

CHAPTER 14

**INTERNATIONAL RESEARCH
AND COOPERATION**

from the

**Strategic Plan
for the
Climate Change Science Program**

By the agencies and staff of the
US Climate Change Science Program

Review draft dated 11 November 2002

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11 November 2002

Dear Colleague,

The Climate Change Science Program will hold the U.S. Climate Change Science Program Planning Workshop for Scientists and Stakeholders at the Marriott Wardman Park Hotel in Washington, D.C., from 3-5 December 2002. The purpose of the Workshop is to provide a comprehensive review of the discussion draft of the Strategic Plan for U.S. climate change and global change research. This Workshop will offer extensive opportunities for the scientific and stakeholder communities to provide comment and input to the Climate Change Science Program Strategic Plan. When finalized by April 2003, the Strategic Plan will provide the principal guidance for U.S. climate change and global change research during the next several years, subject to revisions as appropriate to respond to newly developed information and decision support tools.

We are writing to request your comments on the discussion draft of the Climate Change Science Program Strategic Plan. Comments on all elements of the plan from all communities are essential in order to improve the plan and identify gaps. In your review, we ask you to provide a perspective on the content, implications, and challenges outlined in the plan as well as suggestions for any alternate approaches you wish to have considered, and the types of climate and global change information required by policy makers and resource managers. We also ask that you comment on any inconsistencies within or across chapters, and omissions of important topics. For any shortcomings that you note in the draft, please propose specific remedies. To participate in the review it is not necessary that you review the entire plan.

We ask that comments be submitted by E-mail to <comments@climatescience.gov>. All comments submitted by 13 January 2003 will be posted on the <<http://www.climatescience.gov>> website for public review. While we are unable to promised detailed responses to individual comments, we confirm that all submitted comments will be given consideration during the development of the final version of the Strategic Plan.

Attached to this letter are instructions and format guidelines for submitting review comments. Following the instructions will ensure that your comments are properly processed and given appropriate consideration. If you wish to distribute copies of the plan to colleagues to participate in the review, please provide them with a copy of this letter as well as the attached instructions and format guidelines. We have posted the plan on the workshop website at <<http://www.climatescience.gov>>. PDF files for individual chapters of the plan can be downloaded from this site. If you have any questions, please contact: Sandy MacCracken at 1-202-419-3483 (voice), 1-202-223-3065 (fax), or via the address in the footer below.

We appreciate your contribution of time and expertise to this review, and look forward to your response.

Sincerely,

James R. Mahoney, Ph.D.
Assistant Secretary of Commerce for Oceans and Atmosphere, and
Director, U.S. Climate Change Science Program

Instructions For Submission of Strategic Plan Review Comments

Thank you for participating in the review process. Please follow the instructions for preparing and submitting your review. Using the format guidance described below will facilitate our processing of reviewer comments and assure that your comments are given appropriate consideration. An example of the format is also provided. Comments are due by **13 January, 2003**.

- Select the chapter(s) or sections of chapters which you wish to review. It is not necessary that you review the entire plan. In your comments, please consider the following issues:
 - **Overview:** overview on the content, implications, and challenges outlined in the plan;
 - **Agreement/Disagreement:** areas of agreement and disagreement, as appropriate;
 - **Suggestions :** suggestions for alternative approaches, if appropriate;
 - **Inconsistencies:** inconsistencies within or across chapters;
 - **Omissions :** omissions of important topics;
 - **Remedies:** specific remedies for identified shortcomings of the draft plan;
 - **Stakeholder climate information:** type of climate and global change information required by representative groups;
 - **Other:** other comments not covered above.
- Please do not comment on grammar, spelling, or punctuation. Professional copy editing will correct deficiencies in these areas for the final draft.
- Use the format guidance that follows for organizing your comments.
- Submit your comments by email to <comments@climatescience.gov> by 13 January, 2003.

Format Guidance for Comments

Please provide background information about yourself on the first page of your comments: your name(s), organization(s), area of expertise(s), mailing address(es), telephone and fax numbers, and email address(es).

