

## 能登半島珠洲における大気汚染物質の包括的解析 Comprehensive analyses of air pollutants at Suzu, Noto peninsula, Japan

定永 靖宗<sup>1\*</sup>; 中尾 裕樹<sup>1</sup>; 石山 絢菜<sup>1</sup>; 高治 諒<sup>1</sup>; 松木 篤<sup>2</sup>; 岩本 洋子<sup>3</sup>; 渡辺 幸一<sup>4</sup>; 佐藤 啓市<sup>5</sup>; 長田 和雄<sup>6</sup>; 坂東 博<sup>1</sup>

SADANAGA, Yasuhiro<sup>1\*</sup>; NAKAO, Yuki<sup>1</sup>; ISHIYAMA, Ayana<sup>1</sup>; TAKAJI, Ryo<sup>1</sup>; MATSUKI, Atsushi<sup>2</sup>; IWAMOTO, Yoko<sup>3</sup>; WATANABE, Koichi<sup>4</sup>; SATO, Keiichi<sup>5</sup>; OSADA, Kazuo<sup>6</sup>; BANDOW, Hiroshi<sup>1</sup>

<sup>1</sup>大阪府立大学, <sup>2</sup>金沢大学, <sup>3</sup>東京理科大学, <sup>4</sup>富山県立大学, <sup>5</sup>アジア大気汚染研究センター, <sup>6</sup>名古屋大学

<sup>1</sup>Osaka Prefecture University, <sup>2</sup>Kanazawa University, <sup>3</sup>Tokyo University of Science, <sup>4</sup>Toyama Prefectural University, <sup>5</sup>Asia Center for Air Pollution Research, <sup>6</sup>Nagoya University

Recent remarkable economic progress in East Asia has increased emissions of air pollutants such as nitrogen oxides, sulfur dioxide, ammonia and volatile organic compounds. Such pollutants are transported over a long distance with photochemical reactions and then arrive at Japan as aged species such as gas phase nitric acid (HNO<sub>3</sub>), particulate nitrate (NO<sub>3</sub><sup>-</sup>), sulfate (SO<sub>4</sub>), peroxy nitrates (PNs), organic nitrates (ONs), ammonium (NH<sub>4</sub><sup>+</sup>), organic aerosol (Org) and so on. Many researches on the transboundary pollution in Japan focus on the areas of western Japan near the Asian continent. On the other hand, it is important to investigate the transboundary air pollution in the central Japan area because there are many large cities. In addition, the central Japan is moderately far from the Asian continent, so that more aged air mass from the Asian continent would come at the central Japan. In this research, continuous observations of such air pollutants at Suzu, Noto peninsula, Japan. Suzu is representative remote area and located at the central Japan.

Observations are performed at NOTOGRO (NOTO Ground-based Research Observatory) supersite (37.45°N, 137.36°E) in Suzu. Total odd nitrogen species (NO<sub>y</sub>) and total nitrate (T.NO<sub>3</sub> = HNO<sub>3</sub> + NO<sub>3</sub><sup>-</sup>) were measured by a scrubber difference / NO-O<sub>3</sub> chemiluminescence method. PNs and ONs were measured by a thermal dissociation / cavity attenuated phase shift spectroscopy method. CO, O<sub>3</sub> and SO<sub>2</sub> were observed by non-dispersive IR, UV absorption, and pulsed UV fluorescence methods, respectively. Org, NH<sub>4</sub><sup>+</sup>, SO<sub>4</sub> and fine NO<sub>3</sub><sup>-</sup> were measured by an aerosol mass spectrometer. SO<sub>4</sub> was also measured by a thermal reduction / pulsed UV fluorescence method.

Results of SO<sub>4</sub> and T.NO<sub>3</sub> were reported in this abstract. The air mass origins were classified into five groups; China and Korea (CK) North China (NC), Japan (JP), Russia (RU), and Sea (S), by backward trajectory analyses. Concentrations of air pollutants from CK air mass origin were generally high. In many cases, SO<sub>4</sub> concentrations from JP were lower than those from CK, while T.NO<sub>3</sub> concentrations from JP were similar to those from CK. In addition, SO<sub>4</sub> concentrations from CK were very high, but T.NO<sub>3</sub> concentrations from CK were not, in August 2013 and June 2014. Many of SO<sub>4</sub> in remote area is present as fine particles while NO<sub>3</sub><sup>-</sup> exists as coarse particles mainly. The deposition velocity of coarse particles (ca. 0.03-1.24 cm s<sup>-1</sup>) is larger than that of fine aerosols (ca. 0.05-0.6 cm s<sup>-1</sup>). In addition, the deposition velocity of HNO<sub>3</sub> (ca. 1-8 cm s<sup>-1</sup>) is larger than that of NO<sub>3</sub><sup>-</sup>. The lifetime of SO<sub>4</sub> is longer than that of T.NO<sub>3</sub>, so that SO<sub>4</sub> contributes strongly to the transboundary air pollution at Suzu, in comparison with T.NO<sub>3</sub>. In this presentation, more detailed results and discussion, including other air pollutants will be described.

キーワード: 長距離輸送, 大気汚染物質, 東アジア

Keywords: Long-range transport, Air pollutants, East Asia