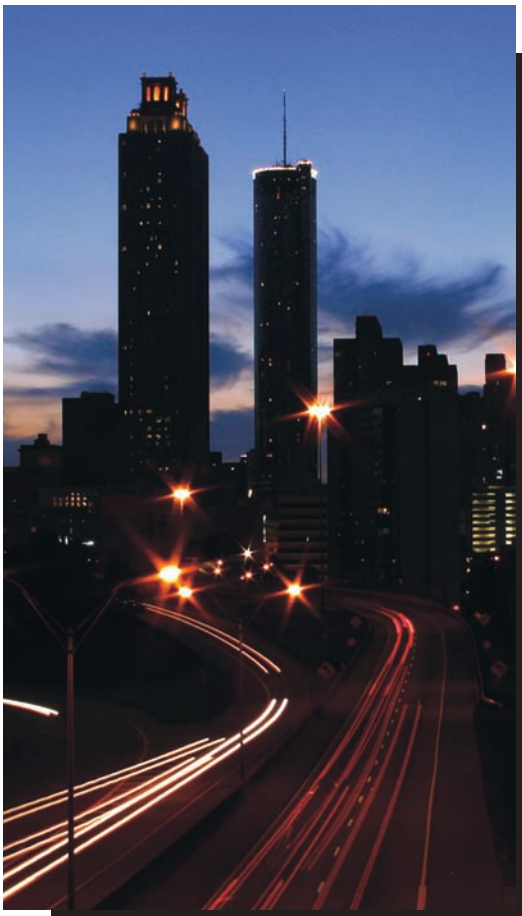


10 International Research and Cooperation

The United States—through CCSP, individual agency, and multi-agency efforts—participates in and supports a wide range of international cooperative activities related to global change and climate change research. These activities include support of key international climate change science research programs, especially those under the aegis of the International Council for Science (ICSU), and their regular review; support of ongoing international assessments; support of regional global change research networks; participation in informal organizations that foster global change research; and support of international efforts aimed at improving and coordinating observations of the Earth.

These enable U.S. scientists acting in cooperation with their colleagues in other countries across the globe to aggregate the critical mass of scientific and financial resources necessary to conduct well-directed comprehensive studies of Earth system processes and their variability and change on both regional and global scales; to provide guidance to CCSP and its participating agencies; to suggest balance to our national research efforts; and, in many cases, to facilitate the exchange of scientists, facilities, and data needed for climate change research.

Individually, CCSP-participating agencies support international activities that correspond with specific agency goals or missions, and/or for which they have been given the lead for the Federal government. In the latter case, and where appropriate, CCSP also provides a centralized structure for soliciting, communicating, coordinating, compiling, and transmitting U.S. input to a variety to international organizations addressing climate and global change research issues of importance to the United States. This includes support to the Department of State regarding programs of the United Nations specialized agencies involved in climate and global change research, the Intergovernmental Panel on Climate Change (IPCC), the United Nations Framework Convention on Climate Change (UNFCCC), and bilateral arrangements for cooperation in climate change science and technology.

CCSP provides appropriate U.S. shares of multilateral funding for centralized coordination of international research programs that are critically important to

international cooperation. This centralized coordination of these programs allows the international programs to collaborate with national research networks on disciplinary and interdisciplinary scientific endeavors and allows for the coordination of important synthesis reports. CCSP, through distributed costs, supports the activities of the IPCC's Working Group I Technical Support Unit and the partner programs of the Earth System Science Partnership (ESSP) including the SysTem for Analysis, Research and Training (START). Long-term and active participation in and contributions to regional research networks including the Inter-American Institute for Global Change Research (IAI), the Asia Pacific Network for Global Change Research (APN), and the burgeoning African cooperation in global change research fosters global change research in developing countries, develops research-driven capacity in those countries, and fosters research partnerships that ultimately support global goals in research into and observations of the Earth system.

The United States, through CCSP, also actively participates in and regularly contributes to a variety of informal activities that are dedicated to coordinating and fostering national global change research programs. Through these informal partnerships, such as the International Group of Funding Agencies for Global Change Research (IGFA), CCSP has an opportunity to interact informally with their counterpart national funding agencies with lead responsibilities for funding of climate and global change research in their countries and regions. IGFA also provides a forum through which ICSU and international global change research programs can interact and exchange information and views on the current state of global change research funding, future directions in global change research, important changes in national and regional programs, and a host of other issues.

The United States, through CCSP, also participates in a variety of programs that promote cooperation with other countries, directly enhance research capabilities in developing countries, and enhance climate forecasting and thereby adaptive capacity to respond to climate change in developing countries.

Updates of key international activities and CCSP interaction with and support of these activities follow. For more detailed information, see Chapter 15 of the *Strategic Plan for the U.S. Climate Change Science Program*.