- Overview comments on the chapter should follow your background information and should be numbered.
- Comments that are specific to particular pages, paragraphs or lines of the chapter should follow your overview comments and should identify the page and line numbers to which they apply.
- Comments that refer to a table or figure should identify the table or figure number. In the case of tables, please also identify the row and column to which the comment refers.
- Order your comments sequentially by page and line number.
- At the end of each comment, please insert your name and affiliation.

Format Example for Comments

I. Background Information

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II. Overview Comments on Chapter 5: Atmospheric Composition

First Overview Comment: (Comment)

Reviewer's name, affiliation: John Doe, University College

Second Overview Comment: (Comment)

Reviewer's name, affiliation: John Doe, University College

III. Specific Comments on Chapter 5: Atmospheric Composition

Page 57, Line 5: (Comment)

John Doe, University College

Page 58, Line 32 - Page 59, Line 5: (Comment)

John Doe, University College

Table 1-4, Row 3, Column 6: (Comment)

John Doe, University College

Please send comments by email to <comments@climatescience.gov>

Foreword

In February 2002 President George W. Bush announced the formation of a new management structure, the Climate Change Science Program (CCSP), to coordinate and direct the US research efforts in the areas of climate and global change. These research efforts include the US Global Change Research Program (USGCRP) authorized by the Global Change Research Act of 1990, and the Climate Change Research Initiative (CCRI) launched by the President in June 2001 to reduce significant uncertainties in climate science, improve global climate observing systems, and develop resources to support policymaking and resource management.

The President's Climate Change Research Initiative was launched to provide a distinct focus to the 13-year old Global Change Research Program. The CCRI focus is defined by a group of uncertainties about the global climate system that have been identified by policymakers and analyzed by the National Research Council in a 2001 report requested by the Administration.

The Climate Change Science Program aims to balance the near-term (2- to 4-year) focus of the CCRI with the breadth of the USGCRP, pursuing accelerated development of answers to the scientific aspects of key climate policy issues while continuing to seek advances in the knowledge of the physical, biological and chemical processes that influence the Earth system.

This *discussion draft* strategic plan has been prepared by the thirteen federal agencies participating in the CCSP, with input from a large number of scientific steering groups and coordination by the CCSP staff under the leadership of Dr. Richard H. Moss, to provide a vehicle to facilitate comments and suggestions by the scientific and stakeholder communities interested in climate and global change issues.

We welcome comments on this draft plan by all interested persons. Comments may be provided during the US Climate Change Science Program Planning Workshop for Scientists and Stakeholders being held in Washington, DC on December 3 – 5, 2002, and during a subsequent public comment period extending to January 13, 2003. Information about the Workshop and the written comment opportunities is available on the web site www.climatescience.gov. A specially formed committee of the National Research Council is also reviewing this draft plan, and will provide its analysis of the plan, the workshop and the written comments received after the workshop. A final version of the strategic plan, setting a path for the next few years of research under the CCSP, will be published by April 2003. We appreciate your assistance with this important process.

James R. Mahoney, Ph.D.
Assistant Secretary of Commerce for Oceans and Atmosphere, and
Director, Climate Change Science Program

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Acronyms

Authors and Contributors

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CHAPTER 14

INTERNATIONAL RESEARCH AND COOPERATION

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From the first days of research on climate science, it has been recognized that change occurs on many scales—from local to regional to global. Early research focused on change as it was manifest at the local level where scientific capabilities were also the strongest. The results of this early research indicated clearly to US scientists studying change that the processes that influence change at the local level could not be divorced from regional and global processes. To obtain first-hand knowledge and to develop comprehensive understanding of these processes—under a broad range of geophysical and biogeochemical conditions—requires scientists to cooperate across national boundaries on both a regional and global basis.

It was recognized that research and observational programs to study change at these levels should be carried out so as to assure the full and open exchange of data among participating scientists and between these scientists and the broader scientific community and those involved in the policy-making process. These research and observational programs also contribute substantively to the international assessment process, such as the Intergovernmental Panel on Climate Change (IPCC) and the Scientific Assessment of Ozone Depletion, as described in the preceding chapters of this plan. It is also important in conducting such programs, especially those involving developing countries, that ways be found to assist scientists in these countries to play a substantive role in the collection and analysis of data and to benefit from the results of these activities. Efforts in these areas have resulted in a comprehensive array of international

1 global change research programs and projects that are steadily evolving as new scientific needs
2 are identified.

