

Cloud droplet size measured for different supersaturations at Noto Peninsula, Japan, in autumn 2012.

Kento Kinouchi^{1*}, Yoko Iwamoto², Atsushi Matsuki²

¹School of Graduate School of Natural Science & Technology, Kanazawa University, ²Institute of Nature and Environmental Technology

The size of cloud droplets is one of the important factors that control the radiative properties and lifetimes of clouds. In general, it has long been accepted that growth rates of cloud droplets depend solely on water vapor supersaturation (SS). To challenge this established theory, we conducted in-situ measurement of atmospheric aerosols and related cloud growth kinetics in East Asia, in order to investigate the relative importance of other factors that can potentially influence the initial cloud droplet growth. In this study, diameters of cloud droplets were measured by using cloud condensation nuclei counter (CCNC) at Suzu, Noto Peninsula (NOTOGRO) in October, 2012. CCNC was operated at four different SS conditions (SS=0.1%, 0.2%, 0.5%, 0.8%). The diameters of cloud droplets activated from ambient aerosols were compared to those activated from ammonium sulfate (regarded here as representative inorganic CCN). The negative correlations between the cloud droplets' diameters and organic aerosol mass fractions were observed. The initial growth rate of cloud droplets activated from ambient aerosol were considered to be inhibited by the existence of organics especially under the lower SS conditions (SS=0.1% and 0.2%).

Keywords: cloud condensation nuclei, cloud droplet size, atmospheric aerosol, chemical composition