

20th Session of the GEWEX Scientific Steering Group (SSG)

**Buenos Aires, Argentina
February 4–8, 2008**

DRAFT REPORT

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Decisions and Action Items

From the 20th Session of the GEWEX Scientific Steering Group (SSG)
February 4–8, 2008, Buenos Aires, Argentina

Decisions/Recommendations:

1. The SSG approved the appointment of four new members (S. Seneviratne, M. McCabe, A. Schweiger and S. Van Der Heever) to the GEWEX Radiation Panel (GRP).
2. The SSG approved the new Terms of Reference for the GRP:
“The GEWEX Radiation Panel guides GEWEX radiation projects in determining global water and energy fluxes in the atmosphere and at the surface, as an element of seasonal-to-interannual climate variability, and the response of the climate systems on decadal-to-interannual time scales to changes in anthropogenic forcing.”
3. The SSG supports that, as an additional goal, the GRP begin working towards data products that can be used for climate and trend analysis.
4. The SSG endorses the strengthening of links between GEWEX and the Global Climate Observing System (GCOS), and recommends Dr. J. Famiglietti as the GEWEX liaison for GCOS.
5. The SSG approves the GEWEX Modelling and Prediction Panel (GMPP) proposal stating that the GMPP chair will co-chair the Working Group on Numerical Experimentation (WGNE) while keeping the current set-up of the structure within GEWEX intact in order to maintain working groups and coordinating bodies for integrated reporting and planning. All three GMPP project chairs become members of WGNE.
6. The SSG strongly recommends that the International Monsoon Study (IMS) be proactive in approaching and including all monsoon-related components within the World Climate Research Programme (WCRP), and in particular to reach out to the African Monsoon Multidisciplinary Analysis (AMMA) and Variability of the American Monsoon System (VAMOS) monsoon activities.
7. The SSG endorses the proposal to hold a joint WCRP Core-Project SSG meeting and suggests starting with a joint Climate Variability and Predictability Project (CLIVAR) - GEWEX SSG meeting.
8. The SSG endorses the GMPP proposal for an Aerosols, Clouds, Precipitation and Climate (ACPC) program but recognizes that a new field campaign should be considered only after the availability and options of other data have been explored.
9. The GEWEX SSG recommends that the Coordinated Energy and Water-cycle Observations Project (CEOP) through its Extremes cross-cut aim at increasing the understanding of processes, particularly those over land areas and those that produce droughts, heavy precipitation and flooding in different regions of the world.
10. The request from the Working Group on Surface Fluxes (WGSF) for GEWEX to support the continuation of their activities is denied. SEE JSC-29 REPORT.
11. The SSG endorsed the promotion of WCRP data set stewardship to ensure unique, consistent and uniformly calibrated data sets.
12. The SSG recommends that GRP develop a strategy for a global hourly precipitation product.
13. The SSG recommends strengthening the WCRP Joint Planning Staff (JPS) staff with a designated person to interface with GEWEX and to reduce to the overall workload on the JPS staff. A letter is to be drafted for the Director of WCRP (Action: GEWEX Chair)

Action Items:

A. SSG General:

- A.1. Provide a few bullet points by March 1, 2008 to the International GEWEX Project Office (IGPO) on the importance of GEWEX and its activities and why GEWEX should continue to exist after its sunset date of 2012. (ACTION: All SSG and GEWEX Panel members) COMPLETE
- A.2. Submit to the WCRP 2009 Joint Scientific Committee (JSC) a draft letter to the Director of WCRP supporting the WCRP Observation and Assimilation Panel (WOAP) in their request to have the JSC adopt a 2–3 year planning horizon for WOAP's biannual meetings. (ACTION: SSG Chair, IGPO Director)

B. CEOP:

- B.1. Send comments to the International GEWEX Project Office (IGPO) on the CEOP Strategic Implementation Plan (SIP) before March 15 (ACTION: All SSG members, panel chairs). COMPLETE
- B.2. Prepare a draft letter from the SSG Chair warning a regional hydroclimate project (RHP) that they are in danger of being terminated as an RHP due to non-compliance of the obligations as outlined in the CEOP SIP (ACTION: IGPO/Chair).
- B.3. Draft a letter to the AMMA International Social Science Council (ISSC) Chair that expresses concern about AMMA not being forthcoming with reports or with its commitments to CEOP and GEWEX. (ACTION: IGPO/Chair)
- B.4. Draft a letter with recommendations to be sent to the World Meteorological Organization (WMO) to change data collection and dissemination practices for precipitation (ACTION: K. Trenberth, IGPO, SSG Chair)
- B.5. Finalize the Hydrologic Applications Project (HAP) implementation plan and commence execution of the Project (ACTION: HAP Chair)
- B.6. Develop a strategy to clarify the links between GEWEX and the Global Water System Project (GWSP), and map a common way forward in addressing climate variability and its impacts on water. (ACTION: Chair HAP, GWSP International Project Office (IPO) Director)
- B.7. CEOP will address SSG concerns with the Northern Eurasian Earth Science Partnership Initiative (NEESPI) Chair on how the NEESPI plans to meet its obligations as an RHP (ACTION: CEOP Chairs)
- B.8. Review the GCOS list of variables and advise the SSG on how GEWEX can contribute. (ACTION: E. Wood)

C. GMPP

- C.1. Draft the Terms of Reference for a merger of GMPP with WGNE and distribute these to SSG members. (ACTION: P. Siebesma, J. Polcher)
- C.2. Before implementing a new field campaign as proposed in the ACPC summary paper, research other data options and report on this to the SSG. (ACTION: P. Siebesma, T. Ackerman, B. Rossow)
- C.3. Send a note of thanks to Andy Pitman for his chairmanship of the Global Land Atmosphere System Study (GLASS). (ACTION: SSG Chair)
- C.4. Ask Bart van den Hurk if he is willing to chair GLASS (ACTION: IGPO, SSG Chair) COMPLETE

D. GRP

- D.1. Draft a letter to the Global Precipitation Climatology Centre (GPCC) requesting precipitation data for Extremes research activities (ACTION: C. Kummerow, SSG Chair, IGPO)
- D.2. Draft a letter requesting sustained support from D/WCRP for the bi-annual Baseline Surface Radiation Network (BSRN) meetings. (ACTION: GRP Chair/IGPO)

E. IGPO

- E.1. Draft a white paper that addresses potential areas for GEWEX and Climate and Cryosphere (CliC) collaboration. (ACTION: IGPO Director)
- E.2. Draft a white paper on a mutual (cross-projects) vision for WCRP. (ACTION: IGPO, SSG Chair and Panel Chairs)

E.3. Distribute for comment by SSG members and panel chairs the proposal by written by K. Trenberth et al. that was developed during the SSG-20 meeting; this proposal provides a rationale for the necessity of a higher temporal resolution pluviometer. (ACTION: IGPO)

1. INTRODUCTION AND OVERVIEW

This report summarizes the main developments in GEWEX during the year 2007 and includes the main items and recommendations from the 20th Session of the GEWEX Scientific Steering Group (SSG), held in at the Palacio San Martin, Ministry of Foreign Affairs in Buenos Aires, Argentina, 4–8 February 2008. The meeting was hosted by Prof. Carlos Eduardo Ereño [Department of Atmospheric and Oceanic Sciences at the University of Buenos Aires and staff scientist for the American and Asian-Australian Monsoon Panels, Climate Variability and Predictability Project (CLIVAR) Project Office]. 38 experts from 12 countries attended the meeting, which was opened by Ambassador Maria Ester Bondanza, Argentinean Director General of the Environment in the Ministry of Foreign Affairs. Several Argentinean presentations were made at the meeting, including an overview of South American scientific issues related to the World Climate Research Programme (WCRP) [Dr. Carolina Vera, Departamento de Ciencias de la Atmósfera (CIMA)], Argentina Space Agency activities [Dr. Raul Colomb, the Comision Nacional De Actividades Espaciales (CONAE)], observations for water management (Alvaro Soldano, NWI) and the Group on Earth Observations (GEO) Latin American Capacity Building Program (Rick Lawford, International GEWEX Project Office).

