.80 | 422.10 | 40.02 | 81.87 | 69.75 | 393.10 | 292.00 | 256.60 | 282.70 | 148.10 |
| | Pa Bon | 58.52 | 28.25 | 159.20 | 55.83 | 36.12 | 25.84 | 41.55 | 38.35 | 28.06 | 397.10 | 150.30 | 131.40 |
| | Bang Kaeo | 534.60 | 257.00 | 342.50 | 222.80 | 64.59 | 66.93 | 81.89 | 217.40 | 118.60 | 476.50 | 242.10 | 212.70 |
| | Pa Phayom | 1133.00 | 493.80 | 447.10 | 434.80 | 58.52 | 166.70 | 87.67 | 403.90 | 287.60 | 266.60 | 300.00 | 150.30 |
| | Srinagarindra | 860.50 | 349.60 | 373.90 | 301.20 | 31.36 | 53.96 | 56.78 | 287.40 | 204.50 | 279.20 | 239.20 | 147.80 |

**Table H-2** $NO_2$ concentration from screen view for the Southern Region of each month in 2010 (Cont.)

| Province | District | C(ug/m³) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| PATTANI | Mueang Pattani | 347.10 | 250.30 | 546.20 | 432.30 | 208.20 | 130.00 | 165.70 | 123.20 | 254.80 | 213.20 | 194.80 | 272.30 |
| | Khok Pho | 223.20 | 158.70 | 370.80 | 311.60 | 139.00 | 84.24 | 113.20 | 87.94 | 174.40 | 159.30 | 137.50 | 204.00 |
| | Nong Chik | 313.30 | 224.30 | 514.60 | 430.60 | 195.00 | 118.50 | 158.50 | 121.60 | 242.00 | 219.10 | 191.30 | 282.50 |
| | Panare | 312.60 | 294.40 | 509.60 | 385.30 | 264.30 | 153.90 | 201.80 | 89.91 | 233.30 | 150.60 | 154.10 | 209.00 |
| | Mayo | 205.20 | 167.10 | 325.30 | 236.30 | 140.70 | 86.52 | 108.20 | 62.49 | 147.40 | 104.80 | 104.20 | 133.30 |
| | Thung Yang Daeng | 186.70 | 158.00 | 304.00 | 211.50 | 134.20 | 82.64 | 101.30 | 54.19 | 133.20 | 92.52 | 94.32 | 115.10 |
| | Sai Buri | 252.80 | 243.20 | 412.00 | 313.10 | 219.70 | 126.80 | 167.70 | 71.51 | 189.40 | 118.40 | 122.80 | 167.90 |
| | Mai Kaen | 622.80 | 547.90 | 1036.00 | 665.40 | 437.70 | 271.30 | 320.00 | 162.60 | 407.70 | 274.60 | 288.80 | 361.00 |
| | Yaring | 215.00 | 172.80 | 336.00 | 251.10 | 145.30 | 89.01 | 112.50 | 66.93 | 154.60 | 111.00 | 109.40 | 144.30 |
| | Yarang | 317.40 | 225.60 | 492.30 | 362.40 | 180.20 | 116.20 | 141.70 | 105.50 | 225.80 | 179.00 | 169.20 | 218.00 |
| | Kapho | 449.20 | 392.00 | 737.50 | 507.80 | 335.00 | 204.30 | 250.60 | 125.70 | 317.50 | 211.50 | 222.20 | 268.40 |
| | Mae Lan | 389.00 | 271.10 | 621.30 | 490.50 | 225.10 | 142.00 | 180.70 | 142.30 | 289.70 | 250.90 | 224.00 | 311.60 |
| YALA | Mueang Yala | 298.80 | 173.00 | 425.90 | 277.20 | 127.00 | 114.50 | 126.00 | 134.50 | 252.20 | 156.40 | 129.50 | 129.10 |
