Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)


U06-P18 Room:Convention Hall Time:May 24 18:15-19:30

# Aircraft observation on mesoscale and microphysical processes in a mesoscale convective system and typhoon

SHINODA, Taro[1*] ; TSUBOKI, Kazuhisa[1] ; KOIKE, Makoto[2] ; NIINO, Hiroshi[3] ; SATOH, Masaki[3]

[1]Hydrospheric Atmospheric Research Center, Nagoya University, [2]Graduate School of Science, the University of Tokyo, [3]Atmosphere and Ocean Research Institute, the University of Tokyo

Aircraft observations can provide high temporal and spatial information along the flight path, thus they are one of useful and important tools for understanding earth sciences as well as ground-based and satellite observations. The Meteorological Society of Japan proposed a research project entitled ”Promotion of Scientific Research on Atmosphere and Climate System Using Aircraft” as a candidate for Master Plan of Large Research Project announced by the Japan Council of Science. Under the project, we make a plan to conduct observations using an aircraft on the circulation and budget of the greenhouse gases, chemical processes of various species in the troposphere, interactions between aerosols and cloud particles, and cloud microphysical processes. Aircraft observations for three-dimensional wind, temperature, humidity, and microphysical properties in and around mesoscale convective systems (MCSs) and typhoons are critically useful for better understanding on the mesoscale and microphysical processes of the phenomena. These results obtained by aircrafts as well as the data assimilation technique are expected to improve the accuracy of numerical weather prediction for extreme phenomena.

However, few aircraft observations focused on mesoscale and microphysical processes are conducted by Japanese researchers. We have less experiences on the aircraft observations on the field. We also have less instruments loaded on a aircraft, thus we need to construct the instruments. For example, no research organization in Japan has a multi-channel dropsonde observation system now. It should be needed for the high spatial continuous observation on the atmospheric environment around MCSs and typhoons. Simultaneous observations of atmospheric and oceanic profiles using a dropsonde and airborne expendable bathythermograph (AXBT) or airborne expendable conductivity, temperature, and depth probe (AXCTD) enable us to explore the interaction between a typhoon and sub-surface layer of the ocean. A videosonde system dropping from an aircraft should be a useful tool to observe microphysical properties in the convective region where an aircraft cannot enter by strong turbulence. Microphysical properties obtained in MCSs and typhoons are useful information to evaluate satellite observations and numerical simulations. In comparison with the observation results on aerosol properties, it is possible to explore the interaction between giant cloud condensation nuclei (GCCN) such as sea salt, the warm rain process, and organization and heating profile in a MCS. Remote sensing instruments such as lidar and polarimetric radar loaded on an aircraft should be developed. Aircraft observations using these instruments around forming and rapidly developing typhoons give us new insight on the phenomena. Also, we have to acquire know-how to operate aircraft observations such as the submission and acceptance of the flight plans, maintenance of instruments and logistics support.

Keywords: Aircraft observations, typhoons, mesoscale convective systems, microphysical processes, observational instruments