The GEO Carbon and GHG Initiative as a contribution to UNFCCC

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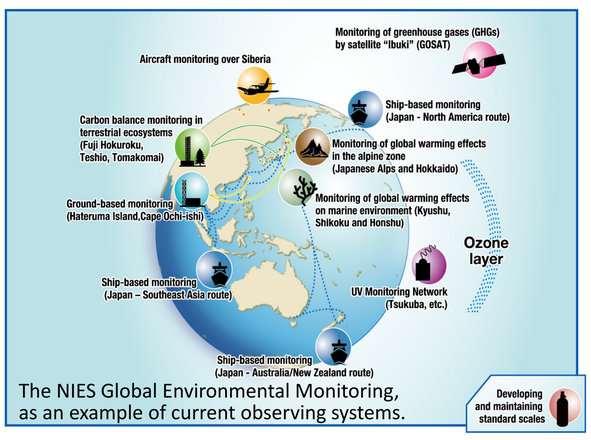
Introduction

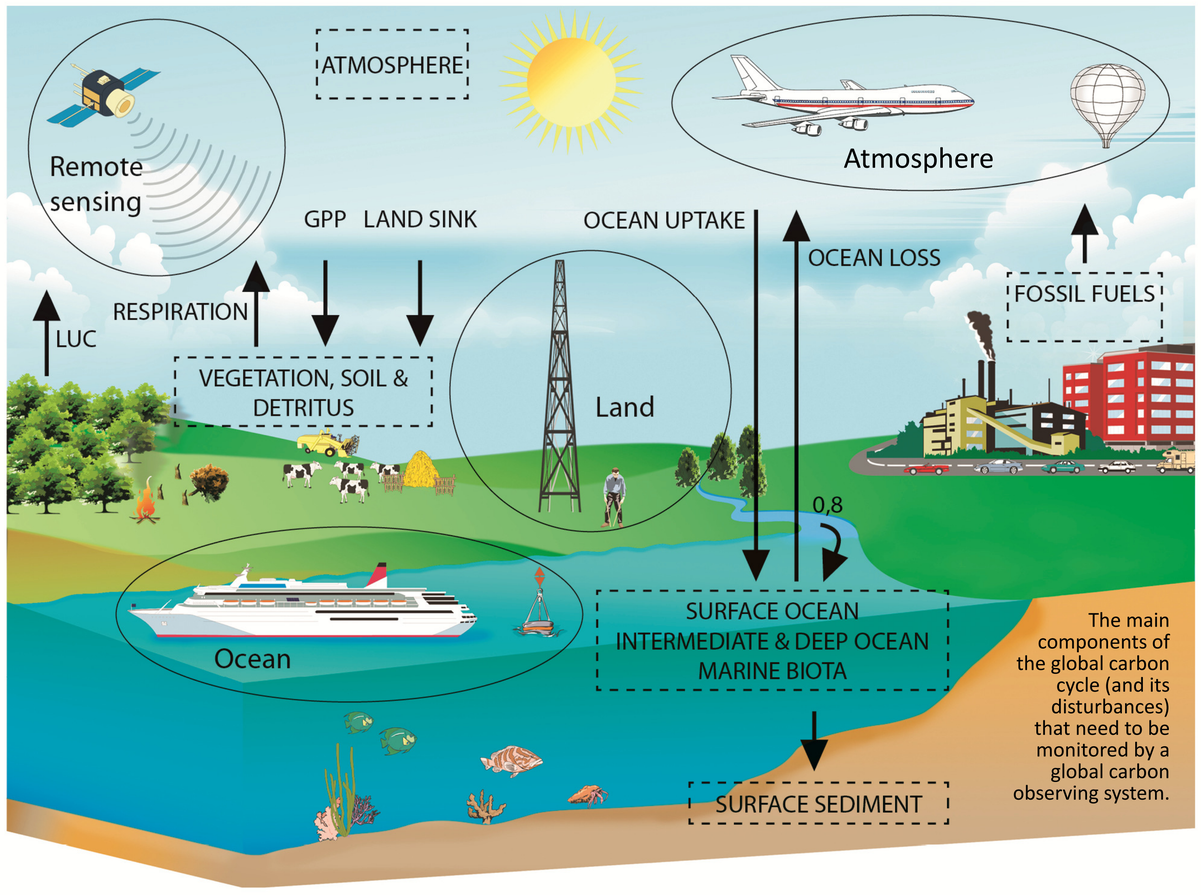
The budgets of carbon and other greenhouse gases (GHGs) still carry many uncertainties that make it difficult to evaluate the success of climate change mitigation strategies. Improvements in long-term, high quality observing systems within and across the atmospheric, oceanic, terrestrial and human domains are required to quantify GHG sources and sinks, to understand changes in the carbon cycle and hence the climate system, and to address society's efforts to mitigate and adapt to climate change. Many observing efforts and initiatives are currently in place at regional and global levels, but what is needed further is a global coordinating mechanism to provide useful, comprehensive and comparable information to resource managers and policy makers.



