

Abstract

The study was the comparisons of the predictability efficiencies of the Particle Less Than 10 Microns (PM10) concentrations caused by open burning between the Simple Box Model and AERMOD Air Quality Model, a case study, Nakhonsawan province. This study related the data collected from the monitoring station with the values predicted by Air Quality Models at same times and locations using Linear regression. The sources input data were calculated using number of hotspots occurred each day according to the Moderate Resolution Imaging Spectroradiometer (MODIS) database provided by the Department of National Parks, Wildlife and Plant Conservation, emission factor from the Compilation of Air Pollutants Emission Factors (AP-42) which were developed by the United State Environmental Protection Agency were applied for PM10 emission rates from open burning. The location of the receptor was referred to the Ambient Air Quality Monitoring Station in Nakhonsawan Province at Nakhonsawan Technical College. The efficiencies of the models were then compared to verify the better model to predict the concentrations of PM10 and use the model as a management tool to control the concentrations of the PM10 in Nakhonsawan province. The study was conducted using the set of data from Nakhonsawan province during 2008-2009.

The result found that, the values calculated by AERMOD Air Quality Model could explain the actual monitored values 0.25% while the Simple Box Model without wind direction concerning explain about 9.31% and the Simple Box Model with wind direction concerning explain about 15.66%.

The comparative study of predictability efficiencies for PM10 concentrations as a result of open burning found that the Simple Box Model with wind direction concerning obtained the highest efficiency about 15.66%.

By using the result of the study to initiate measures to control open burning area to control PM10 in Nakhonsawan province to lower than the Ambient Air Quality Standard, Simple Box Model with wind direction concerning obtained the highest efficiency. The model created equation as follow:

Open burning area (rais/day) = (Wind Speed, m/s) x (Mixing Height, m) x (0.7247 -
Concentration PM10 from the day before, 24-hr avg, $\mu\text{g}/\text{m}^3$ x 0.006)