



Fog chemistry at the summit and on the foot of Mt. Fuji

H. Okochi (1), N. Takemura (1), S. Maruyama (1), Y. Minami (2), and H. Kobayashi (3)

(1) Waseda University, Japan (hokochi@waseda.jp), (2) Ishikawa Prefectural University, Japan, (3) University of Yamanashi, Japan

Mt. Fuji, which is the highest mountain in Japan (3776 m a.s.l.), is an isolated peak and therefore could be regarded as the tower to observe the long-range transportation from East Asia such as China and Korea to Japan, the mixing processes from the boundary layer to the free troposphere, and the nucleation/precipitation scavenging processes of various atmospheric pollutants.

We have studied fog water chemistry on the southeast foot of Mt. Fuji (Tarobo located at the starting point in the Gotemba climbing route, 1300 m a.s.l.) all over the year from 2006. Simultaneous sampling of fog water, rainwater, acidic and ammonia gases, and aerosols in the ambient air were performed at the summit and on the foot of Mt. Fuji during the summer from 2006 to 2009. Dew water was also collected on the foot of Mt. Fuji on clear nights during the summer observational campaign. The volume weighted mean pH of fog water collected on the foot of Mt. Fuji was 3.60 (range: 3.51 – 3.73, n=4) in 2006, 3.81 (range: 3.60 – 5.50, n=9) in 2007, 3.69 (range: 3.26 – 4.11, n=20) in 2008, respectively. During the 4-years summer observational campaign, the volume weighted mean pH of fog water collected at the summit was 4.68 (range: 3.72 – 5.61, n=58), while that of fog water on the foot was 3.57 (range: 3.20 – 6.03, n=20). The total concentration of major ions on the foot was 16 times lower than that at the summit of Mt. Fuji. The pH of fog water decreased as the ratio of nitrate to sulphate increased both at the summit and on the foot, indicating that the absorption of nitric acid in the ambient air into fog droplets is the dominant acidifying process in Mt. Fuji. We will discuss the scavenging mechanism of acidic substances into fog water and the long-range transportation of acidic substances from East Asia.