1.1 Major Activities and Achievements in 2007:

The merger of the Coordinated Enhanced Observation Period ('CEOP') with the GEWEX Hydro-meteorology Panel (GHP) into the Coordinated Energy and water-cycle Observations Project (CEOP) took place in 2007. A new Strategic Implementation Plan (SIP) has been developed that provides a solid outlook and practical strategy for the future, further streamlining Regional Hydroclimate Projects (RHPs) and making them more efficient and coherent through the support and use of the observational systems that were developed during 'CEOP'. Within the new CEOP, the Hydrologic Applications Project (HAP) has started to develop stronger ties with the Global Water System Project (GWSP), the United Nations Educational, Scientific, and Cultural Organization (UNESCO) International Hydrology Programme (IHP), the GEWEX Modelling and Prediction Panel (GMPP) and CLIVAR, and is now establishing test-beds jointly with GWSP and CEOP. The Hydrological Ensembles Prediction Experiment (HEPEX) liaised with HAP and organized its 3rd Workshop in Italy, where much progress was shown, in particular through contributions from the European Centre for Medium-Range Weather Forecasts (ECMWF) and the European Flood Alert System by the Joint Research Centre (JRC). The Extremes working group [formerly the Worldwide Integrated Study of Extremes (WISE)] is now focusing on further understanding processes over land that lead to drought, heavy precipitation and floods in different global regions, and as such will directly contribute to the WCRP Extremes Cross Cut. Through its initial Canadian project on drought, the group is developing plans for studies of drought and other extremes on an international basis. CEOP as a whole has strongly contributed to the development of the Asian Monsoon Year (AMY) as part of the International Monsoon Studies (IMS), as well as linking the Earth System Science Partnership (ESSP) Monsoon Asia Integrated Regional Study (MAIRS) project and CLIVAR (through the Monsoon Asian Hydro-Atmospheric Science Research and prediction Initiative (MAHASRI)). CEOP, in collaboration with the GEWEX Radiation Project (GRP) and GMPP, continues to lead the Monsoons Cross-cut on behalf of GEWEX.

Many of the plans for IMS, AMY and CEOP were solidified during the 2007 CEOP Implementation Planning Meeting in Bali, Indonesia. The RHPs continue to provide regional comprehensive, essential and extensive data sets and are proving invaluable in both regional and global modelling and analysis. The 2007 addition of the Northern Eurasian Earth Science Partnership Initiative (NEESPI) as a new RHP has also provided a significant opportunity to develop valuable high latitude data sets for the Northern Hemisphere.

Through the GRP, GEWEX has supported the continued development and maintenance of surface-based long-term networks such as the Baseline Surface Radiation Network (BSRN), for which the data archive will be re-established at the Alfred Wegener Institute in Potsdam, Germany. GRP has also supported the development of global satellite products such as those from the Global Precipitation Climatology Project (GPCP); these are key in identifying natural variability and trends, validating satellite observations and developing retrieval algorithms, developing parameterization schemes to more accurately represent atmospheric behavior, and evaluating the fidelity of model

simulations of the hydrological and energy cycles. GRP has completed an assessment of its long-term products and concluded that a major reanalysis is merited, given the unique ability of these data sets to provide the first long-term look at climate trends on a truly global basis for a number of climate variables. GRP initiated its Landflux activity at a workshop in Toulouse, France, aimed at determining the turbulent sensible and latent heat fluxes over land (and snow-ice) surfaces. SSG members accepted the GRP proposal to begin working towards global data products that can be used for climate and trend analysis.

GMPP has established itself as the prime model parameterization development and evaluation body in WCRP. The GMPP strategy consists of identifying important regimes in the climate system; evaluating model performance generally and using long-term data sets and field campaign data sets in critical regimes; developing new parameterization approaches through process studies targeting regimes that are not well represented in current models; and supporting the implementation of newly developed parameterizations in climate and numerical weather prediction (NWP) models. Among recent examples of GMPP contributions to climate modelling is the Global Land Atmospheric Coupling Experiment (GLACE) project, which revolutionized land-feedback studies by elucidating areas of strong land-atmosphere coupling, and the GEWEX Cloud System Study (GCSS), which contributed in a major way to the first climate models using a cloud-resolving model approach to parameterization. GEWEX, led by the GMPP, has worked with the International Global Atmospheric Chemistry (IGAC) and the Integrated Land Ecosystem-Atmospheric Processes Study (iLEAPS) to establish a new initiative known as Aerosols, Clouds, Precipitation and Climate (ACPC). A stronger link has been established with iLEAPS and the Global Land/Atmosphere System Study (GLASS) through the Land-Use and Climate IDentification of Robust Impacts (LUCID) project, which looks at the effects of land cover change on climate change.

The SSG approved plans by GMPP to merge with the Working Group on Numerical Experimentation (WGNE) while keeping the GMPP structure within GEWEX intact. The merger aims at strengthening the parameterization efforts within both WCRP and the World Weather Research Programme (WWRP).

1.2 Goals and Plans for Major Activities for 2008 into 2009:

Climate change and the anthropogenic influences that contribute to it are likely to remain high on the international political agenda. The looming environmental crises, in particular regarding our water and energy resources, is an area where GEWEX can provide essential insight in fundamental processes and assistance in providing the necessary data and models for improved risk assessment and mitigation predictions.

CEOP with HAP will initiate studies to demonstrate the added value of Earth observational data, along with process studies and model development in poorly or ungauged basins. CEOP will develop an inventory of floods and droughts as well as the role of land-atmosphere interactions in causing these events. Within GMPP, the intercomparison of water cycle feedback processes in single column models involving the atmosphere only will become a point of focus. CEOP will organize a workshop on Extremes that, along with the Extremes workshop organized by CLIVAR, will help set up a small scoping group and focus on the direction and development of the WCRP Extremes cross-cut. As part of the Monsoons cross-cut, the contributions from GEWEX, particularly outside of the Asian region, need to be strengthened with respect to the IMS, the AMY initiative and links to the Year of Tropical Convection (YOTC).

Further assessment is needed of the global data products and the observations and diagnosis of causes of global energy and water cycle variations from daily-to-decadal scales. This can be extended to include turbulent fluxes over land surfaces.

1.3 Interactions (Especially with WCRP's Sponsors and Partners):

GEWEX uniquely extends WCRP interactions to a large network of satellite programs and the hydrology community. In addition to its strong links with CLIVAR, WGNE, the WCRP Observation and Assimilation Panel (WOAP), Climate and Cryosphere (CliC) and Stratospheric Processes And their Role in Climate (SPARC), GEWEX makes distinct and meaningful contributions to each of the WCRP

cross-cuts. GEWEX also has many links with the International Geosphere-Biosphere Programme (IGBP) within the larger ESSP community, mainly through iLEAPS and more recently through IGAC, and through HAP's maturing interactions with GWSP and other ESSP cross-cuts. In addition, GEWEX has programmatic links to the UNESCO IHP, the International Association of Hydrological Sciences (IAHS) and the Global Climate Observing System (GCOS).

GEWEX represents WCRP on the Executive of the Integrated Global Water Cycle Observations (IGWCO) theme [formerly a theme under the Integrated Global Observing Strategy – Partners (IGOS-P)] and serves on several Group on Earth (GEO) committees. GEWEX scientists also lead several GEO tasks. Through the extensive collaboration CEOP has with the Committee on Earth Observation Satellites (CEOS), GEWEX and WCRP have had better opportunities to influence and benefit from the Earth Observation community. In addition, GEWEX has established links at the national level with many funding agencies, programs, data services, research groups and environmental organizations; for example, the RHPs have connections with both national and international programs and funding agencies such as the Global Environmental Facility. The money invested by WCRP to foster these activities through travel support to meetings has been multiplied a hundred times over in regional studies that support WCRP objectives and WCRP links into dozens of countries where it might otherwise be absent.

With support from WCRP, GEWEX contributes in a variety of ways to the actions, priorities and policies of international and national programs. In the observations field, the value of GEWEX to WCRP is seen through the utility of the data sets and the quality of advice that GEWEX provides through its research. GEWEX has played a major role in bringing climate and water issues and the needs of climate research to a number of space agencies and national environmental programs. CEOP has stimulated a strong financial commitment to water cycle research in Japan, and has been the primary motivator for the emerging Asian Water Cycle Initiative. In the U.S., the National Aeronautics and Space Administration (NASA) has launched the multimillion dollar, multi-year NASA Energy and Water Cycle Study (NEWS) research program. The NEWS Implementation Plan drew heavily from the plans and research activities of GEWEX in defining its goals and its roadmap.

GEWEX has supported the policy of a free and open exchange of data, promoted by the World Meteorological Organization (WMO) and GEO. Through CEOP, GEWEX has demonstrated to stations in its reference site network a strategy for achieving this goal by developing standards, procedures and policies for data formatting, collection, processing, archiving, release, and dissemination. CEOP data providers—even those from countries with restrictive data policies—are freely exchanging data on a routine basis.

In addition to the examples of responsiveness outlined above, GEWEX has been responsive to the research agenda of the U.S. Climate Change Science Program (CCSP) and has collaborated with its water cycle program. GEWEX was the principal architect and advocate of the water cycle science component of CCSP when it was initiated. Through CEOP and the GEWEX Asian Monsoon Experiment (GAME)/MAHASRI, GEWEX has been an important contributor to the ascendancy of the water cycle as a priority in the Japanese government's science priorities. Based on recommendations from WCRP and others, the European community has made more funding available for the support of water cycle research and has provided funding to GEWEX-linked projects such as the Water and Global Change (WATCH) project. GEWEX Extremes research on drought in Canada is now contributing to a Canadian drought response strategy.

