

## The Status of NIES GOSAT-2 Project

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GOSAT-2, the successor to Greenhouse Gases Observing Satellite (GOSAT), is a Japanese earth observation satellite being developed by Ministry of the Environment, Japan Aerospace Exploration Agency (JAXA), and National Institute for Environmental Studies (NIES) and to be launched in FY2017. It will measure column concentrations /amounts of atmospheric CO<sub>2</sub>, CH<sub>4</sub>, CO, and black carbon by a Fourier transform spectrometer (FTS-2) and a multispectral imager (CAI-2).

NIES GOSAT-2 Project is responsible for

- ? Algorithm development for FTS-2 SWIR Level 2 products such as CO<sub>2</sub>, CH<sub>4</sub>, and CO column concentrations/amounts
- ? Algorithm development for Level 4 products such as CO<sub>2</sub> and CH<sub>4</sub> flux
- ? Development and operation of Level 2 ? 4 product processing and distribution system (named G2DPS)
- ? Validation of selected GOSAT-2 products
- ? Data application studies such as atmospheric science, carbon cycle science, and climate change/air pollution related policies
- ? Outreach and capacity building activities

The algorithm for FTS-2 SWIR Level 2 gas column concentrations/amounts products will be based on that of GOSAT. Preliminary investigations suggest that thanks to the SNR improvement in some FTS-2 bands, random errors of GOSAT-2 XCO<sub>2</sub> and XCH<sub>4</sub> estimates will be several tens of percent smaller than those of GOSAT.

One of important challenges of GOSAT-2 is to provide global CO<sub>2</sub> and CH<sub>4</sub> flux products with higher spatial resolution and less uncertainty than GOSAT. The development of a new flux estimation system using sophisticated atmospheric transport model such as NICAM-TM and inversion scheme such as 4D-Var, as well as terrestrial biosphere and fire models, have been attempted to meet this challenge.

G2DPS is a dedicated data system for GOSAT-2 and independent from GOSAT Data Handling Facility (GOSAT DHF). G2DPS is divided into two parts, Basic Component and Processing Component. The preliminary design of G2DPS Basic Component already started and that of Processing Component will follow soon. The definitions of GOSAT-2 higher level products to be generated by G2DPS are currently being discussed with JAXA and GOSAT-2 Science Team members.

The GOSAT-2 validation plan is currently being discussed. Its basic idea is based on GOSAT experiences and data from ground-based high resolution FTS at TCCON sites will be critical to GOSAT-2 Level 2 product validation. To obtain more FTS data in the area with no TCCON sites so far, a three-year project to place a new TCCON site with a high resolution FTS in Southeast Asia has started in 2014.

Atmospheric pollution is a new and very important issue for GOSAT-2. A prototype of the atmospheric pollution monitoring system targeting east asian countries using GOSAT-2 CAI-2 data is being developed using GOSAT CAI data.

More details of NIES GOSAT-2 Project activities will be given in the presentation.