

Integrating Observations to Sustain our Planet

Increasingly, GEO's collaborative initiatives will help address regional and local challenges with greater precision, helping growing economies reduce costs to public sector budgets.

GEO's work can be broadly categorized as follows:

- **Data-sharing**
Globally sharing 65 million resources (datasets, images, documents) previously available for only limited use, has been critical to such international efforts as water research and land and natural resource management.
- **Data access and integration**
Earth observation data (space-based, airborne and *in situ*), information services, standards and best practices can be researched, discovered and accessed through the GEOSS Portal. This has advanced understanding in such challenging areas as global drought, and identifying the links between air quality and climate variables on human health.
- **Major new global observation initiatives**
GEO has fostered substantial new government and international organizational collaboration by identifying important observation gaps in four global initiatives: monitoring biodiversity; reconciling global crop yield forecasts; coordinating monitoring of major seismic and volcanic zones; and understanding the stock and flow of carbon from the world's forests. GEO has helped develop communities of practice, technical tools and formal agreements.
- **Regional coordination, research, innovation**
GEO has fostered major regional initiatives, including water management in Asia; environmental monitoring in Africa and the Himalayas; and disaster response in Central America.
- **User-driven networks and projects**
Working to close significant information gaps, GEO has advanced Earth observations by developing new, user-driven networks and projects designed to monitor mercury compounds and assess global solar and wind resources, among many others.



GEO Exploratory Projects

- a global ocean information system
- a suite of globally-agreed land cover data sets
- a global urban observation system
- a global wildfire information system
- a global drought information system
- a global carbon analysis system
- a global mountain observation and information system
- an information service for cold regions



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For developed and developing nations battling drought and disease, emergency managers making evacuation decisions, farmers making planting choices, companies evaluating energy costs, and coastal communities concerned about sea-level rise, there is a vital global and regional need to get ahead of the curve – to provide new analytical tools, access to timely data, and forecasts about emerging threats that enable wise choices in a changing world.

For nearly a decade, the Group on Earth Observations (GEO) has been driving the interoperability of many thousands of individual space-based, airborne and *in situ* Earth observations around the world. Often these separate systems yield just snapshot assessments, leading to critical gaps in scientific understanding. GEO is addressing such gaps by providing easy, open access to organized observations that enable an increasingly integrated view of our changing Earth. For sound science to shape sound policy, leaders and other decision-makers require this fuller picture as an indispensable foundation of sound decision-making.



GEO's 90 Members and 67 Participating Organizations are collaboratively advancing GEOSS, the **Global Earth Observation System of Systems**. This comprehensive system is making vast new worlds of data transparent, timely, accessible, and a vital catalyst for significantly enriching the quality of life of people around the world. The **GEOSS Portal** provides easy connection to existing observation and data systems.

The vision for GEO emerged from the **2002 World Summit on Sustainable Development in Johannesburg**, which underscored the critical need for coordinated Earth observations. Since 2003, G8 Heads of State have affirmed that urgency, specifically citing the work of GEOSS in their 2008 Declaration on Environment and Climate Change and 2009 Declaration on Responsible Leadership for a Sustainable Future.



GEO's data-sharing principles foster full and open data exchange while recognizing international instruments and national policies. Most data can be accessed at no charge or for the cost of reproduction.



GEO's shared approach to data discovery and access, and demonstrated value across essential sectors, make clear that no matter how effective individual Earth observations, their value multiplies when they work in synergy.



Reducing Market Volatility

With timeliness and transparency, the **GEO Global Agriculture Monitoring (GEOGLAM) Crop Monitor Assessment** is a global initiative designed to enhance agricultural production estimates. Developed in response to the G20 Agricultural Ministers' concerns about reducing market volatility for the world's major crops, GEOGLAM draws on regional expertise, ground observations and analysis of meteorological and satellite data to assess the growing conditions of four major crops – maize, rice, soybeans and wheat. GEOGLAM assessments are now published in AMIS, the UN-hosted Agricultural Market Information System Monthly Monitor.



