Long-term Measurements of Atmospheric Aerosol, Cloud and Snow at Mt. Tateyama

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The aerosol, cloud and snow play an important role in the earth environment at high mountain region (Aoki and Watanabe, 2009). Especially, it is important in the free troposphere, that the aerosol particles are very low. However, our mountain observation sites has shown that large quantities of anthropogenic aerosols, Asian dust, and Siberia forest fire from the Asian continent are transported through the source region to the Mt.Tateyama region. We were studied at the Mt.Tateyama areas, Tateyama Research Laboratory (University of Toyama Mountain observatory) located on top of the Mt.Jodo, Toyama, Japan (36.57˚N, 137.61˚E, 2839 m asl.) and at the Murododaira, Toyama, Japan (36.58˚N, 137.60˚E, 2450 m asl.). Mt. Tateyama, the Northern Japan Alps, is located in southeastern Toyama Prefecture, near the Toyama bay on the coast of Sea of Japan. Horizontal distance is about 30 km from Mountain to Sea. We conducted the measurements of weather, remote sensing of aerosol and cloud, the analysis of snow layer sampled and so on. Furthermore, we measured weather and the aerosol optical properties by using sky radiometer in the city of Toyama (Aoki et al., 2013), our University on the top of roof (36.70˚N, 137.19˚E, 30 m asl.). We started the long-term monitoring of snow layer from Murododaira since 1970’s every mid of April (This season is the maximum snow depth, about six or seven meter every year). The plied snow layers exhibit the chronology of transport and deposition of atmosphere during autumn to spring. It was found that the physical and chemical properties of snow (e.g. Aoki and Watanabe, 2009, Mochizuki et al., 2016, Hayakawa et al., 2019), bio-aerosols (e.g. Maki et al., 2018) and simulation of snow amounts (Kawase et al., 2018). Furthermore, we measured the aerosol optical properties by using sky radiometer at Mt.Jodo and University of Toyama (vertical distance is about 3000 m.). The aerosol optical properties have a significant vertical characteristic. We provide the information, in the presentation, on the mountain science with respect to their temporal and spatial variability of aerosol, cloud and snow on the Mt.Tateyama areas.

Keywords: Mountain Science, Mt.Tateyama, Aerosol, Cloud, Snow, Earth Environment

