

Thesis Title	Acid Deposition in Southern Region of Thailand
Thesis Credits	12
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Degree of Study	Master of Engineering
Department	Environmental Technology
Academic Year	2001

Abstract

The purpose of this research was to conduct the amount of acid deposition in the southern region of Thailand quantitatively. The sampling site was carried out at the Prince of Songkhla University, Hatyai, Songkhla province. The acid deposition composed of wet deposition in the form of rain water and dry deposition collected from the atmosphere. Rainwater samples were collected on daily basis using an automatic wet only collector. For the dry aerosol deposition, the ambient air was drawn through a 4-stage filter pack by a suction pump continuously for 7 days, once month for a period of 12 months.

The result of wet deposition study showed that the annual average pH value of the rain water was 5.6. This indicated that the ambient condition in the southern region was not in the acidic range. The chemical analyses also showed the highest ion concentration of Na^+ of 23.9 microgram/liter, followed by Cl^- , NH_4^+ , SO_4^{2-} , Ca^{2+} , Mg^{2+} , NO_3^- and K^+ at the values of 23.4, 16.1, 14.1, 16.2, 12.2, 8.8, 7.5 and 3.1 microgram/liter, respectively. The ratio of $\text{NO}_3^- / \text{SO}_4^{2-}$ was 0.58. The value smaller than 1 indicated the influence of the sulfur compound in the rain water to be higher than the nitrogen compound. The ratio of $(\text{Ca}^{2+}, \text{Mg}^{2+} \text{ and } \text{NH}_4^+) / (\text{NO}_3^- \text{ and } \text{SO}_4^{2-})$ was determined to be 2.03. This value also indicated the influence of Ca^{2+} , Mg^{2+} and NH_4^+ to play an important part as the buffering ions, in which they had tendency to neutralize acidity of the rain water. The quantity of wet acid deposition of SO_4^{2-} and NO_3^- in Songkhla were found to be 21.8 and 11.2 milliequivalent per square meter per year, respectively.

The dry deposition study in the southern region showed the highest concentration of NH_3 in the atmosphere. Its maximum concentration was found to be 138.7 nanomoles per

square meter. The concentration of other gases, i.e., HCl, SO₂ and HNO₃ were found to be 49.1, 18.5 and 11.6 nanomoles per square meter, respectively. The deposition velocities of gaseous SO₂ and HNO₃ in the region were calculated to be 2.2 and 2.3 centimeters per second, respectively. The deposition velocity depended on the meteorological condition and resistance of the atmospheric layer and the canopy above the earth surface. The quantity of dry acid deposition of SO₂ and HNO₃ in Songkhla were determined to be 34.0 and 25.9 micromoles per square meter per day, or equivalent to 12,410 and 9,454 micromoles per square meter per year, respectively.

A comparative study on the wet and dry acid depositions showed that the quantity of wet deposition was 2.5 times higher than the dry deposition. The study could be shown also that the amount of sulfur deposition was 4 times higher than the nitrogen.

It should be noted by this study that the high concentration of ionic sea salt, i.e. Na⁺ and Cl⁻ as well as NH₄⁺ were found in the rain water samples. The amount of gaseous NH₃ was significantly high also. These indicated the sources of emission from the industrial and agricultural activities nearby the study area.