1.4 GEWEX Roadmap:

GEWEX remains committed to the goals and objectives of WCRP. It brings more than 1,500 scientists from over 50 countries together to address critical aspects of climate prediction issues. Since these scientists are volunteers, good will, trust and commitment are essential attributes that must be present to advance the GEWEX research agenda. GEWEX believes it is essential to provide its scientists with a science framework and a stable programmatic platform as they seek funding and collaborators for their research, and recently consulted with its community to develop a roadmap for the 2007–2012 period that clarifies the roles and expectations from each GEWEX panel and project.

1.5 Publications and Other Projects

WCRP can assist GEWEX in the areas of communications and commitment. WCRP has provided new ways for GEWEX activities to become more visible through its E-Zine Newsletter, Annual WCRP Report, and web site. WCRP can continue to help by articulating its overarching strategic plan for achieving climate research goals to funding agencies and the public, and also by providing a united voice to the international organizations. However, this will require better internal communications.

The International GEWEX Project Office (IGPO) publishes quarterly GEWEX Newsletter and also the IGPO document series for community reports. Representation of GEWEX at numerous national and international conferences, meetings and workshops has resulted in various publications, including proceedings, peer-reviewed literature and more. GEWEX contributes articles to the GEO "Full Picture" and other documentation, and GEWEX activities related to drought were featured in the WCRP report to GEO. This year the IGPO prepared a special issue of the American Meteorological Society (AMS) Journal of Hydrometeorology, published in August 2007, composed of papers from the 5th International Scientific Conference on the Global Energy and Water Cycle in June 2005.

The organization of workshops such as the Mountain Hydrometeorology Workshop, co-organized with the National Oceanic and Atmospheric Administration (NOAA) and NASA in October 2007, and the planned GEWEX-iLEAPS International Science Conference has lead to publication of flyers and other informational products publicizing GEWEX activities and goals.

1.6 Outreach and capacity-Building Activities

GEWEX provides value through its outreach activities developed in many areas due to WCRP coordination. WCRP has fostered a number of GEWEX links with the space community by asking the CEOS to support CEOP and by asking GEWEX to take the lead in developing the IGWCO theme, as well as nominate GEWEX members to GEO working groups and tasks. GEWEX has benefited from these linkages and used these opportunities to advance WCRP science in forums such as the World Water Forum and side meetings of the Commission for Sustainable Development.

There is a major thrust by many international bodies both inside and outside the United Nations to support capacity building. GEWEX scientists have been contributing to the development of GEO and IGWCO Capacity Building activities in Asia and Latin America; both programs will serve WCRP interests. Many of the GEWEX RHPs (e.g., the Climate Prediction Program for the Americas (CPPA), the Large-scale Biosphere Atmosphere experiment (LBA), the Baltic Sea Experiment (BALTEX), the La Plata Basin (LPB), the African Monsoon Multidisciplinary Analysis Project (AMMA), MAHASRI, NEESPI) include scientists from underdeveloped countries. This regional focus has been useful for giving these projects new scientific opportunities; some regional projects (such as BALTEX) have held training programs to enable young scientists to better use GEWEX data sets and services. Furthermore, the European Union recently provided funding to a number of African nations and organizations to enable them to play a larger role in AMMA and strengthen their hydrometeorological services to provide more useful information to national agencies.

2. GEWEX PANEL STATUS REPORTS

2.1 GEWEX Hydroclimate Panel: The Coordinated Energy and Water-Cycle Observations Project:

URL: <http://www.ceop.net>

Chairs and Term Dates: Prof. Toshio Koike and Dr. John Roads, with renewable 2-year terms beginning in 2007 and set to coincide with the annual CEOP International Planning Meetings that take place in September of each year

Objectives:

CEOP's overall goal is to understand and predict continental- to local-scale hydroclimates for hydrologic applications. The key science objectives of CEOP include: (1) What are the average hydroclimate conditions over various regions and conditions?; (2) How does water and energy flow

into and through individual regions as well as become redistributed within these regions by local mechanisms?; (3) How do extremes occur and what is their role in the hydroclimate?; (4) How do aerosols affect the hydroclimate?; (5) Does knowledge of water isotopes help us to understand the water cycle?; (6) Can we simulate and predict the hydroclimate?; and (7) What is the benefit of this increased knowledge for society? To answer these questions and to achieve its overall goal, CEOP's strategic objectives have been made consistent with those of GEWEX in the areas of data set development, quantification of energy and water cycle processes, improved predictive capabilities and connections with operational hydrometeorological services.

Status:

The Coordinated Enhanced Observing Period ('CEOP') was a pilot experiment designed to intensively study hydroclimates for a limited time period (7/1/2001 – 12/31/2004), during which many continental-scale experiments (CSEs) would likely have corresponding intensive observation periods to complement 'CEOP' when new Earth Observing Satellites would be providing a wealth of new information. With the demonstrated unique contributions of 'CEOP', it was agreed that the effort be extended and expanded over a much longer term in order to enable direct contributions to be made to the scientific objectives of GEWEX and the integrated data management activities of WCRP in the future. GEWEX, in full agreement with the GEWEX Hydrometeorology Panel (GHP) and with 'CEOP', decided to merge GHP and 'CEOP' to form a new entity, now designated the Coordinated Energy and water-cycle Observations Project (CEOP). This formal merger into the new CEOP was approved to enhance the efforts of both GHP and the original 'CEOP' and has been accomplished without losing sight of any existing GHP or 'CEOP' strategic goals, as these same scientists were already working on closely-related projects. It did mean, however, that a refocusing of the former GHP and 'CEOP' activities over the last reporting period had to be undertaken toward the new CEOP goal and objectives as expressed above.

The work being undertaken as a precursor to CEOP Phase 2, as presented at the 'CEOP'/CEOP March 2007 International Implementation Planning meeting, and the plan and schedule for the implementation of Phase 2 that was scheduled to begin in 2007 emphasized the extension of existing data and observation processes of the Coordinated Enhanced Observing Period, as well as greater stress on research and analysis components. This provided for CEOP to meet its commitments to the CEOS/IGOS-P Water Theme, to WCRP and to the Global Earth Observation System of Systems (GEOSS). With the merger of GHP and the Coordinated Enhanced Observing Period, it was agreed that it was still necessary for each of the Phase 2 initiatives to be maintained under the Coordinated Energy and Water-cycle Observation Project. The Co-Chairs of the new CEOP and the lead persons of each working group agreed to accept the action to advance such work in 2006–2007, including:

- plans to continue with a watershed hydrology component;
- plans to contribute towards the examination of inter-connectivity between land areas;
- plans to embark on an Extremes initiative;
- plans to initiate an isotope measurements study;
- plans to develop more cross-cutting initiatives that exploit the work undertaken in the GEWEX CSEs, which have now been designated as RHPs;
- plans to undertake a joint initiative with WCRP project CliC and the International Polar Year (IPY);
- plans to exploit CEOP reference sites located in semi-arid regions and at high elevations;
- plans to initiate a new CEOP Monsoons Regional Study; and
- plans to augment and formalize the CEOP international coordination function.

RHP Work Expands: Cold Regions, Semi-Arid, High Elevations, Monsoon Studies Initiated

In addition to regional hydroclimate projects, the new CEOP includes groups focused on regional studies in cold regions, high elevations, monsoon and semi-arid regions. These groups are an outgrowth of the previous 'CEOP' Monsoon project, which attempted to bring together scientists within both the CSEs and the Climate Variability and Predictability Project (CLIVAR). The new CEOP Monsoons Regional Study will reach out to CLIVAR and the WCRP Monsoon cross-cuts to make sure its activities are synergistically connected with these other groups. At the same time, the new CEOP Cold Regions Study (CRS) will begin to reach out to the RHP and WCRP scientists involved in similar activities in CLIC and will be a part of the International Polar Year.

Water and Energy Budget Studies Expanded: Aerosol/Water-Cycle Interactions, Water Isotope Cross-cuts Initiated

The science of CEOP continues to provide a traditional focus for water and energy budgets, which will extend efforts to understand average conditions to those conditions that existed during the 'CEOP' time period (2003–2004) to the present; it also provides a GHP effort to understand average conditions during an earlier period. This extension includes a special focus on extremes during the 'CEOP' period, which connects to WCRP cross-cut activities. New cross-cutting CEOP science efforts include a study of the influence of aerosols and the study of water isotopes, which is also connected to IGBP efforts.

Data and Modelling Work Accommodated at all Scales: Explicit Global, Regional, Land Surface and Hydrologic Applications Projects Emphasized

CEOP now adds explicit global, regional, land surface, and hydrologic applications projects (HAP) as part of its group activities. All of these modelling groups are looking at an ensemble of international models in many different regions focused on the new CEOP reference sites that are described in the Data Management section. Some of these modelling projects expect to show not only their capability to simulate the present climate but the seasonal (HAP) as well, and also expect to be useful for global change assessments in some of the RHPs.

