15.5 Update on U.S. Support for the Global Climate Observing System (GCOS) and Associated Pacific Island Regional GCOS Activities

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1. INTRODUCTION

The international Global Climate Observing System (GCOS) was established in 1992 to ensure that the observations and information needed to address climate-related issues are obtained and made available to all potential users. It is cosponsored by the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC) of United Nations Educational Scientific and Cultural Organization (UNESCO), the U.N. Environment Program (UNEP) and the International Council of Scientific Unions (ICSU). GCOS is intended as a long-term, user-driven operational system capable of providing the comprehensive observations required for monitoring the climate system, for detecting and attributing climate change, for assessing the impacts of climate variability and change, and for supporting research toward improved understanding, modeling and prediction of the climate system. It addresses the total climate system including physical, chemical and biological properties, and atmospheric, oceanic, hydrologic, cryospheric, and terrestrial processes. More Information on the international program can be found at http://www.wmo.ch/web/gcos/gcoshome.html

2. BACKGROUND

This paper describes the support for GCOS provided by the U.S. Climate Change Research Initiative and how that fits in with a proactive approach in the South Pacific region towards an action and implementation planning process with the goal of obtaining a sustainable and robust GCOS observing network for atmospheric, oceanographic, and terrestrial climate observing in the region. The paper outlines the actions taken to date, plans for the future, and how the efforts of the Pacific Islands Regional GCOS Implementation Team (PIRGIT), and evolution of the PIRGIT towards a more formal regional Steering Committee, and combined with related efforts such as the establishment of a virtual Regional Climate Center for the region in order to commence tailored regional and climate forecast products for the nations in the region.

This paper further provides details on the continued support for GCOS provided via the U.S. Climate Change Research Initiative and managed by the U.S. GCOS Program Manager in NOAA. The paper describes how that global effort for supporting GCOS in developing nations fits in with the proactive approach that has been taken in the Pacific Islands region. The process in the Pacific has been accomplished through a solid planning process that has as its goal obtaining a sustainable and robust GCOS observing network for atmospheric, oceanographic, and terrestrial climate observing in the region. The paper describes the actions completed to date, plans for the future, and how the efforts of the Pacific Islands Regional GCOS Implementation Team (PIRGIT), and accompanying evolution of the PIRGIT into a more formal regional Steering Committee, have been combined with related efforts such as the establishment of a virtual Regional Climate Center, in order to provide more tailored regional and climate forecast products for the nations in the region. Finally, the paper delineates how support for GCOS in the region has been leveraged via distinct bilateral climate partnership agreements the U.S. has entered into with Australia and New Zealand.

3. BACKGROUND OF THE U.S. GCOS PROGRAM

As a result of the United Nations Framework Convention for Climate Change (UNFCCC) decision in 1999, the GCOS Secretariat was directed to establish a series of workshops for developing nations. The intent of these workshops was to aid in the establishment of a sustainable in-situ climate observing system across the globe. The first of these workshops was held in Apia, Samoa, from 14-15 August 2000, and included participation from all members of the climate observing authorities in the South Pacific Regional Environment Programme (SPREP) based in Apia, as well as participation from the South Pacific Applied Geoscience Commission (SOPAC) based in Nadi, Fiji.

The United States (U.S.) has been involved with GCOS since its inception. Since 1992, a considerable amount of work has been done by various federal agencies. In particular, federal agencies have supported the international GCOS Steering Committee, and the work of the GCOS data, space, and science panels, as they have engaged in planning GCOS, defining its requirements, and contributing parts of the initial system. NOAA's National Climatic Data Center (NCDC) in Asheville, North Carolina, supports a number of GCOS data management activities. A national GCOS program has begun to emerge over the past two years. In November 1999, a full-time national GCOS

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program manager position was established and filled by NOAA/NESDIS to manage the national program.

