

Chemical characterization of atmospheric aerosols measured at Phimai, Thailand

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Abstract

An intensive field program was performed to measure atmospheric aerosols at the Observatory for Atmospheric Research, in Phimai, Thailand, every six days per month during July 2007-June 2008, under a collaborative study with Chulalongkorn University. Chemical analysis of the collected aerosols with the four size ranges was made for elemental and organic carbons (EC/OC) by improved method, water soluble ions by ion chromatography, and trace elements by PIXE. Chemical composition was estimated for sea-salt particles, soil mineral dusts, and biomass burning. According to a backward trajectory analysis, the surface wind pattern in the dry season was northeasterly from middle October 2007 to middle March 2008, and then shifted southerly from middle March to early May. For the other period, southwesterly monsoon was

prevailed in the wet season. From the hotspot analysis by a satellite dataset, active biomass burning of the residue of agricultural wastes was detected in south China and Indochina from Dec. 2007 to March 2008. A relationship between EC and non sea-salt sulfate in fine particles revealed that the polluted air masses rich in $(\text{NH}_4)_2\text{SO}_4$ emitted from east Asia was transported to Phimai, while in the latter period of dry season, aerosols rich in EC emitted from biomass burning in Indochina was dominant. During the wet season, however, nitrate was higher in coarse particles, due to the emission from automobiles in Bangkok. Sea salt particles and soil dust particles were also detected in coarse particles.