Data Management Aspects Extended: NCAR, MPI, UT, GRDC, GPCC Connections

CEOP Data Management, which was a focal point of 'CEOP', has now successfully implemented a data policy allowing the sharing of *in situ* reference site data, model output data and satellite data, and has set up archival centers for this data at the National Center for Atmospheric Research (NCAR) and the Max Planck Institute (MPI). During the CEOP period, satellite data will become available online at the University of Tokyo (UT), and then along with other data be moved to a central data archive where it can be accessed and distributed to interested users. By the end of CEOP in 2012, we expect to have developed a functioning CEOP data center that will be used by all of the CEOP science groups. It should be noted that CEOP data is already open to outside groups. CEOP data management also has links to a number of associated groups, such as the Global Runoff Data Centre (GRDC) and Global Precipitation Climatology Centre (GPCC).

Key Results:

- (1) Regional Hydroclimate Projects work was expanded to and focused on specialized regional studies resulting in initiatives in semi-arid, cold, monsoon and high-elevation regions initiated in 2007 as part of the new Coordinated Energy and water-cycle Observations Project.
- (2) Water and Energy Budget Studies (WEBS) were expanded in the following ways:
 - An Aerosol/Water-cycle Interactions study began and served as the topic of international discussion at a workshop in China in August 2007.
 - A Water Isotope Cross-cut Study was initiated with a first workshop planned for 2008.
 - An Extremes study was furthered by building on the Worldwide Integrated Study of Extremes (WISE) initiative. The new study has been established and a series of conference calls was continued in 2007. This effort is expected to be another connection to WCRP cross-cut activities.

- A GEOSS/Asian Water Cycle Initiative kicked off in 2007 with 9 meetings.

(3) Explicit Global, Regional, Land Surface and Hydrologic Applications Projects were all initiated in CEOP in 2007.

- The CEOP HAP has been accepted by the Asian Water Cycle Initiative. This cooperation has resulted in the contribution of 13 river basins in Asia for HAP application.

(4) Data Management aspects have been extended

- A new database arrangement was established at NCAR.

- Model data from all 11 numerical weather prediction (NWP) centers was received at MPI.

- Satellite data was archived at the University of Tokyo and arrangements were made for the continued collection and archival of data from instruments flown on satellites by each of the main Space Agencies.

- GRDC and GPCC agreed to be included in the CEOP data management scheme.

(5) A draft of the CEOP Strategic Implementation Plan (SIP) was finalized.

Plans for 2008:

The new CEOP Monsoons Regional Study will connect with CLIVAR and the WCRP Monsoon cross-cuts to ensure its activities are synergistically connected. At the same time, the new CEOP Regional Studies Cold Regions Study (CRS) will begin to connect with RHP and WCRP scientists involved in similar activities in CliC and IPY. Traditional WEBS activities will be extended up to the present from the old 'CEOP' time period of 2003–2004. HAP's connection to the International Association of Hydrological Sciences (IAHS) and the Hydrological Ensemble Prediction Experiment (HEPEX) will be formalized and plans by the Asian Water Cycle Initiative to contribute to HAP will be developed further.

New cross-cutting CEOP science efforts on the influence of aerosols and the studies of water isotopes will hold workshops to encourage further development. The Extremes effort will also hold its first workshop and attempt to include other projects of WCRP. Regular international conference calls will be reinstated to ensure momentum continues between data providers, data archive centers and users.

New Directions:

By the end of CEOP in 2012, we expect to have developed a functioning CEOP data center that will be used by all of the CEOP science groups. The longer term view is that the CEOP data, which is open to outside groups, will eventually be embraced by the broadest possible cross-section of the overall climate research community. This will require the CEOP data management scheme to open and maintain links to a number of associated groups such as the GRDC and the GPCC, as well as other data archive centers.

Questions and dialog about CEOP's unique nature has led to a clearer understanding of the longer term view of CEOP as being science-driven as well as science-enabling. CEOP wants to have scientists involved in data-related activities to ensure the value of the resultant products to the broader community. CEOP does not, therefore, need to be shy about continuing over the long term to "push" for an integrated data system, even though that may well be an outcome of the implementation of its unique coordinated data management scheme.

CEOP in its new framework will want to further clarify its function and status in WCRP. Connections with other core projects such as CliC and CLIVAR and oversight by groups such as the WCRP Joint Scientific Committee (JSC)/WCRP Observation and Assimilation Panel (WOAP) will result in better conclusions regarding its structure and its range of interactions among and between multi-disciplinary groups and various technical and data management centers. Such a unifying configuration could result in CEOP becoming a collaborating Project within WCRP.

It is valid and appropriate for CEOP in its new configuration to expand its science scope and, from material incorporated into its Implementation Plan, work on extremes/teleconnections, aerosols and the water cycle, watershed hydrology such as science issues and the extension/enhancement of data collection, and analyses into cold and semi-arid regions as part of CEOP's future vision.

Contributions to WCRP Strategic Themes:

GEWEX Roadmap Objective 1:

- CEOP Data Management and associated global data centers are producing multi-year integrated prototype hydroclimate data sets that will allow users to get model output data, satellite data and *in situ* measurements of various hydrometeorological data, including its isotopes, for a particular *in situ* location.
- It will eventually be possible to scale up the CEOP data to cover continental-scale to global regions.
- CEOP expects that it will be able to provide observations of many fundamental variables of the water and energy cycle which are now only available as model output. By the end of 2012, we expect that the CEOP data will become a recognized part of a GEWEX/WCRP and perhaps eventually a GEOSS-distributed data center.

GEWEX Roadmap Objective 2:

This objective is the main focus of all of the CEOP Elements. CEOP data will be used to:

- describe the connection between high-altitude reference stations and regional monsoons (Africa, South America, North America, Asia/Australia);
- evaluate satellite products of precipitation and surface radiation and energy budgets with reference data;
- improve our understanding of hydrologic processes, specifically cloud processes and land surface exchanges; and
- provide an estimate of uncertainty in various global analyses and regional simulations of water and energy processes and variables.

GEWEX Roadmap Objective 3:

- All of the RHPs are connected to NWP centers as well as hydrometeorological models capable of simulating and predicting the hydroclimate variable. These models will be confronted with CEOP data to better understand where current physical parameterizations may be failing.
- CEOP will have a special focus on land surface, including soil moisture, snow cover and complex terrain. Besides coarse seasonal averages, an additional focus will be on the predictability of high temporal resolution features associated with diurnal to annual cycles.

GEWEX Roadmap Objective 4:

- RHPs are fully committed to developing applications as part of their technical requirements, which requires interactions with hydrologic services and related groups. These individual RHP efforts will be internationally organized within CEOP by HAP in collaboration with other international groups such as HEPEX and the IAHS.
- Besides HAP, these efforts will be done in concert with land surface models and regional modelling groups that contribute to CEOP and GMPP efforts.

Finally, CEOP is committed to assessing the contribution of remote sensing measurements for hydrologic applications and predictions.

CEOP Contributions to WCRP/GEWEX Cross-cuts:

Main areas of research within RHPs cover

CEOP-MONSOON will provide the GEWEX perspective to WCRP cross-cut activities of the Integrated Monsoon Studies (IMS) initiative. Under the IMS, collaborations among GEWEX, CLIVAR, The Observing System Research and Predictability project (THORPEX) and the Monsoon Asia Integrated Regional Study (MAIRS) are expected. The contributions of CEOP-MONSOON to the IMS

in particular will be on the fields related to land surface conditions and/or processes, and floods and drought in large river basins.

CEOP in its new framework will continue to evolve as a relevant aspect of the initial configuration of GEO/GEOSS, and thereby contribute to GEWEX/WCRP interests and strategies associated with these developments.

Summary:

GEWEX, in full agreement with GHP and the Coordinated Enhanced Observing Period ('CEOP'), decided to merge GHP and 'CEOP' to form a new entity designated as the Coordinated Energy and water-cycle Observations Project (CEOP). This formal merger into the new CEOP has enhanced the efforts of both GHP and 'CEOP' while maintaining consideration of initial GHP and 'CEOP' strategic goals and ongoing science work. The merge also required a refocusing of former GHP and 'CEOP' activities toward new CEOP goals and objectives, as well as the documentation of these matters, including the methods and plans for future accomplishments. The result of this process has been the delivery of the Final Draft of the CEOP Strategic Implementation Plan for consideration by the GEWEX SSG and the broader climate science community. Through this process, CEOP has established itself as the international focal point for WCRP/GEWEX Global Hydrometeorological Research, and in 2007 reached out to all interested researchers to participate and contribute to the development of current and future hydrometeorological observations, simulations and predictions.

List of Key Publications:

- Coordinated Enhanced Observing Period Special Issue of the Journal of Meteorological Science of Japan (JMSJ): February 2007
- Coordinated Energy and Water-cycle Observations Project Strategic Implementation Plan: January 2008

List of Meetings and Workshops:

9–10 January, 2007, 2nd Asian Water Cycle Symposium, Tokyo, Japan
12–17 March, 2007, Joint CEOP/IGWCO Planning Meetings, Washington, D.C., USA
4–8 June, 2007, 5th Study Conference on BALTEX, Kuressaare, Saaremaa, Estonia
6–8 September, 2007, The 7th CEOP International Implementation Planning Meeting, Bali, Indonesia

Planned Meetings and Workshops:

20 January 2008, West African Monsoon Model Evaluation Workshop, New Orleans, LA, USA
1–6 June 2008, Deserts to Monsoons Workshop, Crete, Greece
May 2008, CEOP Extremes Workshop (tentative)
15–17 September 2008, 2nd CEOP annual meeting

List of Members and Term Dates:

Because CEOP has just come into formal existence, all the key persons listed are assumed to be newly appointed this year and most are expected to serve 3 year terms.