Improving Forest Management

GEO helps nations monitor their forests and forest carbon through the **GEO Global Forest Observation Initiative (GFOI)**. This partnership fosters sustained use of satellite and ground observations to implement national forest monitoring and measuring, reporting and verification systems. GFOI enables countries to report in accordance with relevant international frameworks, as well as support national policies and other efforts to better manage forests. Partners include the Committee on Earth Observation Satellites (CEOS), the UN Food and Agriculture Organization (FAO), Australia, Japan, Norway and the United States.



Combating Mercury Hazards

With the engagement of more than 20 GEO Member governments and the European Commission, the **Global Mercury Observation System** helps protect people and the environment from mercury contamination. Highly advanced e-infrastructure provides real-time observations from over 40 ground sites, ocean cruises, flights and experiments, and fosters collaboration in many regions lacking observational infrastructures. Collaborating with European and North American programs also enables the system to provide, for the first time, mercury concentrations at different latitudes and times of year.



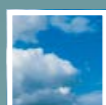
Bolstering Water Security

The **GEOSS Asian Water Cycle Initiative** coordinates and harmonizes the acquisition, processing, quality checking and archiving of watershed data for 18 national river basins in 20 countries. The aim is to integrate water resources management by putting GEOSS information to work in addressing common water-related problems. Climate change impacts, for example, are being assessed in each river basin. With donor- agency support, water security projects such as dam operation optimization for hydro-power generation and flood control are being implemented in Indonesia, Philippines and Vietnam.



Strengthening Hazard Assessments

The **Geohazard Supersites and Natural Laboratories** initiative is a partnership of international agencies monitoring earthquakes, volcanoes and other geohazards. Fundamental scientific research is strengthened through broad collaboration and acquisition of *in situ* and space data. Supersites include volcanoes in Hawaii, Iceland and Italy and faults in California and Turkey. Expected results include improved estimates of volcanic unrest, better response during eruptions, improved forecasts of ash dispersion, and more accurate, reliable hazard assessments.



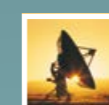
Advancing Air Quality Forecasts

Under GEO, **AirNow-International (AirNow-I)** is leveraging a decade of U.S. experience by providing real-time air quality forecasts in China, Europe and Mexico. In real-time, decision-makers can quickly and accurately provide information about air quality conditions, including those for wildfires and dust storms. Data further support emission-reducing actions. AirNow-I helps deliver vital air quality information across 27 European countries. More than 100 million Shanghai-area residents and visitors have already benefited from the forecasts, and a second effort is underway. In Mexico, a pilot in one state has led to a future national pilot.



Monitoring Mining's Footprint

The increased availability and improved reliability of Earth observations enable new and exciting applications, shaping, for instance, the future of mining. Working with mining companies, regulatory bodies and others, the **EO-Miners** team identified 11 indicators affecting mining communities and nearby natural habitat, including land use, air and water quality, accidents, job creation and economic value to the broader community. Integrated into Earth observation approaches, such indicators are helping to monitor mining's footprint in demonstration sites in the Czech Republic, Kyrgyzstan and South Africa. The aim is to support sound mining policy and regulations.



Ensuring Access to Low-cost Data

When access to Earth observations is limited, developing nations can face severe challenges. In response, **GEONETCast** was developed by the China Meteorological Administration (CMA), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and the U.S. National Oceanic and Atmospheric Administration (NOAA). As an expanding global network of low-cost, satellite-based dissemination systems, GEONETCast data helps ensure access to clean water in India; reliable weather forecasts in Brazil; and greatly improved productivity of once-degraded soil in Kenya, among numerous other efforts. In Africa, China, Europe and the Americas, GEONETCast makes ocean, meteorological, vegetation and other data and services available to its diverse user communities.



Emerging GEO Initiatives

Recent GEO activities generated in response to information gaps identified by user communities include **AfriGEOSS** and the **African Water Cycle Coordination Initiative**, **Cholera Early Warning System**, **Global Carbon Observing System**, and **Blue Planet**, which focuses on oceans and society.