3
4 When US scientists identify international collaboration necessary for them to address important
5 scientific problems at the regional and global level, they are encouraged to address these to the
6 maximum extent possible through direct scientist-to-scientist cooperation. US scientists
7 studying global change thus work directly with colleagues in other countries in a number of key
8 areas, as is highlighted in earlier sections of this plan.

1. Goals of International Cooperation in Climate Science

10
11 The broad scope and complexity of US climate science research often also requires that the
12 United States develop a broad, well-organized international framework within which:

- 13 • Regional- and global-scale specific cooperative research and observational programs
14 can be planned and implemented;
- 15 • US scientists and scientific institutions can interact effectively with scientists and scientific
16 institutions with expertise in other geographic areas not normally accessible to US
17 scientists;
- 18 • The full and open exchange of scientific observations and data needed for research
19 results can be encouraged and the results of such research can be exchanged;
- 20 • Research needed to support decision-making can be identified and developed;
- 21 • Early warnings of emerging environmental issues can be obtained;
- 22 • Other countries, their agencies, institutions, and scientists, can be encouraged to
23 become more actively involved in research and observational programs; and
- 24 • The research and observational capabilities of these countries, especially developing
25 countries, can be improved.

2. The International Framework

27
28 US scientists, US funding agencies and the US Government and our colleagues and
29 counterparts in other countries have developed such a framework to address both research and
30 observational requirements.

31
32 This framework includes a series of global-scale research programs; non-governmental and
33 intergovernmental international organizations at both the global and regional level; various
34 networks for coordination of observing systems—both *in situ* and remote sensing—and data
35 exchange and management; and organizations that focus on education, training, and capacity-
36 building.

37
38 The United States is involved in numerous significant partnerships with other nations to develop and
39 implement climate-related satellite programs. Such satellite remote-sensing systems require
40 development of collaborative international ground-based networks, maintenance of these networks, and

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1 assurance of calibration relative to widely recognized standards. This cannot be accomplished only
2 through collaboration of scientists from all nations. Such ground-based observations also form an
3 important link for the calibration and validation of satellite data that are obtained by the space agencies
4 that constitute the Committee of Earth Observing Satellites (CEOS).

5
6 A few illustrative examples include the following:

- 7 • French partnership with the United States was vital to the success of the
8 TOPEX/POSEIDON mission over the past 10 years to measure ocean topography.
- 9 • Japan provided satellite and launch for the US ocean surface wind instruments (NSCAT
10 on ADEOS I and SeaWinds on ADEOS II) and the precipitation radar and launch for
11 the very successful Tropical Rainfall Measuring Mission.
- 12 • Japan also is providing the Advanced Microwave Sounding Radiometer (AMSR-E) on
13 NASA's Earth Observing System (EOS) Aqua satellite mission.
- 14 • Brazil contributed the HSB atmospheric sounding instrument on Aqua.
- 15 • Canada has provided the MOPITT instrument on the EOS Terra satellite.
- 16 • German partnership was key to the successful recent launch of the GRACE satellite to
17 measure time variations in the Earth's gravity field.

18
19 In addition to their fundamental contribution to the mission flight success, these partnerships
20 have substantially broadened the science and end-user communities for climate-related satellite
21 observations.

22 23 **THE GLOBAL-SCALE INTERNATIONAL RESEARCH PROGRAMS**

24
25 Within the global-scale research programs, scientists from many countries address: the physics
26 and related chemistry of global change, with a special focus on climate, through the World
27 Climate Research Programme (WCRP); the biology and chemistry and related geosciences of
28 global change, through the International Geosphere-Biosphere Programme (IGBP); the human
29 dimensions of global change, through the International Human Dimensions Programme (IHDP);
30 and biodiversity science, through the Diversitas program.

31
32 These programs link to international scientific unions through the International Council for
33 Science (ICSU) and with ICSU committees, such as the Scientific Committee for Ocean
34 Research (SCOR); the Scientific Committee on Problems of the Environment (SCOPE); and
35 the Scientific Committee on Antarctic Research (SCAR).