Toshio Koike	Congbin Fu	Michael
John Roads	Kun Yang	Lautenschlager
Sam Benedict	Ron Stewart	Ben Burford
Jin Huang	William Lau	Kenji Taniguchi
Jair Maia	David Noone	Ulrich Looser
Hugo Berbery	Kei Yoshimura	Tobias Fuchs
Hans-Joerg Isemer	Mike Bosilovich	
Amadou Gaye	Burkhardt Rockel	
Jun Matsumoto	Ray Arrit	
Helen Cleugh	Matt Rodell	
Pasha Groisman	Eric Wood	
Tetsuo Ohata	Steve Williams	
Gianni Tartari		

2.2 GEWEX Radiation Panel (GRP)

URL: <http://grp.giss.nasa.gov>

Chairs and Term Dates: William B. Rossow (2001–2007) and Christian Kummerow (2008–2010)

Objectives:

The GEWEX Radiation Panel (GRP) focuses its work in three areas: (1) advancing understanding of the atmospheric radiative transfer process that is central to the global energy and water cycle; (2) advancing understanding of the radiation physics needed for improved analysis of remote sensing observations, with particular attention to determinations of precipitation and land surface properties; and (3) compiling and analyzing a complete quantitative description of the weather-to-decadal scale variability of the global energy and water cycle.

Current activities in each area are undertaken respectively by cooperation with (1) the International Radiation Commission's 3-D Radiative Transfer working group (3DRT) and their Intercomparison of Radiation Codes in Climate Models (ICRCCM), and the joint GRP-ARM (Atmospheric Radiation Measurement) Continuous Intercomparison of Radiation Codes (CIRC) working group; (2) the Working Group on Cloud and Aerosol Profiling (WGCAP) and the new Working Group of Precipitation Radar Networks (WGPRN); and (3) the Working Group on Data Management and Analysis (WGDMA). WGDMA is the combination of all the participants in the projects producing global data products that provide key missing elements of the energy and water cycle, namely: clouds by the International Satellite Cloud Climatology Project (ISCCP), precipitation by the Global Precipitation Climatology Project (GPCP) and the Global Precipitation Climatology Center (GPCC), surface radiation fluxes by the Surface Radiation Budget project (SRB) and the Baseline Surface Radiation Network (BSRN), aerosols by the Global Aerosol Climatology Project (GACP), ocean surface turbulent fluxes of heat and water by SeaFlux, and a new project to be called LandFlux to provide land surface turbulent fluxes of heat and water.

Status:

All of the global data products (except SeaFlux and LandFlux) are available through 2006 and into 2007, now providing more than 2 decades of global determinations of clouds, precipitation, aerosols (ocean only) and surface/top-of-atmosphere radiation. Monthly mean global maps of all these and related data products are available online at the GRP web site for their respective time periods in a common map grid. Formal international assessments of the products from ISCCP, GPCP, GACP and SRB were started 3 years ago (the aerosol effort was re-started again this year) to provide a critique of the reliability of these products, as well as any other available data products that provide similar long-term global records. The Precipitation assessment is complete; WGPRN has issued a report that has been reviewed by outside colleagues and the GRP. The Radiation and Clouds assessments have completed their second workshops in the past year and are now working to sharpen comparison results to produce reports; the Clouds assessment is planning a third workshop in July 2008. The aerosol assessment conducted its first workshop on 14–15 September 2006, but has had to be re-started again. Funding for the continuation of the global data projects is currently in place. WGDMA is continuing work toward a coordinated re-processing of all the products to start in 2009. BSRN has arranged for a new archives institution—the Alfred Wegener Institute in Bremerhaven, Germany—so that further evolution of its products can now proceed. CIRC is nearly ready to release a web site that will provide both synthetic- and observation-based tests for any radiative transfer code calculating broadband fluxes, such as those used in global climate models (GCMs). GRP continues to monitor progress by the National Oceanic and Atmospheric Administration (NOAA) and the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) in developing new global water vapor products. SeaFlux held two workshops in May and September 2007, is nearing completion of a report about the global data product comparisons, has developed a proto-type for a new sea surface temperature product, and is preparing for production of additional new products in 2008. GRP began the LandFlux initiative with a workshop in May 2007. GRP, together with the GEWEX Cloud System Study (GCSS), supported planning efforts for the Year of

Tropical Convection.

Key Results:

- (1) Monthly mean global maps in a common grid from all GEWEX and additional related products are now available online at the GRP web site.
- (2) GPCP extended its data record to 29 years.
- (3) ISCCP extended its data record to 24 years and has completed a 20-year climatology of cloud particle sizes.
- (4) GACP extended its data record to 26 years.
- (5) SRB extended its data record to 24 years and has made several significant improvements in its products.
- (6) BSRN arranged for a new archives institution, the Alfred Wegener Institute for Polar and Marine Research in Bremerhaven, Germany, to replace the Swiss Federal Institute of Technology in Zurich.

Plans for 2008:

CIRC is planning to release its web site while continuing to add test cases and organize a “users” (GCM modelers) workshop for late 2008. Plans will be formulated by BSRN during the next year to increase the range of data products provided and improve access to them; this activity is now growing into a key component of the Global Climate Observing System (GCOS). SeaFlux plans to begin production of one or more new ocean flux products based on existing comparison studies, algorithm improvements and input data set improvements; after some additional testing, the final products should be ready for production in 2009. LandFlux is sponsoring two workshops in the coming year to continue development of needed land surface products, including land surface skin temperatures (diurnally resolved) and soil moisture and inundation. Work will also continue to explore the extension of the LandFlux activity towards remote sensing of a full set of land hydrological quantities. To get some focused studies of surface-atmosphere exchanges in polar regimes started and to exploit data sets being collected as part of the International Polar Year (IPY), a small *ad hoc* working group will organize comparisons of the main GRP data products with available *in situ* measurements. In order to focus more on cloud-precipitation processes (including aerosol effects), a possible re-organization of WGCAP and WGPRN will be discussed by e-mail; as part of this effort, the data sets and cases held on the GCSS Data Integration for Model Evaluation (DIME) web site could be expanded for precipitation and aerosol studies. The DIME activity might also be expanded to support some modelling-related activities to be initiated concerning cloud precipitation and land hydrology processes. With approval of extended funding for ISCCP, a switch of the products will be made from the original 30-km sampled radiances to the (backup) 10-km sampled radiances; this change will not only allow for production of more robust products that are better for process studies (as contrasted with the original “climatology” goals) but also allow for production of new versions of all the GRP products with the same time sampling and map grid. Fully integrated products for process studies will be considered as well. Efforts are underway over the next 2 years to convert ISCCP from a (partially) research-based to a fully-operational activity to become part of the GCOS; based on the lessons learned in this activity, the other GRP global projects could also be converted after the planned re-processing is completed in 2010.

New Directions:

Three shifts of emphasis for the future were discussed by the GRP at their last meeting: increasing focus on cloud precipitation processes (which includes aerosol-cloud interactions), beginning efforts to expand the LandFlux activity to include the development of remote sensing capability for a full set of land hydrology quantities, and bringing into the GRP some modelling expertise in these two areas. Additionally, it was decided to organize a small effort to evaluate the global data products in polar regimes to exploit the data collection activities of the IPY. The Statement of the new GRP Chairman (Chris Kummerow, below) provides more information about GRP new directions.

Statement of the New GRP Chairman about Scientific Directions:

As the incoming chair of the GEWEX Radiation Panel, I gave some thought to the new thrusts and objectives that GRP should pursue. I quickly concluded, however, that GRP did not need new thrusts; instead, it needed to finish the data products for which it is known and from which it has contributed to the state of knowledge in the global water and energy cycle. These products—ISCCP, GPCP, SRB, GACP—

constitute the best long-term climate data sets for a complete water and energy budget picture of the Earth. The addition of the Seaflux and Landflux efforts, while not yet products, will constitute the most complete and the best long-term data set available to the community. And yet, they are not perfect. They must all be reprocessed to take advantage of the latest algorithm improvements and independent assessments, for each of the products is a vital activity that must continue. The major new thrusts can be described as (1) ensuring long-term stability in the input data so that these products can be used confidently for climate trend monitoring; (2) pushing the time and space scales down to scales at which these products can be used for process studies; and (3) continuing coordination of science efforts aimed at improving the products.

