8th International Conference on Fog, Fog Collection and Dew
Taipei, Taiwan, 14–19 July 2019
IFDA2019-184

Mercury in fog water collected on Mt. Front Lulin in central Taiwan

Guey-Rong Sheu (1), Ly Sy Phu Nguyen (1), Otto Klemm (2), and Neng-Huei Lin (1)

(1) Department of Atmospheric Sciences, National Central University, Jhong-Li, Taiwan, (2) Climatology Working Group, Institute of Landscape Ecology, University of Munster, Munster, Germany

Atmospheric mercury (Hg) can get incorporated into fog water via scavenging of gaseous oxidized Hg and particulate Hg. Besides, fog droplet may act as a reaction vessel for aqueous chemistry by providing the medium for the conversion of various Hg species. Accordingly, fog water deposition through impaction with vegetation and the Earth's surface can be an important source of Hg deposition to these ecosystems. In spite of the potential importance of fog to atmospheric Hg transport and cycling, however, very limited fog water Hg measurements have been reported. Fog water was sampled on Mt. Front Lulin in central Taiwan between March 7 and April 1, 2017 for total mercury (Hg) analysis. A total of 10 fog events were encountered, and 78 and 63 fog water samples were collected for Hg and major ion analyses, respectively. The mean cloud water pH was 4.17. NH_4^+ and SO_4^{2-} were the major cation and anion in fog water. About 99% of the measured SO_4^{2-} was non-sea-salt-SO_4^{2-} (nss-SO_4^{2-}), indicating the influence of human activities. Concentrations of Hg ranged between 0.1 and 32.8 ng L^{-1}, with a mean of 7.2 ng L^{-1}, which is lower than the mean Hg level of 9.6 ng L^{-1} for the cloud water samples collected on Mt. Bamboo in northern Taiwan in January-March 2009. Elevated Hg concentrations were usually associated with highly acidic samples. Hg concentrations were well correlated with major ion concentrations, especially SO_4^{2-}, NO_3^-, K^+, and NH_4^+. Results of this research indicated that human activities, such as coal combustion, industrial activities, and biomass/biofuel burning could have contributed to the measured Hg in fog water.