

Global Monitoring of Greenhouse Gases

Description

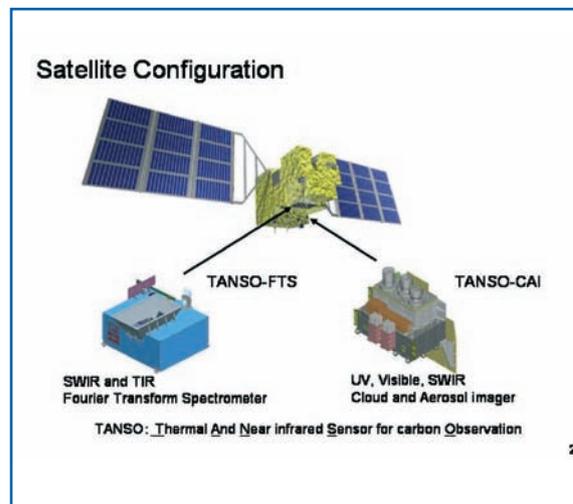
Climate change is threatening the safety and security of human society – as indicated by the recent IPCC Fourth Assessment Report and the Stern report – and is becoming a top-priority political issue. The upcoming G8 Summit meetings in Japan will focus on this issue. The global monitoring of greenhouse gases is important for clarification of climate change mechanism. The *Greenhouse Gases Observing Satellite (GOSAT)* is being jointly developed by the *Japan Aerospace Exploration Agency (JAXA)*, *Japan's Ministry of the Environment (MOE)*, and the *National Institute for Environmental Studies (NIES)* to be launched in 2008 (tentative date) to conduct frequent (once every three days) and precise monitoring of carbon dioxide (CO₂) and methane distributions in the Earth's atmosphere. Through the Global Earth Observation System of Systems (GEOSS), GOSAT data will be made available to research communities around the world to contribute to the prediction of the Earth's climate and the setting of evidence-based policy decisions.



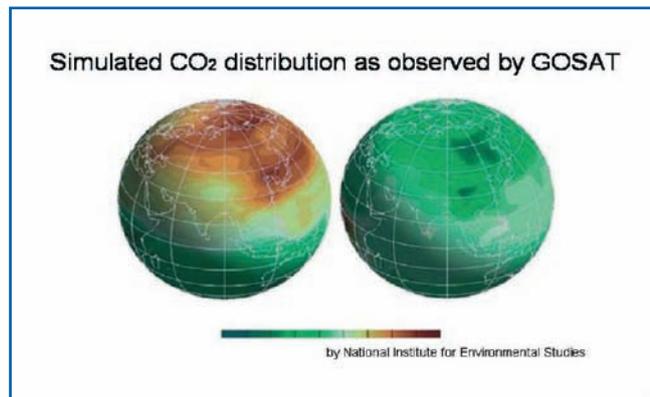
Cooperation is planned with the *Orbiting Carbon Observatory (OCO)* being developed by NASA, and with scientific communities in the US and Europe. Accurate information on greenhouse gases can be obtained not only through satellite monitoring, but also by direct atmospheric observation at fixed sites at the ground level, at oceanic surfaces by ships, and in the upper atmosphere by aircraft. These comprehensive observation networks bring us closer to an understanding of the global cycles of these gases. In support of the objectives of GEOSS, the *Japanese Alliance for Climate Change Observation (JACCO)* was launched by MOE and the *Japan Meteorological Agency (JMA)* in April 2006 to plan and coordinate comprehensive climate change observation systems.

Added Value

GEOSS has brought together GOSAT, OCO, JMA, NIES, and JACCO to coordinate global greenhouse gas observation systems and provide better access to observed data and derived information. Global observation data of CO₂ and methane by these satellites will offer a unique contribution to the Climate Societal Benefit Area of GEOSS. GOSAT and OCO are also cooperating to establish interoperability in data quality through cross-calibration and validation. JACCO is promoting the planning and coordination of climate change observation systems, and seeks to improve access to data and information for policy decision support. GEOSS has facilitated dialogue between the World Data Centre for Greenhouse Gases (WDCGG) at JMA and the Carbon Dioxide Information Analysis Center (CDIAC) which provides data and information services on concentrations of greenhouse and related gases (CO₂, CH₄, etc.) around the world.



The Integrated Global Carbon Observation system (IGCO) being promoted by GEOSS will contribute to the harmonization of space-based observations and in-situ observations, in addition to the harmonization of observation planning, modeling, and predictions.



Relevance to GEO

These efforts contribute to the following tasks in the GEO 2007-2009 Work Plan:

- CL-06-02: Key Climate Data from Satellite Systems,
- EC-06-01: IGCO, DA-07-03: Virtual Constellations, and
- DA-07-06: Data Integration and Analysis System

Participants

Collaborating countries:

- Japan (JAXA, NIES, Ministry of Education, Culture, Sports, Science and Technology (MEXT), MOE, JMA, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), JACCO),
- USA (NASA, CDIAC),
- World Meteorological Organization (WDCGG), IGCO

Current Status and Next Steps

GOSAT is in full-scale development for its scheduled launch in 2008. Cooperation with OCO for calibration, validation, and data exchange is being coordinated with NASA. Collaboration on data analysis with the US and European science communities is being planned. The global monitoring of greenhouse gases data that will be provided through WDCGG, CDIAC and other organizations include the observation data:

1. at fixed stations by JMA and NIES for land,
2. and research vessels by JMA, voluntary observational ships by NIES and buoys managed by JAMSTEC for ocean, and
3. aircraft observation by NIES, Tohoku University, JMA and JAXA for upper air. Data integration among satellite, *in-situ* and mobile observation is necessary for validation of satellite products and clarification of climate change mechanism.