

International research collaboration in GOSAT-based greenhouse gas observation

*Tatsuya Yokota¹, Members of GOSAT_Project^{1,2}

1.National Institute for Environmental Studies, 2.Japan Aerospace Exploration Agency

More than seven years have passed since the Greenhouse gases Observing SATellite (GOSAT) was launched. Over those years, many international research groups mutually collaborated in validating GOSAT data, estimating carbon fluxes, and conducting other related studies. Thus far, the GOSAT Project, promoted by the Ministry of the Environment of Japan, the Japan Aerospace Exploration Agency (JAXA), and the National Institute for Environmental Studies (NIES), issued GOSAT Research Announcement (RA) ten times, and adopted 123 research proposals

(http://www.gosat.nies.go.jp/en/researchannouncement_4.html). Among them, 46 studies were already completed (some of the final reports submitted) or finished, and 77 are still in progress. These studies are categorized in the following four research fields:

(1) Data processing algorithms: developing algorithms for retrieving carbon dioxide (CO₂) and methane (CH₄) concentrations from GOSAT data, detecting light interfering clouds and aerosols, and computing solar-induced fluorescence,

(2) Data validation: monitoring GHG phenology, developing instrument prototypes for GHG measurement, inter-comparing several GOSAT GHG data, evaluating vegetation indices, and comparing GOSAT GHG data with model simulations,

(3) Carbon balance estimation and atmospheric transport modeling: estimating surface CO₂ and CH₄ fluxes from GOSAT GHG data,

(4) Data application: researching GOSAT-based NDVI, CO₂ and CH₄ distribution relationships, monitoring wildfires and volcanic activities, and understanding relationships between vegetation activities and atmospheric CO₂ and CH₄.

We hold annual GOSAT RA meeting to facilitate research collaboration through the exchange of new research findings.

Further, the members of the GOSAT Project at JAXA and NIES collaborate closely with those of the NASA OCO-2 team (previously the Atmospheric CO₂ Observations from Space (ACOS) team) through frequently exchanging latest information and research findings during bi-weekly teleconferences, field campaigns, and annual workshops.

In Europe, the European Space Agency is leading GHG-Climate Change Initiative (GHG-CCI, <http://www.esa-ghg-cci.org/>), promoting long-term GHG emission estimation using SCIAMACHY data and GOSAT data.

We herein explain the above international collaborative activities and also report the progress of the ongoing GOSAT Project.

Keywords: greenhouse gas, carbon dioxide, methane, calibration and validation, retrieval algorithm, carbon flux estimation