| | Betong | 106.50 | 61.83 | 179.10 | 69.25 | 17.31 | 22.80 | 11.94 | 50.42 | 50.44 | 98.04 | 77.19 | 18.18 |
| | Bannang Sata | 217.20 | 91.83 | 282.20 | 97.00 | 28.46 | 56.62 | 27.68 | 83.67 | 154.20 | 115.50 | 96.61 | 36.60 |
| | Than To | 223.00 | 105.40 | 316.70 | 108.50 | 27.33 | 52.21 | 21.27 | 91.52 | 136.10 | 152.80 | 124.20 | 33.14 |
| | Yaha | 324.00 | 142.50 | 392.30 | 181.40 | 64.68 | 98.10 | 65.40 | 135.30 | 251.30 | 160.90 | 131.90 | 87.47 |
| | Raman | 172.60 | 104.50 | 263.40 | 138.70 | 73.20 | 67.62 | 67.64 | 65.59 | 135.10 | 77.36 | 72.29 | 53.49 |
| | Kabang | 196.80 | 82.59 | 225.60 | 97.18 | 26.77 | 51.63 | 23.56 | 80.52 | 135.90 | 83.60 | 77.40 | 43.01 |
| | Krong Pinang | 374.50 | 170.20 | 482.60 | 208.40 | 77.74 | 112.90 | 78.14 | 151.40 | 285.40 | 185.40 | 156.70 | 90.96 |
| NARATHIWAT | Mueang Narathiwat | 219.10 | 185.30 | 460.20 | 194.00 | 154.60 | 154.20 | 83.72 | 71.90 | 134.40 | 140.40 | 111.70 | 76.27 |
| | Tak Bai | 119.30 | 180.80 | 402.30 | 170.00 | 196.30 | 192.00 | 68.77 | 34.35 | 39.53 | 143.40 | 87.13 | 89.74 |
| | Bacho | 367.70 | 272.30 | 603.60 | 351.50 | 225.40 | 184.10 | 197.90 | 135.20 | 294.10 | 159.80 | 152.30 | 136.00 |
| | Yi-ngo | 303.90 | 182.60 | 520.10 | 206.60 | 114.50 | 120.50 | 79.38 | 96.86 | 198.50 | 128.60 | 131.10 | 61.05 |
| | Ra-ngae | 211.00 | 116.70 | 369.90 | 121.00 | 58.61 | 75.52 | 34.28 | 66.09 | 129.20 | 92.80 | 93.71 | 27.71 |
| | Rueso | 152.70 | 74.61 | 241.30 | 89.59 | 34.19 | 41.56 | 28.20 | 49.02 | 100.10 | 50.81 | 60.71 | 21.53 |
| | Si Sakhon | 206.70 | 92.09 | 324.40 | 97.88 | 26.94 | 46.35 | 18.76 | 65.14 | 126.70 | 85.87 | 91.69 | 15.68 |
| | Waeng | 143.10 | 113.10 | 296.90 | 63.15 | 44.37 | 100.40 | 34.61 | 81.84 | 116.40 | 151.30 | 84.23 | 20.47 |
| | Sukhirin | 138.90 | 85.11 | 229.00 | 51.59 | 30.45 | 58.20 | 19.75 | 56.78 | 104.90 | 168.20 | 103.30 | 14.17 |
| | Su-ngai Kolok | 132.30 | 143.80 | 343.80 | 115.60 | 116.00 | 142.40 | 53.77 | 59.03 | 83.06 | 134.60 | 79.44 | 53.14 |
| | Su-ngai Padi | 100.70 | 97.25 | 239.30 | 81.36 | 76.10 | 90.81 | 34.92 | 40.10 | 62.06 | 97.08 | 61.37 | 35.01 |
| | Chanae | 121.60 | 64.17 | 189.90 | 48.21 | 21.16 | 38.22 | 13.28 | 43.21 | 84.76 | 114.00 | 79.10 | 10.75 |
| | Cho-airong | 168.00 | 155.50 | 390.40 | 146.70 | 131.00 | 140.30 | 57.59 | 55.67 | 93.67 | 134.60 | 95.98 | 60.71 |

# BIOGRAPHY


| | |
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