

Comparison with GC-FID, SIFT-MS and NMHC analyzer at suburban area

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Volatile Organic Compound (VOC) is a precursor of photochemical oxidant. Monitoring of VOC has been performed by NMHC analyzer. But each VOC has different contribution for producing ozone, and measurement of individual VOC species is required. VOC can be measured by GC-FID or GC-MS. But they required to involve concentration procedure and oxygenated VOC (OVOC) would be not analyzed quantitatively. Selected ion flow tube mass spectrometry (SIFT-MS) is a technique which allow to analyze OVOC without concentration procedure, Here, we compared with NMHC analyzer results with the sum of GC-FID results with OVOC measured by SIFT-MS. Ambient air measurements were conducted on fall in 2021, summer in 2022, fall in 2022, and winter in 2023 at Minamiosawa, suburb of Tokyo. NMHC analyzer at Atago monitoring site (about 5km away from Minamiosawa) was used for comparison. Generally, good correlations between the SIFT-MS derived concentrations and the GC-FID derived concentrations of VOCs were obtained. The slope of the correlation plots was some difference in different period, The difference would be mainly caused by the concentration difference in each season. Relative contribution of OVOC to sum of VOCs is higher during summer. Sum of GC-FID and OVOC obtained by SIFT-MS tended to be higher than NMHC analyzer.

Keywords: Volatile organic compound, Selected ion flow tube mass spectrometer, Gas chromatography/Flame ionization detector