Climate Monitoring:

Each of the GRP products listed is being used (sometimes improperly) for studying climate trends. This is a natural outcome of having time series that are now approaching 30 years of use. Helping these analyses are the *in situ* data (BSRN and GPCP) that act as necessary references for the satellite products. Unfortunately, the infrared (IR) and microwave radiances that go into these products have not received very much attention in terms of their climate stability. While efforts are underway under numerous sponsorships, GRP must ensure that the input data used in its products meets the stringent tests required for climate change detection. Existing WMO efforts include the Global Space Based Inter-Calibration System (from WMO-GOS) and the CEOS Working Group on Calibration and Validation (WGCV) Microwave Sensors Sub-Group (MSSG) that met January 22–23, 2008. There is a Global Precipitation Measurement Working Group on Microwave Radiance Inter-Calibration that met January 15–16, and a WMO Television and Infrared Observation Satellite (TIROS) Operational Vertical Sounder (TOVS) Working Group that does intercalibration of IR and Microwave sounders. NOAA has additionally begun a data stewardship program. While not proposing a separate activity, GRP needs to be aware of these activities and push calibration activities that are necessary for its own long-term climate monitoring needs.

Finer Scale Products:

The current trend in climate models is toward finer spatial scales, with the objective of potentially replacing convective parameterizations by explicit cloud formulations. Comparisons between models and observations implies a new set of requirements aimed at evaluating the physical processes in the models, rather than simply monthly resultant fields. Research in these process-oriented studies is also relatively new, but growing quickly as part of the global cloud resolving model efforts. To address this, GRP will continuously focus on producing families of products that continue the long-term climate monitoring products while producing products at much finer time and space resolution applicable to process studies.

Process Studies:

Satellite products continuously evolve and improve with our understanding of physical processes and how they can be used to constrain retrievals. Two such areas are receiving considerable attention of late and can be used to improve the GRP products: polar fluxes and clouds/aerosols/precipitation processes. The first is due to the increased emphasis in polar science brought about by IPY and will be used specifically to investigate how well GRP products perform in polar regions and how new understanding can be used to improve these products in polar regions. The second objective deals with the onset of precipitation—this is a key process that determines the interaction between water and energy fluxes but an area in which very little work had been done. New satellite data such as the A-train complement of sensors can now be used to begin such investigations. GRP plans to establish a working group in this area to coordinate modelling and observational efforts that can improve the products in this important area.

Future

The primary goal of GRP for the next several years remains the completion of a comprehensive and quantitative description of global energy and water cycle variations, from mesoscale to global scale covering a period of almost 2 decades (some components will cover nearly 3 decades). This involves the coordinated re-processing of the current global products and bringing SeaFlux and LandFlux activities to fruition, as well as completing thorough assessments of the quality of all these products. The GRP will also work to foster research efforts using these and other data products, now focusing on a cloud-aerosol-radiation budget, cloud-aerosol-precipitation and surface-atmosphere exchanges.

Recommendations:

- (1) BSRN should find a way to produce summary products (e.g., daily and monthly means) that are freely available.
- (2) GACP needs to formulate a plan to obtain some estimate of aerosol optical thicknesses over land areas.
- (3) GEO/GCOS should strongly urge participating satellite agencies to develop a calibration satellite for the whole satellite constellation (both broad and narrowband radiances), and urge participating operators of surface networks to develop network-wide calibration procedures. Actions in response to this recommendation include the formation by the Committee on Earth Observation Satellites (CEOS) of the Global Space-Based Inter-Calibration System (GSICS) and the listing of the Climate Absolute Radiance and Refractivity Observatory (CLARREO) mission in the NASA Decadal Survey.

Contributions to WCRP:

GRP continues production of many key climate data sets; with the maturing of the SeaFlux and LandFlux projects, this effort will provide a complete quantitative description of the variations of the energy and water cycle from weather to climate scales. GRP continues to lead efforts to define the primary characteristics of climate data records and to develop a satellite-based climate observing system. Specific contributions to the cross-cutting themes include participating in planning for YOTC (organizing the observational aspects), which contributes to the Monsoon Cross-cut; beginning a comparison of the global data products with surface-based measurements being collected as part of IPY; and providing comprehensive data sets that can be used to determine and study extreme weather events.

Summary:

The GEWEX Radiation Panel (GRP) continues to make progress on advancing understanding of the processes causing variation of the global energy and water cycle. Four global data products (clouds, precipitation, aerosols and radiative fluxes) are available for a period more than 20 years and are being formally assessed by international groups. Efforts are also underway to collect a complete observational description of the global energy and water cycle. Work on the radiation part of the global energy and water cycle is becoming very mature; a shift of emphasis to cloud precipitation (including aerosol) processes is planned.

Key Publications:

An article was published in *CLIVAR Variations* titled "Analyzing the variations of the global ocean energy cycle" to highlight the global data product collections now being assembled. This completes the assignment to advertise the global products within WCRP.

Providing a list of all the scientific publications related to GRP activities requires too much effort but some key papers are mentioned in project-specific reports. More than 800 papers have been published using GPCP products and more than 1,300 papers have been published using ISCCP products.

Meetings, Workshops:

13–15 Nov06:	4 th WGDMA Meeting, Greenbelt, MD, USA
22 May07:	SeaFlux Workshop, Acapulco, Mexico
28–31 May07:	1 st LandFlux Workshop, Toulouse, France
25–27 Jun07:	3 rd Radiation Assessment Workshop, New York, NY, USA
05–07 Sep07:	5 th WGDMA Meeting, New York, NY, USA
27 Sep07:	4 th SeaFlux Workshop, Amsterdam, Netherlands
09–12 Oct07:	18 th GRP Meeting, Buzios, Brazil
04 Nov07:	GSICS Executive Meeting, Cocoa Beach, FL, USA
13–14 Nov07	YOTC Planning Meeting, Arlington, VA, USA

Planned Meetings/Workshops:

31 Mar – 04 Apr08:	2 nd International Workshop on Space-Based Snowfall Measurement, Steamboat Ski Village, CO, USA
07–09 Apr08:	LandFlux – Land Surface Temperature Workshop, Asheville, NC, USA

02–06 Jun08:	pan-GCSS Meeting, Toulouse, France
07–11 Jul08:	BSRN Meeting, Utrecht, the Netherlands
21–23 Jul08:	Cloud Assessment Workshop, New York, NY, USA
23–25 Jul08:	ISCCP 25th Celebration, New York, NY, USA
09–10 Sep08:	AVHRR Solar Calibration Workshop, Madison, WI, USA
22–24 Sep08:	6 th WGDMA Meeting, Hong Kong, China
14–17 Oct08:	19 th GRP Meeting, Seoul, Korea
20–22 Oct08:	LandFlux – Microwave for Hydrology Workshop, Oxnard, CA, USA

Members:

David Barber (University of Manitoba, Canada)	2006–2009
John J. Bates (NOAA NCDC, USA)	2003–2007
Abderrahim Bentamy (IFREMER, France)	2004–2007
Tadahiro Hayasaka (Research Institute for Humanity and Nature, Japan)	2002–2007
Toshiro Iguchi (CRL, Japan)	2002–2008
Christian Kummerow (CSU, USA)	2006–2010
Zhanqing Li (University of Maryland, USA)	2004–2007
Norm Loeb (NASA Langley Research Center, USA)	2005–2008
Luiz Machado (CPTEC, INPE, Brazil)	2005–2008
Catherine Prigent (Paris Observatory, France)	2003–2008
Joerg Schulz (Deutscher Wetterdienst, Germany)	2006–2009
BJ Sohn (Seoul National University, Korea)	2007–2010
Claudia Stubenrauch (LMD, France)	2007–2010
Fengsheng Zhao (China Meteorological Administration, China)	2006–2009

Project and Working Group Chairs:

Thomas Ackerman (PNL/DOE, USA)	WGCAP
Robert Adler (NASA GSFC, USA)	GPCP
Robert Cahalan (NASA GSFC, USA)	IRC 3-D WG
Carol Anne Clayson (Florida State U, USA)	SeaFlux
Robert Ellingson (Florida State U, USA)	IRC ICRCM
Ellsworth Dutton (NOAA, USA)	BSRN
Tobias Fuchs (Deutscher Wetterdienst, Germany)	GPCC
Lazaros Oreopolus (NASA GSFC, USA)	CIRC
Vincenzo Levizzani (ISAC, Italy)	WGPRN
Michael Mishchenko (NASA GISS, USA)	GACP
William Rossow (CCNY, USA)	ISCCP (WGDMA Chair)
Jacqui Russell (Imperial College, UK)	Liaison to GERB
Paul Stackhouse (NASA LARC, USA)	SRB
Graeme Stephens (Colorado State U, USA)	Liaison to CloudSat
Taneil Uttal (NOAA, USA)	Liaison to IPY
Bruce Wielicki (NASA LARC, USA)	Liaison to CERES
David Winker (NASA LARC, USA)	Liaison to Calipso

2.3 GEWEX Modelling and Prediction Panel (GMPP)

URL: <http://www.gewex.org/projects-GMPP.htm>

Chair: Prof. Christian Jakob

Overview:

GMPP's role is to coordinate the activities within GEWEX that aim to improve the representation of the global water and energy cycle within Earth system models. Furthermore, it coordinates collaboration with modelling and related observational activities within and beyond GEWEX. Particular focus areas of GMPP are cloud systems, land-surface processes and the atmospheric boundary layer (ABL). To address these difficult areas of parameterization adequately, GMPP is organized into three activities:

- The GEWEX Cloud System Study (GCSS)
- The Global Land/Atmosphere System Studies (GLASS)

- The GEWEX Atmospheric Boundary Layer Study (GABLS)

All three groups have successfully continued their activities. Those will be addressed in detail in individual project reports.