The NIES Global Environmental Monitoring, as an example of current observing systems.

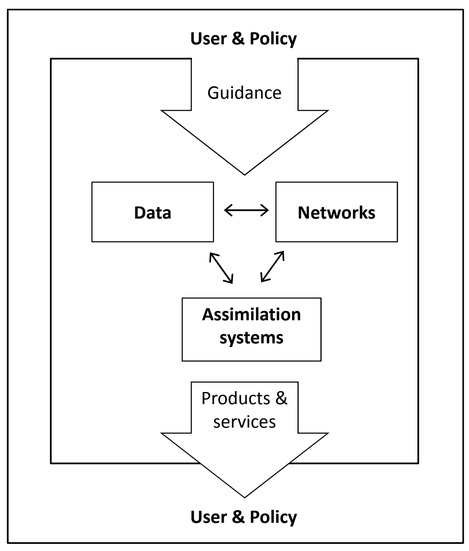
Objective

The main aim of the *GEO Carbon and GHG Initiative* is to develop an independent system for monitoring and evaluating natural and anthropogenic changes in the carbon cycle and GHG emissions and to provide decision makers with timely and reliable policy-relevant information, recommendations and data-products.



Mission

The *GEO Carbon and GHG Initiative* is a global effort proposed in the framework of GEO to promote interoperability and provide integration across the different components of a global carbon monitoring system, particularly at the interfaces of the different domains (atmosphere, ocean and terrestrial) and approaches (space-based, air-borne and in-situ). The intention is neither to rewrite new strategies nor duplicate existing efforts, but instead to build on existing initiatives and networks, ensure their continuity and coherence, and fill in the missing pieces to obtain a comprehensive, globally coordinated, carbon and GHGs observation and analysis system. The initiative shall address policy agendas and will operate as a common and open platform to plan and implement strategies and joint activities at the global level from science to policy.



Planned Activities

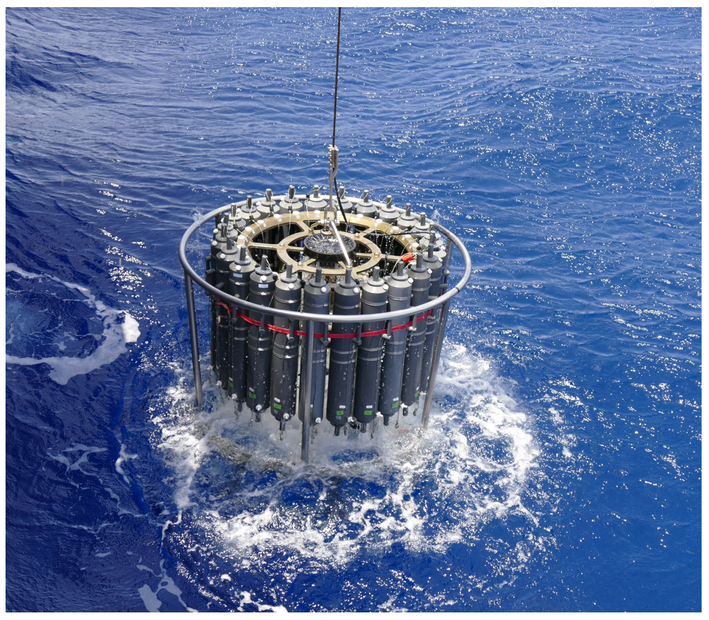
These are the activities already planned, divided in four different tasks. Further tasks can be carried our depending on the requirements.

