Observation on Atmospheric Aerosol at the summit of Mt. Fuji: Chemical species as indexes of a long-range transport.

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Free troposphere, which involves about 70 % of global air in weight, is still one of the frontiers for atmospheric chemistry. It is important to directly observe the aerosol in free troposphere for elucidation of the transport mechanism of atmospheric aerosol. Since it is hard to approach the free troposphere, most sample collection is performed by airplane observations. Therefore, the sampling conditions have been limited to comparatively good meteorological conditions when airplanes can fly. Mountains higher than 3000m, can be another candidate for sampling sites of free troposphere, however, the accompanying boundary layers, even though small, should always be considered in selecting the sampling sites. The summit of Mt. Fuji (3776m a.s.l.) is thought to be in the free troposphere most of the time throughout the year, due to the shape of the mountain as a high and slim sole peak. (Tsutsumi et al., 1994) Since 1990, some of the authors collected precipitation and aerosol samples at the summit. Tsutsumi et al. has been measuring the concentration of ozone since 1992. On the basis of these preliminary works, summer campaigns of 10 days to 2 weeks of concentrated observation were begun in 1997. During these campaigns aerosols (bulk-low volume air sampler, bulk-high volume air sampler, Andersen sampler, particle counter, individual particulate for EDX determination), precipitation and fog samples were collected. Chemical species in aerosol and precipitation samples were determined using ionchromatography, ICP-AES, ICP-MS, etc. Trace gases (CO, H2, SO2, NOx, NOy, HCl, H2O2 and MHP) have been measured, as well as O3, which has been continuously observed by a Dasibi type UV spectrophotometer since 1992. In the 2002 campaign, concentration of radon was also determined at the summit as well as at Tarobo on the ESE slope (1300m a.s.l.). Concentration of black carbon was determined continuously at the summit using an ethalometer. Continuous SO2 determination was also performed using a UV luminescence method.

From the results obtained in these six years, it can be concluded that the high mountain station, such as Mt. Fuji, has a potential importance as a platform of chemical observation of free troposphere. It can offer continuous observation data, which is impossible to be obtained by airplane observations. More observation campaigns, including other seasons than summer and early autumn, should be performed in future.

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