Encouraged by discussions at the Scientific Steering Group (SSG) in 2007, much of the attention of pan-GMPP activities have since focused on increasing its collaboration with groups outside GEWEX and on initiating a discussion of the future of coordinated parameterization research within the various World Climate Research Programme (WCRP) and World Meteorological Organization (WMO) structures. Strong collaborations with the Cloud Feedback Model Intercomparison Project (CFMIP) and the Aerosols, Clouds, Precipitation and Climate (ACPC) initiative have been developed. Those activities provide a strong link between GCSS and the Joint Scientific Committee's (JSC) Working Group on Coupled Modelling (WGCM) and the Integrated Land Ecosystem-Atmospheric Processes Study (iLEAPS), respectively. Despite budget problems, it was possible for GMPP to meet jointly with Working Group on Numerical Experimentation (WGNE), thereby reinvigorating this very important link with the Numerical Weather Prediction (NWP) community.

In establishing these new links it became apparent that the GMPP projects are being recognized as expert groups in parameterization, and that their expertise is heavily sought after in model-related projects of many WMO and International Geosphere-Biosphere Programme (IGBP) activities. Given the continuing decline in the number of people engaged in parameterization development, however, it also became apparent that supporting all those activities may stretch the program beyond its capabilities. This and the desire of the WMO Commission for Atmospheric Sciences (CAS) to establish a parameterization expert group highlighted again the need for a discussion on the future of parameterization research within WMO. The discussion was initiated by the GMPP and WGNE chairs at the joint GMPP/WGNE meeting and resulted in a proposal for discussion within the WCRP and CAS communities. GMPP would like the GEWEX SSG to discuss this proposal and, if agreement can be reached, support the establishment of a parameterization expert group within WGNE in which GEWEX modelling activities would play a central role.

Shifting the coordination of parameterization efforts to a group more highly recognized within WMO will undoubtedly raise the profile of such research and the GEWEX groups involved. Such a shift does, however, pose the question of the role of the GMPP structure. It is proposed that if the WGNE parameterization effort is successfully established, the position of the GMPP chair be either abandoned or filled jointly by the chairs of GCSS and GLASS instead of a separate individual. SSG input for this proposal is sought. Given the financial situation of WCRP, it is evident that the alternative of growing GMPP in its own right (discussed at the last SSG meeting) is not feasible and that a rationalization of effort within WMO through a parameterization effort in WGNE provides the best alternative at this point.

In summary, GMPP has successfully established new collaborative relationships with a number of groups and has put the field of parameterization research back on the map for discussion in WMO, while maintaining its basic science activities at a continually high level.

Status:

Many of the processes that are important to weather and climate act on scales smaller than the grid-sizes of contemporary models used in NWP, seasonal prediction and climate simulation. Examples of such processes are turbulence and convection in both the atmosphere and the ocean, cloud processes, and processes related to energy, water and biogeochemical exchanges at the land and ocean surfaces. As these processes affect the evolution of the Earth System on all time-scales, they need to be represented in models; this is usually achieved by means of parameterization. It is generally accepted that the key deficiencies—and hence uncertainties—in our current climate projections are directly related to our ability to represent these parameterized processes. Modern parameterizations are comprised of conceptual models of the processes they are aiming to represent. Importantly, this extends their usefulness well beyond application in a model, as the conceptualization of a process requires a deep understanding of its mechanisms and feedbacks. It can be argued that in many areas the need for improved

parameterizations has driven research progress, such as in the design and implementation of both field experiments and research satellites.

Over the last decades we have seen great advances in both computing and model design, leading to the application of models with smaller and smaller grid-sizes, particularly in the NWP area. Limited-area NWP models are now routinely used at grid-sizes well below ten kilometers. These grid-sizes begin to approach scales where certain processes that have traditionally been parameterized can be resolved by the model. Perhaps the prime example of such a process is that of atmospheric deep convection. This development has led to the erroneous impression that parameterizations—in particular those of deep convection—do not require much further development, as they will become obsolete in the foreseeable future. While it is likely that a small number of research activities will employ models of high-enough resolution to be able to abandon the parameterization of deep convection, it is highly unlikely that even the most advanced prediction centers will be using models of such resolution for several decades to come. This is true in particular for efforts in medium-range weather and seasonal prediction and climate simulation, where the requirements of ensemble methods will prohibit the use of such high-resolution models. Even where these can be used, the parameterization of processes other than deep convection will remain of crucial importance for the foreseeable future.

Issues:

In contrast to the great advances in computing and general model development, the scientific field of parameterization development has not advanced correspondingly and is arguably in decline, especially for moist processes such as clouds and convection. There are a number of likely reasons for this—parameterization research requires a team effort where all aspects of development are covered in a holistic manner, and the research needs to be embedded in a global or limited area modelling effort to ensure that the work is relevant and practicable in the context of the overall model development. This makes it difficult to establish sustainable efforts away from large modelling centers. With only a few notable exceptions, many centers have actually reduced their relative effort in parameterization in recent years. It is likely that a significant contribution to this decline also comes from a lack of visibility and promotion of the field through relevant international organizations. In WCRP, parameterization development activities are carried out on a relatively small scale and are mostly concentrated in the GEWEX Modelling and Prediction Panel (GMPP), a small organizational unit that is one of several WCRP Projects. CAS has no specific parameterization expertise since its restructuring, although it recently expressed interest in the need for this. It is important to note that many of the GMPP activities have been strongly supported by WGNE, whose membership represents the main institutions where parameterization development is carried out and implemented in the main NWP and global models.

Given the current and future importance of parameterization to applications used in both programs, it is remarkable how little visibility (and support) is given to parameterization development.

Recommendations:

Given the arguments outlined above, it is time to rethink the organization of parameterization development in various WMO activities. The aims of the changes proposed below are:

- to prevent the demise of parameterization as a scientific discipline;
- to promote throughout all WMO research programs the need for additional investment in parameterization development;
- to facilitate the necessary dialogue between parameterization developers and model users in all areas of model application;
- to facilitate scientific activities such as coordinated research programs, workshops and scientific conferences on parameterization;
- to embrace parameterization development as an important contribution to enhance our predictive capabilities on all space and time scales; and
- to build a critical mass within the WMO structures to make significant progress in critical areas of parameterization development over the next 10 years.

To achieve the aims above, it is proposed that one central parameterization expert subgroup be formed within WMO that will engage with all other programs and will become the focal point for parameterization development within the organization. As WGNE represents both WCRP and CAS, it is proposed that the expert group reside within WGNE. It is also proposed that WGNE appoint a WGNE co-chair with specific responsibility for the parameterization activities, as this move will add substantially to WGNE's portfolio (note that having co-chairs has been encouraged in recent years to share the voluntary workload). The membership of the expert group will be drawn initially from existing groups within WCRP and CAS; at a minimum, the group would invite the current chairs of the GEWEX projects GCSS, GLASS and GABLS that currently form GMPP. It is proposed to investigate and encourage the inclusion of parameterization efforts beyond the atmosphere and land surface, such as the ocean and the cryosphere, to enable cross-fertilization of concepts.

While WGNE represents the NWP community well, its membership currently does not cover the entire spectrum of activities with which the new expert group needs to engage, such as seasonal prediction and Earth System Modelling. It is envisaged that the new WGNE co-chair would attend relevant meetings of groups like the WGCM while their respective chairs interact with the new and wider parameterization community by attending future WGNE meetings.

It is important to note that this proposal has minimal cost implications, since the core of the proposed expert subgroup would be constituted from the existing GMPP membership who already meet annually with WGNE. The new arrangement will also enable contributions by the CAS to parameterization-relevant activities.