36
37 These programs also provide a framework within which major field campaigns can be organized
38 involving ships, aircraft, satellites, balloons, surface-based measurements, and laboratory
39 studies. One example of such a campaign is the Global Observation of Forest and Land Cover
40 Dynamics program (GOF-C-GOLD), an international effort to provide accurate, reliable,
41 quantitative space-based and *in situ* observations of forests and other vegetation cover for
42 sustainable development of terrestrial resources. This program also contributes to improving
43 understanding of the terrestrial carbon budget.

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3. Bilateral Cooperation in Climate Change Research and Technology

In response to an initiative of President George W. Bush, the United States has recently undertaken to develop bilateral cooperation with a number of other countries that share US interests and capabilities in specific areas of climate change research and technology. Efforts are well underway with Italy, Japan, and Australia. Discussions are in progress with the People's Republic of China, the Republic of Korea, Canada, India, seven Central American countries, and the European Union.

4. Multilateral International Cooperation in Research and Observational Programs

National agencies that fund global change research, satellite remote sensing systems, agricultural research, and development aid also coordinate their efforts with their counterpart agencies in other countries through a number of organizations and networks. These include the International Group of Funding Agencies for Global Change Research (IGFA); the Committee on Earth Observing Satellites (CEOS); and the Consultative Group on International Agricultural Research (CGIAR). Through IGFA, national agencies that fund global change research exchange information, identify issues of mutual interest, and develop approaches to resolving these issues that the agencies then implement nationally.

The United States is one of the largest donors to CGIAR, which sponsors sixteen international agricultural research centers devoted to improving food security, alleviating poverty, and improving the management of natural resources in developing nations. These centers are engaged in biological research that is intended to increase production of basic food crops and livestock and to maintain and enhance the natural resource base relating to soil, water, aquatic resources, agro forestry, and forestry.

The United States interacts at the intergovernmental level with partner countries in United Nations (UN) organizations that support global change research, both directly and indirectly. Preeminent among these are the World Meteorological Organization (WMO); the Intergovernmental Oceanographic Commission (IOC) of the UN Educational, Scientific and Cultural Organization (UNESCO); the UN Environment Programme (UNEP); the Food and Agriculture Organization (FAO); the UN Development Programme (UNDP); and the World Health Organization (WHO). Through its participation in UNEP, the UNDP, and the World Bank, the United States also participates actively in and supports the Global Environmental Facility (GEF), the primary international institution for transferring energy and sequestration technologies to the developing world.

Among other things, these agencies are involved in sponsorship of a number of the key scientific bodies involved in international cooperation in global change research, e.g., the World Climate

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1 Research Program. The WMO, UNESCO, IOC, UNEP and FAO, in cooperation with
2 ICSU, also sponsor and oversee coordination of many of the observational systems that
3 support global change research, including the Global Climate Observation System (GCOS),
4 Global Ocean Observation System (GOOS), and the Global Terrestrial Observation System
5 (GTOS).

6
7 Of special note, the WMO and the IOC have established a new Joint Technical Commission for
8 Oceanography and Marine Meteorology (JCOMM) to which the two organizations have
9 entrusted development, maintenance, coordination, and guidance of the operation of their global
10 marine meteorological and oceanographic observing systems.

5. Regional Cooperation In Global Change Research

12
13 The United States also participates in and supports regional cooperation in global change
14 research, especially in the Americas, Asia and the Pacific, and Africa. In 1990 President
15 George H.W. Bush hosted a ministerial-level *Conference on Scientific and Environmental*
16 *Research Related to Global Change*. At this conference, the United States proposed—and
17 the Conference agreed—to establish three hemisphere-scale regional global change research
18 networks.

19
20 The first of these, the Inter-American Institute for Global Change Research (IAI), was set up in
21 1992, and the Asia-Pacific Network for Global Change Research (APN) soon followed. In
22 Africa the SysTem for Analysis, Research, and Training (START) has established a Pan-
23 African START Regional Committee (PACOM). START and PACOM are involved in
24 designing and implementing regional cooperative research in such areas as climate variability and
25 climate change; water and food security; and land use change, ecosystems, and biodiversity.
26 Regional networks directed at GOF-C-GOLD objectives have also been established in Central
27 Africa and the Miombo region in southern Africa.

