

AAS001-07

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Source apportionment of nonmethane hydrocarbons using observational data, two receptor models and emission inventory

Yu Morino^{1*}, Toshimasa Ohara¹, Yoko Yokouchi¹, Atsushi Ooki¹

¹National Institute for Environmental Stu

Source contributions of nonmethane hydrocarbons (NMHCs) were evaluated using observational dataset, two receptor models, and emission inventory. The C2-C8 NMHCs were measured with a time resolution of 1 hour by online gas chromatograph with a flame ionization detector (GC-FID) installed on the rooftop of a main building of Saitama Institute of Public Health (a Saitama site) from November 2006 to December 2007. Similar set of instruments for NMHCs measurement has been deployed at Fukue Island (a Fukue site) in 2009. Background concentrations of NMHCs at the Saitama site, which were estimated from monthly lower 5 percentile, well corresponded with monthly median concentrations of NMHCs at the Fukue site, suggesting that the background concentrations were reasonably estimated. Two receptor models were calculated for the NMHC source apportionment. One is the chemical mass balance (CMB) model and the other is the positive matrix factorization (PMF). The source contributions of NMHCs calculated by the two models corresponded within a factor of two, which is a measure of uncertainties in NMHC source apportionment using these two models. The results of the receptor models were consistent with emission inventory, suggesting that current emission inventory captures the source profiles of NMHC emissions.

Keywords: nonmethane hydrocarbons, source apportionment, chemical mass balance, positive matrix factorization, emission inventory