

## 4.126 Annual variation of new particle formation at the summit of Mt. Fuji.

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Abstract:

New particle formation (NPF) is the process creating particles by condensation with surrounding gases. The NPF process makes the number concentration of aerosols particles with a diameter  $< 25$  nm (: a nucleation mode) increase, affecting the Earth's radiation budget by direct effect. However, the NPF mechanism and growth process are not sufficiently understood due to the limited observation data related with various chemical species and multi-step chemical reactions. Therefore, the long-term measurement of aerosol size distributions need to be done in various places. The top of Mt. Fuji is located at the area where has little effect on the local anthropogenic sources, and located within the free troposphere. Moreover, a direct observation of the aerosol particles transported from Asian continent is possible. In this study, we elucidate the annual variation and the diurnal change of NPF by the long-term measurement of size-resolved number concentration at the top of Mt. Fuji ( $35.360^{\circ}\text{N}$ ,  $138.727^{\circ}\text{E}$ ,  $3776$  m a.s.l.) during summer (July to August) in 2011-2017. The measurement was conducted by using a Scanning Mobility Particle Sizer (SMPS) under dry condition (relative humidity  $< 30\%$ ). The detectable diameter range was from  $10$  nm to  $487$  nm.

We defined the NPF event as an event that the size-resolved number concentration in the nucleation mode increased over 1 hour. We observed 176 NPF events for 217 days. Most events occurred at 8 o'clock (daytime) and 20 to 21 o'clock (nighttime) in local time. According to a back-trajectory analysis (NOAA HYSPLIT version 4), the observed airmasses were often transported from the Asian continent. Moreover, using the trajectories, we estimated the location and time where and when the NPF occurred. We found that the observed NPF events occurred mainly during the daytime (80%), and the events occurred mainly over Japan islands.