28
29 The United States hosts two organizations that emphasize cooperation with developing countries
30 in global change research. The first is the START program cited above, an international non-
31 governmental organization that was established under the aegis of ICSU. START is co-
32 sponsored by the IGBP, the WCRP, and the IHDP. Its purpose is to build capacity in
33 developing countries to conduct research on global environmental change and the challenges
34 these changes pose for human health, agriculture, water, and food security, and to apply the
35 results of such research in decision-making.

36
37 The second is the International Research Institute for Climate Prediction (IRI), an innovative
38 science institution working to accelerate the ability of societies worldwide to cope with climate
39 fluctuations, especially those that cause devastating impacts on humans and the environment,
40 thereby reaping the benefits of decades of research on the predictability of the El Niño-
41 Southern Oscillation phenomenon and climate variations.

1
2 The United States also actively promotes global change research in the Antarctic and Arctic, the
3 former through cooperation with other parties to the Antarctic Treaty and SCAR, and the latter
4 through the Arctic Council; the International Arctic Sciences Committee (IASC); and the Arctic
5 Ocean Sciences Board (AOSB).
6

6. U.S. Plans and Objectives For Future International Cooperation

7
8 The overall framework for international cooperation in global change research and observations
9 has been responsive to the needs of US global change science. However, this framework
10 should be broadened and strengthened to keep pace with the evolving needs of this science with
11 respect to both research and observations.
12

13 Climate modeling capabilities have improved dramatically in recent years and can be expected
14 to continue to do so. As a result, US scientists are now able to model Earth system processes
15 and their coupling on a regional and global scale with increasing precision and reliability. To
16 continue to improve such modeling will require substantial expansion of Earth observing
17 systems, both remote and *in situ*, in order to fill gaps in existing databases, especially in those
18 areas of the world for which existing data is sparse. Such data-sparse regions include remote
19 regions, especially those with harsh environments, and areas where existing capabilities to make
20 observations and collect data are limited, such as the oceanic and interior land areas of the
21 Southern Hemisphere and both polar regions.
22

23 To expand cooperation internationally, the President has announced that the United States
24 intends to:

- 25 • Commit \$25 million to support the implementation of climate observation and response
26 systems in developing countries;
- 27 • Expand funding of the GEF;
- 28 • Support transfer of energy and sequestration technologies to developing countries to
29 promote sustainable development while limiting their greenhouse gas emissions growth;
- 30 • Expand cooperation in climate change research and technology with a number of key
31 countries and regional organizations; and
- 32 • Work with the IAI and other institutions to better understand regional aspects of climate
33 change.
34

35 The Climate Change Science Program also intends to:

- 36 • Encourage regional cooperation in Africa, working in cooperation with ICSU, the Third
37 World Academy of Science (TWAS), and START, possibly leading to a hemisphere-
38 scale regional network for global change research in Africa;
- 39 • Promote further development and expansion of global observing systems through the
40 Global Climate Observing System (GCOS) and the Argo program (a global array of
41 free-drifting profiling floats that measure the temperature and salinity of the upper 200

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- 1 meters of the ocean) for ocean observations, through further multilateral and bilateral
2 cooperative efforts analogous to those already initiated;
- 3 • Encourage expanded cooperation in biodiversity research, especially through the
4 Diversitas program;
 - 5 • Enhance efforts to bring science and technology to bear on increasingly complex
6 problems of natural resource development (e.g., the application of climate information
7 for improved adaptation and disaster preparedness); and
 - 8 • Work closely with the international global change research programs—the WCRP,
9 IGBP, IHDP and Diversitas—to promote effective transition of a number of their
10 present focused programs to cross-cutting programs (such as the Global Environmental
11 Change and Food Security Program) that are intended to relate global change research
12 more directly to major societal and economic factors.
- 13

1 **Authors and Contributors**

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3

PART III. COMMUNICATION, COOPERATION, AND MANAGEMENT

4

Chapter 14. International Research and Cooperation

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