Task 1 – User needs and policy interface: to engage with users and policy makers and ensure the consistency with their needs and address the policy agenda.

Task 2 – Data access and availability: to provide long-term, high quality and open access near-real-time data and data products, complying with the GEOSS principles, from a domain-overarching carbon cycle and GHGs monitoring system.

Task 3 – Optimization of observational networks: to develop and implement on an ongoing basis a procedure for achieving observations of identified essential carbon cycle variables within user-defined specifications and at minimum total cost.

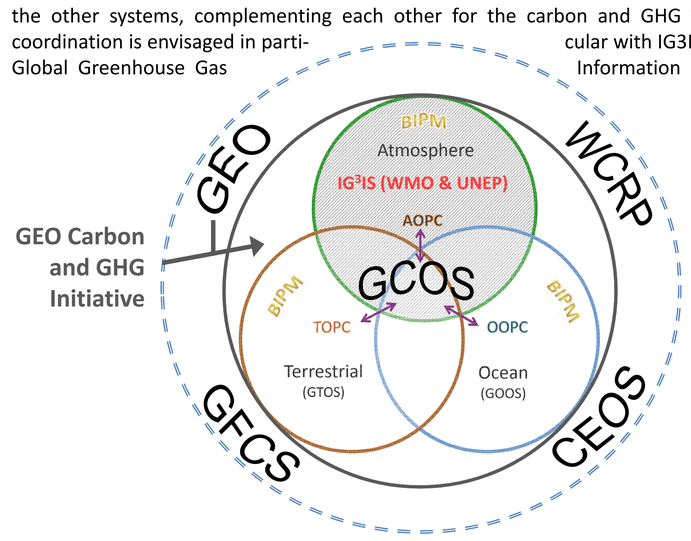
Task 4 – Budget calculations and breakdown across scales to support policy implementation: to develop consistent budgets of CO_2, CH_4, and N_2O)from local/urban to global scales using a combination of observations, inventories, models and data assimilation techniques.



Policy relevance

After the recent agreement reached in Paris (UNFCCC CoP 21, 2015) the need for a coordinated initiative to establish a long-term global observation system for carbon cycle and GHGs that provides, on an operational mode, reliable data, information, recommendations and products with sufficient accuracy, coverage and timeliness to address climate policies, is needed more than ever. This is exactly the purpose of the *GEO Carbon and GHG Initiative*. The intention is to closely interact with UNFCCC and its bodies and Parties for the monitoring, reporting and verification (MRV) process. National reports contain inputs that are essential to any global assessment, and the *GEO Carbon and GHG Initiative* may in turn provide the countries with useful and independent information, ranging from data to methodologies. The services provided will include not only biophysical data, but also cost-estimates and evaluations of social impacts associated with emissions reduction, land-use change, ocean management and other policy relevant strategies.

The *GEO Carbon and GHG Initiative* cross-cuts all the domains and will be coordinated with the other systems, complementing each other for the carbon and GHG component. Full coordination is envisaged in particular with IG3IS, the Integrated Global Greenhouse Gas Information System of WMO.



GCOS = Global Climate Observing System
GOOS = Global Ocean Observing System
GTOS = Global Terrestrial Observing System
AOPC = Atmospheric Observation Panel for Climate
OOPC = Ocean Observation Panel for Climate
TOPC = Terrestrial Observation Panel for Climate
BIPM = Bureau International des Poids et Mesures
WMO = World Meteorological Organization
CEOS = Committee on Earth Observation Satellites
GEO = Group on Earth Observations
GFCS = Global Framework for Climate Services
WCRP = World Climate Research Programme

Images: A. Bombelli, GEOCARBON, ICOS-ERIC, NIES, T. Tanhua