

Comparison of CO₂ vertical profiles measured by balloon-borne instrument measurements with aircraft measurements

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The atmospheric CO₂ concentration has drastically increased since the Industrial Revolution due to the mass consumption of fossil fuels and natural gas by human activities. CO₂ is considered to be a major factor of global warming; therefore it is very important to measure CO₂ correctly. Current CO₂ monitoring sites are limited and there are not many CO₂ vertical profile measurements.

We are developing balloon-borne instruments which can measure the vertical distribution of CO₂ in any place in the world under any kind of weather conditions. The objective is to contribute to raise the precision of climate change prediction by utilizing the balloon-borne instruments all over the world like ozone sonde instruments.

We will present comparisons of balloon-borne instrument results and aircraft measurement results in order to validate the balloon-borne instruments precision.

We used two types of aircraft data for the comparison analyses, one is CONTRAIL(Comprehensive Observation Network for Trace gases by AirLiner) data of passenger aircraft CO₂ measurements and the other is the data obtained by aircraft measurements performed by JAXA and NIES for validation of the GOSAT satellite.

Firstly, we compared the data obtained on 7 January 2011 using the balloon-borne instruments at three sites (Isezaki, Ichihara, and Shirako) with the CONTRAIL data. Secondly, we compared two data obtained on 31 January and on 3 February 2011 using the balloon-borne instruments at Moriya with the JAXA/NIES aircraft measurements at Tsukuba.

Keywords: carbon dioxide, balloon-borne measurement, aircraft