Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U04-P02 会場:3 階ポスター会場 時間:4 月 29 日 14:00-15:15

東シナ海上空における窒素化合物の航空機観測
Aerial observations for nitrogen compounds over the East China Sea

定永 靖宗 [1*] ; 坂東 博 [1] ; 新垣 雄光 [2] ; 加藤 俊吾 [3] ; 梶井 克純 [4] ; 張 代洲 [5] ; 渡邉 泉 [6] ; 藤本 敏行 [7] ; 奥山 喜久夫 [8] ; 荻 崇 [8] ; 瀬戸 章文 [9] ; 高見 昭憲 [10] ; 清水 厚 [10] ; 畠山 史郎 [6]
SADANAGA, Yasuhiro[1*] ; BANDOW, Hiroshi[1] ; ARAKAKI, Takemitsu[2] ; KATO, Shungo[3] ; KAJII, Yoshizumi[4] ; ZHANG, Daizhou[5] ; WATANABE, Izumi[6] ; FUJIMOTO, Toshiyuki[7] ; OKUYAMA, Kikuo[8] ; OGI, Takashi[8] ; SETO, Takafumi[9] ; TAKAMI, Akinori[10] ; SHIMIZU, Atsushi[10] ; HATAKEYAMA, Shiro[6]

[1] 大阪府立大学, [2] 琉球大学, [3] 首都大学東京, [4] 京都大学, [5] 熊本県立大学, [6] 東京農工大学, [7] 室蘭工業大学, [8] 広島大学, [9] 金沢大学, [10] 国立環境研究所
[1]Osaka Prefecture University, [2]University of the Ryukyus, [3]Tokyo Metropolitan University, [4]Kyoto University, [5]Prefectural University of Kumamoto, [6]Tokyo University of Agriculture and Technology, [7]Muroran Institute of Technology, [8]Hiroshima University, [9]Kanazawa University, [10]National Institute for Environmental Studies

In order to clarify long-range transport of air pollutants from the Asian continent, we have conducted aerial observation over the East China Sea and measured air pollutants centering on aerosols, as part of Grant-in-Aid for Scientific Research on Innovative Areas “ Impacts of Aerosols in East Asia on Plants and Human Health (ASEPH) ” . In this presentation, the results of nitrogen compounds such as nitrate are mainly described.

The aerial observations were conducted in October, 2009 (autumn), December, 2010 (winter) and March, 2012 (spring) over the East China Sea. The flights were performed between Fukue Island and the southern offing of Jeju Island and the flight altitudes were 500, 1000, 2000 and 3000 m. Onboard measurements of gaseous total odd nitrogen species, gaseous nitric acid (HNO_3(g)), O_3, SO_2, CO and black carbon were made and particles were collected on filters for ionic and metal component analyses.

The concentration ratios of particulate nitrate (NO_3^-(p)) to inorganic total nitrate (T.NO_3 = HNO_3(g) + NO_3^-(p)) were less than 0.5 in most of the flights except under high concentrations of dust particles (Kosa) or transboundary air pollutants. Most of NO_3^-(p) would be $NaNO_3$ formed by the reaction of gaseous nitric acid (HNO_3(g)) with sea salt aerosols during the observations in autumn and winter except on October 17 and December 11, when high concentrations of Kosa were transported. In the spring observation, the fraction of $NaNO_3$ in NO_3^-(p) was low and a large part of NO_3^-(p) would be originated from reactions of HNO_3(g) with gas phase ammonia and soil dust particles.

O_3 concentrations decreased with altitude in autumn and increased in winter. Positive and negative correlations between NO_y-T.NO_3 and O_3 concentrations were observed throughout the flights in autumn and winter, respectively. This indicates that the major components of NO_y-T.NO_3 were secondary photochemical nitrogen oxides such as PANs and NO_x, in autumn and winter, respectively. The differences of vertical distribution and NO_y components between autumn and winter may be caused by the variation of solar radiation intensity.

キーワード: 航空機観測, 硝酸 (塩), 反応性総窒素酸化物, 東アジア
Keywords: aerial observation, nitrate, total odd nitrogen species, East Asia