The primary focus of this position is to coordinate the development of a national GCOS program that involves all U.S. federal agencies with a role in climate observing and monitoring. As part of this effort, the U.S. national program is also a great proponent of ensuring a robust and sustainable program in other regions. Given the importance of the Pacific region and our great involvement via the National Weather Service Pacific Region Headquarters in Honolulu, Hawaii, it was a natural extension of the national program to become more involved in the development of a Pacific Islands GCOS effort. This involvement in the Pacific Region is even more important in light of bi-lateral climate agreements the U.S. now has with Australia and New Zealand that will be described later in the paper.

Like other developed nations, the U.S. was required to submit a report on the status of its systematic observations for climate. That report was finalized and made available to the UNFCCC Secretariat in August 2001. The full report as well as a summary of the report are available in Adobe PDF format at the U.S. national GCOS home page at http://www.eis.noaa.gov/gcos/soc_long.pdf

4. INTERNATIONAL INVOLVEMENT

In addition to the requirement for national reports on systematic observations, the UNFCCC at its 1999 meeting invited the GCOS Secretariat to continue to assist with and facilitate the establishment of an appropriate intergovernmental process that would identify potential improvements in the global observing system for climate and set priorities for acting on those improvements. As such, the U.S. GCOS program has been one of the leaders in this effort.

The U.S. continues to be an active participant in and large supporter of the international Global Climate Observing System (GCOS) program in a number of areas. These areas of support can be characterized in two categories of support: (1) global; and (2) regional.

Global Support

The global support represents the overall U.S. Government's support of GCOS. In May 2002, the U.S. State Department contributed $600K (US) in funding to the GCOS Secretariat in order to conduct the second adequacy study of GCOS on a global basis. This adequacy study was called for by the UNFCCC and is a joint GCOS/Intergovernmental Panel for Climate Change effort . This was intended to produce an adequacy report based on among other things the analysis of GCOS national reports in order to focus attention on where critical gaps in the overall global climate observing are in order for resources to be better directed. Published in April 2003, *The Second Report on the Adequacy of GCOS* provides a detailed assessment on the gaps in GCOS that provides solid scientific requirements that can be used in resource mobilization towards current and future GCOS support and enhancements. It is planned to be reviewed and endorsed by Environmental and Foreign Affairs Ministers around the world, when presented to COP-9 in December 2003. A copy of the 2nd Adequacy Report can be found on the GCOS home page at http://www.wmo.ch/web/gcos/gcoshome.html.

As part of this global aspect of U.S support for GCOS, and in response to a United States Presidential Climate Change Research Initiative (CCRI), the U.S. has formulated a Framework for International GCOS Support plan. This plan focuses on the status of GCOS, what is needed to bring GCOS to its operational-design level, and the support needed from the scientific, donor, and host communities to implement selected improvements to it.

Under the Climate Change Research Initiative (CCRI) budget line for the support of atmospheric Global Climate Observing (GCOS) networks, NOAA has committed to selected improvements in the management and operation of GCOS and GCOS-related atmospheric networks beginning in 2003, and has taken leadership, working with the GCOS Secretariat at the World Meteorological Organization (WMO), in funding GCOS improvements. In line with that, the NOAA CCRI for the Global Climate Atmospheric Observing System budget for FY 2003 allocated a total of $3.773M that begins to address the most critical needs and deficiencies of GCOS upper air observing sites in Chile, Congo, Cook Islands, Ecuador, Kenya, the Maldives, and Tanzania, as well as the establishment of new aerosol climate observing sites in the Indo-Asia-Pacific region. In addition this funding is used to support the operations of the GCOS Secretariat, stage GCOS regional workshops in developing countries, and support critical GCOS data management activities at the GCOS Lead Data Center at the National Climatic Data Center in Asheville, North Carolina

Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.) Undersecretary of Commerce for Oceans and Atmosphere and NOAA Administrator has demonstrated great support for and commitment to the international GCOS effort. In speeches to the Executive Councils of the *Intergovernmental Oceanographic Commission of UNESCO* and the WMO in June 2002, Admiral Lautenbacher made the following statements that encourage other nations to join the US in this CCRI partnership to support GCOS.