Highlights of Recent Activities

Intergovernmental Panel on Climate Change Fourth Assessment Report. The IPCC began release of its Fourth Assessment Report (AR4) in early 2007. In addition to providing scientific expertise and leadership during the drafting and editing process, CCSP supports the activities of the Working Group I Technical Support Unit via interagency distributed costs. Via its coordination office, CCSP managed the U.S. author nomination process, the Expert and Government Reviews, and the final government review of the Summaries for Policymakers for Working Groups I and II. The Working Group I report, *Climate Change 2007: The Physical Science Basis*, was accepted in February 2007; the Working Group II report, *Climate Change 2007: Impacts, Adaptation, and Vulnerability*, in April 2007; and the Working Group III report, *Climate Change 2007: Mitigation of Climate Change*, in May 2007. The final Synthesis Report is scheduled for release in November 2007.

Famine Early Warning System Network Program. USAID Famine Early Warning System Network (FEWS NET) efforts to provide short- and long-term climate forecasting in the developing world is helping to enhance the adaptive capacity of developing countries to respond to climate variability and change. For instance, in August 2005, FEWS NET released a report on *Recent Drought Tendencies in Ethiopia and Equatorial Subtropical Eastern Africa*, which demonstrated how warming in the Indian Ocean and changes in the monsoonal circulation pattern could reduce rainfall across large areas of the Greater Horn of Africa. A new report is being prepared that extends this analysis to other areas of the African continent. This information will better enable development agencies and regional and local institutions to direct appropriate resources and support toward strengthening the adaptive capacity of affected groups and the food production systems upon which they depend.

World Climate Research Program. In addition to its extensive core activities, the World Climate Research Program (WCRP) in 2006 contributed significantly to the IPCC AR4 through the WCRP-Coupled Model Intercomparison Project. WCRP reported to the UNFCCC Subsidiary Body for Scientific and Technical Advice (SBSTA) 25 on research gaps and needs related to the convention with ESSP partners. WCRP also held a successful workshop on sea-level rise and variability which developed an interdisciplinary international consensus on observational needs for monitoring sea-level rise. WCRP, in cooperation with the International Geosphere-Biosphere Programme (IGBP), convened a workshop on next-generation

Earth system models and emissions scenario requirements in preparation for the IPCC Fifth Assessment Report (AR5) and communicated them to the IPCC Chair.

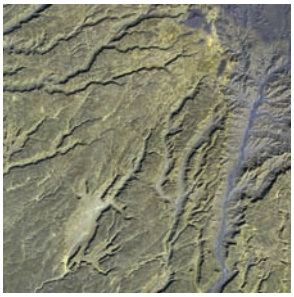
International Geosphere-Biosphere Programme. In addition to the successful input to the IPCC with the WCRP through the Coupled Carbon Cycle Model Intercomparison Project, IGBP published its second-phase Science Plan and Implementation Strategy that will guide the IGBP with nine core projects through the coming years. IGBP joined with CCSP and others to sponsor the first AfricaNess Workshop in 2005 and continued its support of development of an African Global Change Research Network. Currently, a science plan is under development to underpin the efforts of this network.

International Human Dimensions Programme. The International Human Dimensions Programme (IHDP) is currently preparing a science plan for the period 2007 to 2015. IHDP has also recently decided to relocate the activities of its central secretariat to the United Nations University in Bonn to reduce costs and improve the international linkages of its programs. Given its unique scientific community that includes social scientists who study the science policy and science practice interface, IHDP's increased emphasis on decision support complements the decision-support activities of CCSP.

DIVERSITAS Programme. DIVERSITAS emphasizes aspects of biodiversity science related to climate and global change, thus complementing CCSP's responsibility to monitor changes in biodiversity related to global change. In 2006, DIVERSITAS' international profile continued to expand. The program was recognized as a Participating Organization in the Group on Earth Observations GEO-III plenary and asked to serve as the lead agency for the Biodiversity Societal Benefit Area; and, with the Global Terrestrial Observing System, the Global Biodiversity Information Facility, and GEO organized a workshop to define user needs for a global biodiversity observing system. The program also continued to provide significant contributions to development of an International Mechanism of Scientific Expertise on Biodiversity (IMoSEB). DIVERSITAS continues to make progress in implementing all of its core projects including forging critical links with other programs' projects and activities.

