

## Chemical characterization of atmospheric aerosols at Phimai, Thailand

### II. Contribution of fossil fuel combustion, biomass burning, and soil dust

H. Tsuruta<sup>1</sup>, J. Chotpitayasunon<sup>2</sup>, B. Thana<sup>2</sup>, T. Takamura<sup>3</sup>, S. Sudo<sup>4</sup>, S. Yonemura<sup>4</sup>, K.Sera<sup>5</sup>, Y.Saitoh<sup>6</sup>, Y. Shirasuna<sup>7</sup>, K. Hirano<sup>7</sup>, T. Hayasaka<sup>8</sup> and T. Nakajima<sup>1</sup>

<sup>1</sup>Atmosphere and Ocean Research Institute, The University of Tokyo  
5-1-5 Kashiwanoha, Kashiwa, Chiba 277-8568, Japan

<sup>2</sup>Department of Geology, Faculty of Science, Chulalongkorn University  
Phayathai Road, Bangkok, 10330 Thailand

<sup>3</sup>Center for Environmental Remote Sensing, Chiba University  
1-33 Yayoicho, Inage, Chiba Chiba, 263-8522, Japan

<sup>4</sup>National Institute for Agro-Environmental Sciences  
3-1-3 Kannondai, Tsukuba, Ibaraki 305-8604, Japan

<sup>5</sup>Cyclotron Research Center, Iwate Medical University,  
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

<sup>6</sup>Takizawa Institute, Japan Radioisotope Association,  
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

<sup>7</sup>Yokohama City Institute of Environmental Sciences,  
1-2-15 Takigashira, Yokohama 235-0012, Japan

<sup>8</sup>Center for Atmospheric and Oceanic Studies, Tohoku University  
6-3, Aoba, Aramaki, Aoba-ku, Sendai 980-8579, Japan

#### Abstract

An intensive field program was performed to measure atmospheric aerosols at the Observatory for Atmospheric Research, in Phimai, Thailand during July 2007-June 2008. 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. A relationship between elemental carbon (EC) and non sea-salt sulfate ( $\text{nss-SO}_4^{2-}$ ) 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 were dominant. These source-receptor relationships which

were analyzed in the previous report were supported by the detailed analysis using Pb and Zn in fine particles in the dry season. For soil dust, Zr in coarse particles was a good indicator of soil dust in atmospheric aerosols in the latter dry season, because it could be re-suspended into the atmosphere from surface soils in Indochina after the surface soil became dry. Furthermore, the relationship between K and Fe in fine and coarse particles strongly suggests that the soil dust could be also released into the atmosphere by the strong thermal plume generated by biomass burning in the latter dry season.