AGENDA
20th Session of the Scientific Steering Group (SSG)
of the Global Energy and Water Cycle Experiment (GEWEX)

The Palacio San Martin, Ministry of Foreign Affairs
Arenales 761 Buenos Aires, Argentina
February 4–8, 2008

GEWEX gratefully acknowledges the following organizations for sponsoring this meeting:

Ministerio de Relaciones Exteriores, Comercio Internacional y Culto
Ministerio de Ciencia, Tecnología e Innovación Productiva
CLIVAR Project Office for the American and Asian-Australian Monsoon Panels,
Department of Atmospheric and Oceanic Sciences, University of Buenos Aires
World Climate Research Programme (WCRP)
U.S. National Aeronautics and Space Administration (NASA)
U.S. National Oceanic and Atmospheric Administration (NOAA)
U.S. Department of Energy (DOE)

Monday, February 4, 2008:

- 09.00 – 09.45:** **Executive Session**
(for SSG members only. to discuss background, issues and what the SSG meeting should achieve)
- 09.00 – 09.45:** **General Registration**
- 09.45 – 10.00:** **1. Introduction and Welcoming Remarks**
1.1: Welcome from the Chair of GEWEX SSG and the World Climate Research Programme (WCRP) (Soroosh Sorooshian and Vladimir Ryabinin)
1.2: Welcome by Local Arrangements Committee and Introduction to the meeting site (Carlos Ereño)
- 10.00 – 10.45:** **2. Overview of Activities and Plans**
2.1: Chairman's Report (Soroosh Sorooshian)
2.2: Update on activities at WCRP (Vladimir Ryabinin)
2.3: Update and outlook for the International GEWEX Project Office (Rick Lawford/Peter van Oevelen)
- 10.45 – 11.10:** BREAK
- 11.10 – 12.00:** **2. Overview of Activities and Plans (continued)**
2.4: European GEWEX Coordination Activities Report (Peter van Oevelen)
2.5: Chinese GEWEX Coordination Activities Report (Yuping Yan)
2.6: Review of outstanding action items from the last Joint Scientific Committee (JSC), the 19th GEWEX SSG Meeting, and updates to the GEWEX Roadmap (Peter van Oevelen, Rick Lawford)
- 12.00 – 13.15:** LUNCH
- 13.15 – 15.00:** **3. Presentations on Local Projects**
3.1: Overview of WCRP related scientific issues in South America (Carolina Vera)

- 3.2: Argentina Space Agency (CONAE) activities (Dr. Raul Colomb from CONAE)
- 3.3: The use of Earth Observations and climate information in managing water resources in Argentina (Alvaro Soldano, from the Instituto Nacional del Agua (National Water Institute))
- 3.4: Towards a GEO Latin American Capacity Building Program (Rick Lawford)

15.00 – 15.20: BREAK

- 15.20 – 17.30:** **4. GEWEX Radiation Panel (GRP)**
- 4.1: Status of GRP projects and assessments and GRP contributions to the GEWEX Roadmap (William Rossow/Chris Kummerow)
 - 4.2: Actions needed from the SSG

18.00: WELCOME COCKTAIL RECEPTION

Tuesday, February 5, 2008:

- 09.00 – 11.00:** **5. Status Report on the Coordinated Energy and Water Cycle Observations Project (CEOP)**
- 5.1: CEOP overview and contributions to the GEWEX Roadmap and response to the 2007 Rapporteur's report (Toshio Koike)
 - 5.2: Overview of the CEOP Science and Implementation Plan (Sam Benedict)
 - 5.3: La Plata Basin (LPB) Project (Hugo Berbery)
 - 5.4: Climate Prediction Program for the Americas (CPPA) (Jin Huang)
 - 5.5: CEOP Data Systems (Steve Williams)
 - 5.6: The Hydrologic Applications Project (HAP) (Eric Wood)
 - 5.7: Discussion

11.00 – 11.20: BREAK

- 11.20 – 12.00:** **6. GEWEX and the Global Water System Project (GWSP)**
- 6.1: GWSP presentation (Lydia Dümenil Gates)
 - 6.2: United Nations Educational, Scientific, and Cultural Organization (UNESCO) International Hydrology Programme (IHP) (Annukka Lipponen)
 - 6.3: Discussion of GEWEX linkages with water programs

12.00 – 13.15: LUNCH

- 13.15 – 15.00:** **7. Science Talks: Preparing for the WCRP Extremes Cross-Cut**
- 7.1: Advances in extremes research in CEOP (Ron Stewart)
 - 7.2: Estimation of precipitation extremes in observations (Olga Zolina)
 - 7.3: Extremes in climate models (Kevin Trenberth)
 - 7.4: Global Soil Moisture Monitoring with the MetOp Advanced Scatterometer (ASCAT) and the Environmental Satellite (ENVISAT) Advanced Synthetic Aperture Radar (ASAR) in support of Hydrometeorological Applications (Wolfgang Wagener)
 - 7.5: Discussion: Future GEWEX Contributions to the WCRP Extremes Cross-cut

15.00 – 15.20: BREAK

- 15.20 – 16.45:** **8. GEWEX and International Coordination Programs for Observing Activities**
- 8.1: Program Introduction (Group on Earth Observations (GEO), Global Climate Observing System (GCOS), and others) (Toshio Koike, Vladimir Ryabinin)
 - 8.2: WCRP Observation and Assimilation Panel (WOAP) (Kevin Trenberth, Bill Rossow)
 - 8.3: JAXA's Earth Observation Programs and Applications (Kazuo Umezawa)
 - 8.4: Discussion on GEWEX participation in International Coordinating Programs for Observing Activities
- 16.45 – 17.30:** **9. Relations between GEWEX and the Integrated Land Ecosystem-Atmospheric Processes Study (iLEAPS)**
- 9.1: Summary of GEWEX links with iLEAPS (Pavel Kabat)
 - 9.2: Discussion on next steps

Wednesday, February 6, 2008:

- 09.00 – 10.45:** **10. GEWEX Modelling and Prediction Panel (GMPP)**
- 10.1: Overview of GMPP activities and contributions to the GEWEX Roadmap (Pier Siebesma)
 - 10.2: GCSS Activities (Pier Siebesma)
 - 10.3: ACPC (Pavel Kabat, Pier Siebesma)
 - 10.4: Updates on other Modelling Activities:
 - a) Update on WGNE including the GMPP/WGNE initiative on the Future of Parametrization research
 - b) Plans for The World Modelling Summit for Climate Prediction
 - 10.5: GMPP Response to 2007 SSG comments on GMPP (Pier Siebesma)
 - 10.6: Summary and actions needed
- 10.45 – 11.10:** BREAK
- 11.10 – 12.30:** **11. GEWEX Inputs to WCRP Monsoon Activities**
- 11.1: The International Monsoon Study (IMS) (Tetsuzo Yasunari, Rick Lawford)
 - 11.2: The Asian Monsoon Year (AMY) and GEWEX monsoon activities (Tetsuzo Yasunari)
 - 11.3: Update on the Year of Tropical Convection (YOTC) (Martin Miller)
 - 11.4: The Monsoon Asia Integrated Regional Study (MAIRS) (Tetsuzo Yasunari, Pavel Kabat)
 - 11.5: The Climate Variability and Predictability Project (CLIVAR) Monsoon Activities (Jim Hurrell)
 - 11.6: Discussion
- 12.30 – 13.30:** LUNCH
- 13.30 –18.00:** FIELD TRIP

Thursday, February 7, 2008:

- 09.00 – 10.00: 12. GEWEX Links with CLIVAR, Climate and Cryosphere (CliC)**
12.1: Overview of CLIVAR (James Hurrell)
12.2: CliC/GEWEX interactions (Peter van Oevelen)
12.3: Discussion on future interactions
- 10.00 – 10.30: BREAK**
- 10.30 – 12.00: 13. Agency Updates**
13.1: The National Aeronautics and Space Administration (NASA) (Jared Entin)
13.2: The National Oceanic and Atmospheric Administration (NOAA) (Jin Huang)
13.3: The European Space Agency (ESA) (Einar Herland)
13.4: Others
- 12.00 – 13.00: LUNCH**
- 13.00 – 14.30: 14. Discussion of GEWEX Inputs to WCRP priorities for the Next JSC Meeting**
(These discussions will proceed with a very preliminary outline of the issue, followed by discussion about GEWEX needs and the conclusion or position that GEWEX wishes to promote)
- 14.1: Anthropogenic Climate Change
14.2: Decadal Prediction
14.3: Aerosols
14.4: The International Polar Year (IPY)
- 14.30 – 15.15: 15. Update on the 6th International Scientific Conference on the Global Water and Energy Cycle**
15.1: Status Report on Preparations for the GEWEX/iLEAPS conference in August 2009 (Peter van Oevelen, Anni Reissell)
15.2: Discussion
- 15.15 – 15.30: BREAK**
- 15.30 – 18.00: 16. Second Executive Session**
(SSG Members and Panel Chairs only, to review outcomes from Days 1 to 4)

Friday, February 8, 2008:

- 08.30 – 09.15: 17. Discussion of the GEWEX Future within WCRP and International Science**
- 09.45 – 10.30: 18. 2007 Rapporteur Comments on GEWEX Activities and the contributions of Panels to the GEWEX Roadmap**
18.1: CEOP
18.2: GMPP
18.3: GRP
18.4: Other Issues

10.30 – 11.00: BREAK

11.00 – 12.00: **19. Other Issues of Relevance to GEWEX**
19.1: Succession Planning (Soroosh Sorooshian)
19.3: Other issues (All)
19.4: Chairman's summary remarks (Soroosh Sorooshian)

12.00 – 13.00: LUNCH and FAREWELLS

20th SESSION OF THE GEWEX SCIENTIFIC STEERING GROUP
BUENOS AIRES, ARGENTINA
4-8 FEBRUARY 2008

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