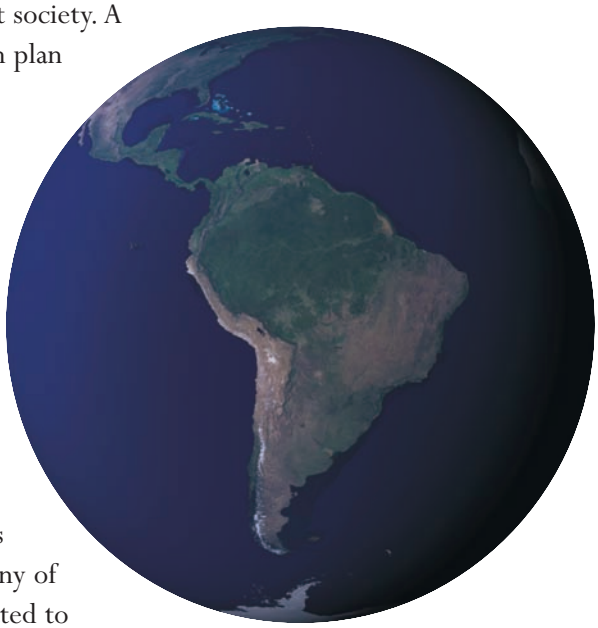
Earth System Science Partnership. The Earth System Science Partnership hosted its Second Open Science Conference on "Global Environmental Change: Regional Challenges" in November 2006 in Beijing, People's Republic of China. This meeting brought together over 800 scientists from virtually all climate and global change research disciplines. At this meeting, the Global Environmental Change and Human Health Project and the Monsoon Asia Integrated Regional Study (MAIRS) were launched. These projects, along with the Global Water System Project (GWSP), the

Global Carbon Project (GCP), and Global Environmental Change and Food Systems (GECAFS), are expected to contribute to significant scientific advances in the science of global change research.



SysTem for Analysis, Research and Training Programme. START programs, given their focus on development of research-driven capacity in developing countries for all of the ESSP programs, directly supports U.S. goals of fostering global change research and developing research capacity as called for in the Global Change Research Act of 1990. With its global reach and extensive on-the-ground experience working with scientific principal investigators, local communities, governments, and young scientists, the START program has played a critical role in advancing a variety of projects of interest to the United States and the global scientific community. Prior to the ESSP Open Science Conference, the START program successfully held its second START Young Scientists Conference which brought together the talent of early career scientists from all over the world (including many from the United States) and from many global change disciplines to discuss their research and forge connections that will promote international collaborative scientific cooperation and activities. START, through its connections with development aid agencies, is uniquely positioned to forge meaningful connections between the global change research and development communities.

Global Earth Observation System of Systems. The United States is playing an important role in the Global Earth Observation System of Systems (GEOSS), an international framework for coordinating and sustaining Earth observations and related information. Information from GEOSS is expected to revolutionize understanding of the Earth and how Earth observations may benefit society. A copy of the 10-year implementation plan for GEOSS adopted by the United States and nearly 60 countries in February 2005 may be found at <www.earthobservations.org>. The U.S. Group on Earth Observations (USGEO) has drafted a strategic plan for integrated Earth observations, which contributes directly to GEOSS. CCSP coordinates USGEO's climate and global change-related activities. USGEO is focusing on the following areas, many of which are directly or indirectly related to

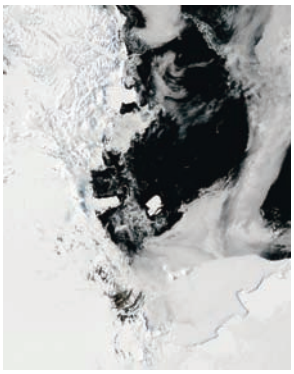


CCSP: understanding, assessing, predicting, mitigating, and adapting to climate variability and change; weather forecasting; reducing loss of life and property from disasters; protecting and monitoring ocean resources; supporting sustainable agriculture and combating land degradation; understanding the effect of environmental factors on human health and well-being; developing the capacity to make ecological forecasts; protecting and monitoring water resources; and monitoring and managing energy resources.

Bilateral Cooperation in Climate Change Science and Technology. Since June 2001, the United States has launched bilateral climate partnerships with 15 countries and regional organizations that, combined with the United States, account for almost 80% of global greenhouse gas emissions (for a more substantive discussion of the climate change science and technology bilaterals, see <www.climatescience.gov/Library/stratplan2003/final/ccspstratplan2003-chap15.htm#5>). Partnerships have been established with Australia, Brazil, Canada, China, Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama), the European Union, Germany, India, Italy, Japan, Mexico, New Zealand, the Republic of Korea, the Russian Federation, and South Africa. These bilateral initiatives seek to build on key elements of CCSP and the Climate Change Technology Program, including research, observations, data management and distribution, and capacity building.

Successful joint projects have been initiated in areas such as climate change science; clean and advanced energy technologies; carbon capture, storage, and sequestration; and policy approaches to reducing greenhouse gas emissions. The United States is also assisting key developing countries in efforts to build the scientific and technological capacity needed to address climate change.