"I strongly believe that NOAA is the right agency to take a leadership role within the United

States, but we know full well that we cannot do this alone. The global observation effort for climate is far too enormous for one organization, or even one country, to undertake alone. We must work together. Perhaps the greatest challenge is to develop one integrated observation plan for the atmosphere, ocean, and land which everyone can support. The Global Climate Observing System (GCOS) and Global Ocean Observing System (GOOS), working with the Integrated Global Observing Strategy (IGOS) Partners and others, have developed international consensus on overall needs. There is, however, much work still to be done. This challenge lies in our ability to provide one coherent plan which integrates space and in-situ observations across those three elements."

As a follow-on to this, the U.S. hosted an international Earth Observation Summit in Washington, DC, on July 31, 2003. At the summit, 37 nations were represented and the purpose of the summit was to "***Promote the development of a comprehensive, coordinated, and sustained Earth observation system or systems among governments and the international community to understand and address global environmental and economic challenges; and. Begin a process to develop a conceptual framework and implementation plan for building this comprehensive, coordinated, and sustained Earth observation system or systems."*** As a result of the summit, an ad hoc Group on Earth Observations (GEO) -- was established to prepare a 10-year implementation plan for a coordinated, comprehensive, and sustained Earth observation system or systems. A two-day inaugural meeting of the group was held August 1-2 to facilitate planning for the year ahead, and a GEO Secretariat has been established and is hosted by NOAA. Details and documents related to the summit can be found at http://earthobservationsummit.gov/. GCOS will obviously play an important part in such an integrated observing system.

Regional Support

The regional support for GCOS represents the efforts on the part of the U.S. GCOS Program office. While the funding levels are not at the same levels as that of the U.S. global support for GCOS, it is far more focused on efforts dealing with regional workshops for developing nations with a special emphasis on the South Pacific Island States' region.

The Regional Implementation Workshop, initiated by the GCOS in response to Decision 6/CP.5 of the FCCC and held in Apia, Samoa in August 2000 with support and active participation by both Australian and US experts, built on the South Pacific Regional Environment Program's (SPREP) needs analysis and has provided the basis for development of a Pacific Island-GCOS (PI-GCOS). The PI-GCOS Action Plan has identified the high priority actions, many of which can be implemented as stand alone modules, that will assist in restoring and improving observing systems in the region to a level necessary to effectively monitor the climate of the region and systematically detect trends and changes in climate.

The U.S. GCOS Program Office in NOAA has been a supporter of the PI-GCOS effort since the Apia workshop and has contributed resources towards that effort. In Fiscal Year (FY) 2000, the contribution to PI-GCOS was $25K (US) in support of the workshop; in FY2001 and FY2002 the combined contribution to PI-GCOS was an additional $65K (US) in support of the PI-GCOS Action Plan and Implementation Team meetings, and associated logistics. In FY 2003, support to SPREP amounted to $105K; the additional funding included support for a data management workshop, as well as some support for related ocean observation work on the part of SOPAC. In FY2004 the U.S. GCOS Program Office plans (contingent upon final budget disbursements for FY 2004) to continue its support of the regional effort at levels consistent with previous years. These funds continue to address the actions and proposals from the PI-GCOS Action and Implementation Plans developed over the past couple of years. In addition, the US GCOS Program Coordinator plans to continue contributing his in-kind support and facilitation of furthering the goals of PI-GCOS. In addition to supporting GCOS regional efforts in the Pacific, the U.S. GCOS Program Office has also provided resources to help stage other workshops as well as providing presenters on various topics. The GCOS Regional Workshop for South America, held in Santiago, Chile, from October 14-16, 2003, was the most recent example of that additional regional support.

