

3.110 Chemical characteristics and deposition amounts of precipitation components in Bangkok metropolitan region.

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Abstract:

A comprehensive study on the chemical characteristics and deposition fluxes of precipitation components including pH, major ions (SO_4^{2-} , NO_3^- , Cl^- , Na^+ , NH_4^+ , K^+ , Mg^{2+} , Ca^{2+}), water insoluble organic carbon (WIOC), water soluble organic carbon (WSOC), elemental carbon (EC) were carried out from September 2015 to March 2017 at suburban site and urban site in Bangkok metropolitan region, Thailand. To study the scavenging effect of atmospheric particles by wet deposition, particulate carbonaceous components in $\text{PM}_{2.5}$ and Coarse particles were also observed simultaneously. Average pH of rainwater at suburban and urban sites were 4.7-7.0 and 4.6-7.1, respectively. The total annual wet deposition fluxes for different species at both sites ranged from 5.3 to 86.1 meq/m^2 with the following order: $\text{NH}_4^+ > \text{Ca}^{2+} > \text{NO}_3^- > \text{SO}_4^{2-} > \text{Cl}^- > \text{Na}^+ > \text{K}^+ > \text{Mg}^{2+}$. The deposition amount of carbonaceous components were also evaluated and compared with the observation results in Japan. The average concentrations of carbonaceous components were higher at suburban area than city center of Bangkok. The contribution of insoluble organic components to total organic carbon at suburban site is more important, the contribution of EC from vehicle exhaust was more important at urban site. The ions, and carbonaceous concentrations were higher in dry season, while the deposition amount was higher in wet season. The influence of scavenging process by precipitation was more important for OC than EC. The long range transport from inland (East direction) contributed significantly EC and anthropogenic ions to the rainwater from sites in Bangkok Metropolitan Region. The chemical species in rainwater at Bangkok metropolitan region were mainly composed of carbonaceous components from combustion sources, acid-base ions and marine species. This study is conducted within the JICA Research Institute's research project, "A Study on Urban Air Pollution Improvement in Asia," which focuses on $\text{PM}_{2.5}$ and other air pollution problems and analyzes relevant policies, primarily in Asian countries.