Two ongoing objectives for the bilateral activities will be continued advancement of results-oriented programs and the fostering of substantive policy dialogs within all of the bilateral climate change partnerships. In order to broaden U.S. cooperative efforts to advance a practical and effective global response to climate change, the United States will expand outreach and support to the developing country community, utilizing a regional approach where feasible.



Highlights of Plans for FY 2008

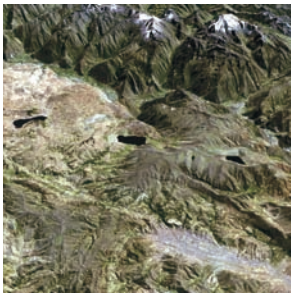
World Climate Research Program. WCRP will focus primarily on implementation of its 2005-2015 Strategic Framework while pursuing its multi-year activities and core projects. WCRP will also pursue a set of short-term cross-cutting activities to develop and coordinate research of immediate relevance to end users. In 2007, WCRP will focus on effective dialogue with UNFCCC/SBSTA, prioritizing research for the overall UNFCCC following on the IPCC AR4 and in preparation for the AR5. WCRP will also focus on extremes and risks, with an emphasis on drought and flood, abrupt changes in the cryosphere, and the intensity of monsoons.

International Geosphere-Biosphere Programme. IGBP will focus on implementing its new, second-phase science plan and implementation strategy, fast-track initiatives, and its extensive collaborations with WCRP. One such example is the collaboration on Atmospheric Chemistry and Climate between the Stratospheric Processes and their Role in Climate (SPARC) and the International Global Atmospheric Chemistry (IGAC) projects. IGBP will also hold its Fourth Congress—*Sustainable Livelihoods in a Changing Earth System*, whose goal will be to take a strategic look at ways to make IGBP's activities more relevant to decisionmakers and improve participation of scientists from developing countries.

International Human Dimensions Programme. IHDP will focus on development of its science plan and strategic vision for its second decade. As important elements of this new plan, IHDP plans to improve incorporation of central social science approaches and to engage other groups including social and physical scientific communities, the wider practice community, stakeholders, and other potential producers and users of global environmental change science. The overall expectation is that the efforts of the core projects and the central secretariat will expand the overall community, improve the efforts and outputs of the program, and ultimately move toward mainstreaming of human dimensions in Earth system science.

DIVERSITAS. DIVERSITAS will not only continue its efforts through its core projects, but will, together with IGBP, undertake a fast-track initiative focused on plant functional types that are key to understanding the role of plant diversity in mediating ecosystem function and the response of plants to environmental change. DIVERSITAS will continue to serve as the lead agency for the Biodiversity task of the GEOSS and will continue to develop a draft Global Biodiversity Observation System Concept. The program expects to hold two side events at the next

Convention on Biological Diversity SBSTA related to its contributions to the development of an IMoSEB.



Earth System Science Partnership. The ESSP is implemented primarily through its four cross-cutting projects focusing on water, carbon, food and health, and integrated regional studies such as the recently launched Monsoon Asia Regional Study. GWSP is designed around three themes: magnitudes and mechanisms, linkages and feedbacks, and resilience and adaptation as well as cross-cutting themes. The project is currently preparing to launch a global digital water atlas and a global study of water flows, among other activities. GCP's activities focus around three themes under which numerous activities are organized: patterns and variability, processes and feedbacks, and carbon management as well as high-level syntheses.

SysTem for Analysis, Research and Training Programme. START will implement its project Advancing Capacity to support Climate Change Adaptation (ACCCA). START plans to complete its Assessments of Impacts and Adaptation to Climate Change (AIACC) project and to report to the Global Environment Facility on its results. START will also assist in the implementation of MAIRS, whose project office is located at the Chinese Academy of Sciences in Beijing.

US-Japan Liaison Group on Geosciences and Environment. The United States, with Japan, plans to develop the 12th US-Japan Workshop on Geosciences and Environment in FY 2008; to review the wide range of ongoing cooperative projects; and to consider and approve appropriate new cooperative projects on mutually agreed topics in the geosciences and environment with a special focus on climate and global change.

Asia Pacific Network for Global Change Research. CCSP, through its Interagency Working Group (IWG) on International Research and Cooperation, and with funding from the National Science Foundation, continued its support for the Asia-Pacific Network for Global Change Research (APN) for which Japan has the lead funding responsibility. APN approved nine new projects and continuing projects for funding in 2006/2007. APN also approved three comprehensive research projects and ten new capacity-building projects under the APN Scientific Capacity Building/Enhancement for Sustainable Development in Developing Countries (CAPaBLE) Programme, including one on the Research Needs on the Ecology of Global Change in Island Landscapes of the Republic of Palau.

APN launched its 2007/2008 call for proposals under its regular program and its CAPaBLE program with the CCSP IWG on International Research and Cooperation participating in the review process through the U.S. National Points-of-Contact.