In the past year the U.S. has entered into two important bi-lateral climate agreements in the Pacific Region. The Climate Action Partnership (CAP) between the U.S. and Australia, and the Climate Change Partnership (CCP) between the U.S. and New Zealand, provide for a number of GCOS-related projects that will be of benefit to the region. In essence many of the projects are actually tri-lateral in nature as all three countries are quite committed to advancing the goals of GCOS in the region. These bi-laterals cover a wide range of projects dealing with climate prediction, ocean observing, stratospheric detection, water vapor measurements, capacity building and training, and communication of information. It is believed that these agreements will focus the attention and resources of all three countries towards developing a sustainable and robust GCOS program in the region.

One issue that the U.S. GCOS program is addressing is the continued operation of the Global Observing System Information Center (GOSIC) located at http://gosic.org/. The GOSIC is under a second-phase 3-year development effort under the auspices of Dr. Ferris Webster at the University of Delaware. The U.S. GCOS Coordinator is one of the sponsors of GOSIC

along with the NOAA Office of Global Programs. The GOSIC has recently (October 2003) undergone its second review by the international GCOS community where a reviewed of the operation and relevance of the GOSIC was conducted that included an update since the last review in April 2001. This latest review has provided some good direction and ideas for the GOSIC to continue pursuing. NOAA is providing on-going financial support to the GOSIC for this new 3-year development phase. At the end of that developmental period, the GOSIC plans a 2-year transition period in which to transition its operation to a permanent operational agency. NOAA may be one of the candidate organizations to host the GOSIC system.

In support of the PI-GCOS effort, the GOSIC has begun the development, in concert with the regional PI-GCOS Program Officer, of a Pacific Islands GCOS portal in order to facilitate the access to Pacific Islands GCOS datasets that may be held in a diverse group of data centers.

This portal, to be located at http://pi-gcos.org, will be a key tool to aid in the management of the Pacific Islands Regional GCOS Program program as well as providing an administrative tool for use by the regional program officer. That position is funded by the U.S. GCOS Program Office as part of the integrated Pacific Islands team effort of which the US is an active participant along with Australia, New Zealand, and the member nations of SPREP.

A conceptual framework structure of the PI-GCOS program can be found on the last page of this paper. At the 10th meeting of the global GCOS Steering Committee in April 2003, the concept in this framework for a regional Steering Committee (SC) was endorsed, and was further called out as a structure for other regions to emulate. While the regional PI-GCOS Program Officer will work on a day-to-day basis for SPREP, the regional SC will be made up of interested persons from the region (a Terms of Reference is in development) who are dedicated to seeing GCOS progress and will exist to provide external advice and scientific oversight. The regional SC would then also coordinate with the global SC in order to ensure that the global nature of GCOS is maintained in the regional program.

5. VIRTUAL CLIMATE CENTER FOR THE PACIFIC

A Task Team has been established to provide guidance and assistance in the designation and implementation process for establishing a Regional Climate Center (RCC) within the Region. This supports climate prediction which is relatively new and that National Meteorological and Hydrological Services (NMHS) are the customers of RCC products and services, The Task Team has reported that a Virtual RCC would be appropriate for the South Pacific with this set-up allowing all Members and their respective national and regional climate centers/agencies to participate at a comfortable and affordable level.

The foreshadowed South Pacific RCC is proposed to be inclusive so that all South Pacific climate centers can play a role in climate prediction and RCC services. Taking into consideration the capabilities of some NMHSs or climate agencies/centers, in particularly in Small Island Developing States (SIDS), information has been provided on roles and capabilities of NMHSs or climate agencies/centres to provide forecast products and services to meet the virtual RCCs requirements. These activities will strongly support PI-GCOS activities.

6. CONCLUSION

The U.S. has been very supportive of the overall international GCOS program effort and has provided considerable support on both a global as well as regional effort. It is believed that support for GCOS should be global in nature and the US is working to be a leader in helping to make GCOS a sustainable and robust system both regionally and globally, and that can serve the needs of an improved global climate monitoring system.

PI-GCOS Conceptual Framework