

4.041 JMA aircraft observation for greenhouse gases over the western North Pacific.

Presenting Author:

Kazuhiro Tsuboi, Meteorological Research Institute, Japan, ktsuboi@mri-jma.go.jp

Co-Authors:

Hidekazu Matsueda, Meteorological Research Institute, Japan

Yousuke Sawa, Meteorological Research Institute, Japan

Yousuke Niwa, Meteorological Research Institute, Japan

Masamichi Nakamura, Japan Meteorological Agency

Kazuyuki Saito, Japan Meteorological Agency

Teruo Kawasaki, Japan Meteorological Agency

Shinya Takatsuji, Japan Meteorological Agency

Kentaro Kozumi, Japan Meteorological Agency

Shuichi Hosokawa, Japan Meteorological Agency

Haruka Koda, Japan Meteorological Agency

Shigeyuki Ishido, National Institute of Advanced Industrial Science and Technology, Japan

Shohei Murayama, National Institute of Advanced Industrial Science and Technology, Japan

Abstract:

The Japan Meteorological Agency (JMA) and the Meteorological Research Institute (MRI) developed a flask air sampling system on a cargo C-130H aircraft, as well as a greenhouse gases (GHG) measurement system for the flask samples, as part of a new operational monitoring program of the JMA. Since 2011, the JMA has carried out an operational aircraft observation in the mid-troposphere at about 6km altitude over the western North Pacific. The C-130H cargo aircraft of the Japan Ministry of Defense flies from Atsugi air base near Tokyo to Minamitorishima (an island located nearly 2000 km southeast of Tokyo) once a month. Air samples are collected in flasks during a cruising flight at 6 km, as well as a descending over the Minamitorishima with the WMO/GAW global station. Mole fractions of CO₂, CH₄, CO, and N₂O in the flask air samples are measured using a high-precision analysis system with two laser-based instruments. In cooperation with National Institute of Advanced Industrial Science and Technology, we observe O₂/N₂ ratio using a high-precision MS analysis of flask air samples since May 2012. The 7-year GHG data could capture the geographical variations and their seasonal cycles in the mid-troposphere, as well as the climatology of their vertical profiles over the background station of Minamitorishima. We also found synoptic-scale events with the increased GHG due to Asian continental outflow through the mid-troposphere.