

EARTH OBSERVATION SYMPOSIUM (B1)  
Future Earth Observation Systems (2)

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GREENHOUSE GASES OBSERVING SATELLITE (GOSAT) AND ITS INITIAL CALIBRATION AND  
VALIDATION RESULTS

**Abstract**

Japan Aerospace Exploration Agency (JAXA) successfully launched Greenhouse Gases Observing Satellite (GOSAT) on January 23, 2009. GOSAT is the world's first dedicated satellite for Greenhouse gas observation. The GOSAT is a joint endeavor with the JAXA, Ministry of the Environment (MOE) and National Institute for Environmental Studies (NIES). The mission objective of the GOSAT is to observe the global distribution of CO<sub>2</sub> and CH<sub>4</sub> and their changes from space. The accuracy of CO<sub>2</sub> columnar density is expected between 1-4ppm.

GOSAT has two sensors on-board. One is the thermal and short wave infra-red sensor for observing greenhouse gases (TANSO-FTS). It is a Fourier Transform Spectrometer and covers wide range of spectrum including 0.76-14 micron in 0.2cm<sup>-1</sup> spectrum resolution. The 0.76 micron band is used to observe O<sub>2</sub> density and determines the exact path length. The 1.6 and 2.0 micron bands are used to observe CO<sub>2</sub> density. The 1.6 micron band is also used to observe CH<sub>4</sub> density. The 5.5-14 micron band is used to observe CO<sub>2</sub>, CH<sub>4</sub>, tropospheric Ozone, and water vapor. Altitude distribution data for CO<sub>2</sub> and CH<sub>4</sub> is also available with this band. The number of total observation channel reaches up to 17,000. The other sensor is the Cloud and Aerosol Imager (TANSO-CAI) and it is used to compensate errors which are caused by the cloud and aerosol.

After the successful launch, initial on-orbit check was conducted for three month and it was followed by the calibration and validation activities for another three month. Through these activities, all functions and performance of GOSAT were confirmed nominal as designed and data quality was validated. Data distribution of GOSAT Level-1 data (spectra) will be started nine month after launch and that of Level-2 will be started twelve month after launch respectively. Data distribution through ESA or NASA is also under coordination.

This paper shows the overview of GOSAT project and its sensor design. Its on-orbit performance and calibration/validation results are also provided.