
[JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG44] Promotion of Application and Utilization of Aircrafts for Earth sciences

convener: Nobuhiro Takahashi (Institute for Space-Earth Environmental Research, Nagoya University), Makoto Koike (Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo), Toshinobu Machida (国立環境研究所, 共同), Taro Shinoda (Institute for Space-Earth Environmental Research, Nagoya University)

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Under the current situation of rapid global environmental change, such as global warming, that affects the human societal activities and societal basis such as water and food, both the observational study of the Earth become more important as well as the studies on the numerical models. In particular, aircraft observation is expected to be better than the satellite and/or ground based observation when the immediate or direct observation is needed. For example, in situ measurements of the microscopic values such as concentration of greenhouse effect gaseous and size distribution and chemical components of aerosols and clouds are only available by aircraft observation. Aircraft observation is also useful for detailed remote sensing of typhoons, ecosystem, atmosphere, ocean, geodesy, volcanology, seismology. Activities of the aircraft observation has not been weighted in Japan comparing with other countries.

From the viewpoint of using aircraft for research purposes, the same situation also faces the aerospace field. Also, in the field of atmospheric sciences, big research projects using aircraft are in progress and a new field of aircraft observation is opening up. Based on these facts, we propose this session as a forum for discussing ideas from various fields on further progress of aircraft observation.

[ACG44-P04] Observations of Atmospheric Greenhouse Gases using Commercial Aircraft by CONTRAIL project

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To fill the gap of atmospheric CO₂ observation in upper atmosphere, we developed the Continuous CO₂ Measuring Equipment (CME) and the Automatic air Sampling Equipment (ASE) and installed them on commercial airliners operated by Japan Airlines (JAL) under the CONTRAIL project started in 2005. As of 2018, JAL prepared ten aircraft, eight of Boeing 777-200ER and two of Boeing 777-300ER, to be able to carry the CME. Five of 777-200ER can be equipped the ASE. When we need air samples on the routes where JAL does not operate 777-200ER, a Manual air Sampling Equipment (MSE) can be used instead of ASE. MSE consists of simply hand-operated pump and metal flasks.

To prepare the replacement of aircraft type in the next generation, we have been studying to modify Boeing 787 aircraft to install CME and ASE. We are planning to finish the design and to modify JAL's 787 in these 3-4 years.

The CONTRAIL data can be distributed on the request of any researcher for any scientific purpose. Recently CONTRAIL-CME data are openly available with doi number: doi:10.17595/20180208.001.