

## GEO Carbon Observations and Analysis System and the idea of Asian contribution

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Recognizing the growing need for improved Earth observations, over 130 governments and leading international organizations are collaborating through the Group on Earth Observations (GEO) to establish a Global Earth Observation System of Systems (GEOSS) by the year 2015. They are contributing their respective Earth monitoring systems to GEOSS and interlinking these systems so that they work together better.

GEO through its Members and Participating Organizations, has begun work to implement a global carbon observation and analysis system addressing the three components of the carbon cycle (atmosphere, land and ocean) to provide high quality information on carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) concentrations, and emission variations. By combining observations, reanalysis and product development we will be able to develop tools for carbon tracking and carbon storage evaluation, including improved global networks of atmospheric CO<sub>2</sub> observations, air-surface exchange flux networks, as well as surface ocean CO<sub>2</sub> and related marine biochemistry observations.

GEO Members and Participating Organizations: Australia, Canada, France, Japan, Netherlands, Norway, UK, Italy, USA (NASA, NOAA, USGS, USDA), Committee on Earth Observation Satellites (CEOS), European Space Agency (ESA), Food and Agriculture Organization (FAO) Global Climate Observing System (GCOS), Global Terrestrial Observing System (GTOS), World Meteorological Organization (WMO) and the World Climate Research Program (WCRP) are supporting the development of an integrated global carbon observation system.

In close collaboration with national governments, space agencies, and relevant technical experts, GEO will demonstrate this capability through the establishment of robust methodologies, satellite acquisition plans and a series of regional pilot studies, which will provide a template for a consistent and reliable global carbon monitoring system.

One of major activities is to foster the use of space-based greenhouse gas (GHG) observations and consolidate data requirements for the next-generation GHG monitoring missions. By establishing close cooperation with CEOS and the GEO Carbon Community of Practice plans will be implemented for the end-to-end utilization of space-based GHG data, particularly those of Japan's GOSAT mission and NASA's replacement OCO mission, and other GHG observation missions being prepared in Europe.

The global carbon cycle determines the amount of carbon dioxide and methane that accumulates in the atmosphere, increasing the Earth's greenhouse effect. It is therefore a key component of the global climate system. The carbon cycle also responds to climate change, and understanding the ability of the carbon cycle to continue to act as a partial sink of fossil fuel emissions into the future will be a vital factor in determining the "allowable" fossil fuel emissions, while keeping concentration below certain levels.

Current uncertainties on the space-time distribution of CO<sub>2</sub> and CH<sub>4</sub> fluxes are very large. For well informed policy action aiming to curve down the future increase of CO<sub>2</sub> and CH<sub>4</sub>, these uncertainties must be reduced, by establishing an Integrated Global Carbon Observing system (IGCO). The main goal of this report is to describe the building blocks and coordinated implementation of such an Integrated Global Carbon Observing system.

In Japan, IBUKI(GOSAT) satellite has been launched and been monitoring global atmospheric GHG since 2009. In Asian region, Japan has been strongly promoted to develop the AsiaFlux network. Furthermore, Japan is active to develop integrated global carbon cycle model. It will propose the way towards more integrated approach in order to integrate each Japanese activity for contributing as Asia component of the integrated global carbon observations and analysis system.

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