The GEWEX Coordinated Enhanced Observing Period (CEOP) and the GEWEX Hydrometeorology Panel (GHP) were merged into the Coordinated Energy and Water Cycle Observations Project (CEOP) in 2007. This is a Special CEOP issue of the *GEWEX Newsletter*, which will also serve as the CEOP Newsletter in cooperation with the Committee on Earth Observation Satellites (CEOS).

GEWEX WCRP

Global Energy and Water Cycle Experiment

NEWS

Vol. 18, No. 3 SPECIAL CEOP ISSUE August 2008

CEOP LEGACY AND CONTRIBUTIONS

Ghassem R. Asrar, PhD

Director, World Climate Research Programme
World Meteorological Organization, Geneva, Switzerland

I take this opportunity to acknowledge the contributions of The Global Energy and Water Cycle Experiment (GEWEX), the Coordinated Enhanced Observing Period, which is now part of the Coordinated Energy and water cycle Observations Project (CEOP), and other affiliated research projects towards advancing our knowledge of water and energy cycle processes through observations, modelling, synthesis and analysis of the state of scientific understanding during the past decades. The articles presented in this special issue of GEWEX News reflect clearly on the transformational changes in our understanding and the approaches we are taking to further investigate the role of the water and energy cycle in the climate system, and, in turn, the impacts of climate change and variability on the water and energy resources. This evolution in our scientific knowledge and research approaches would not have been possible without CEOP's unique contributions to efforts already underway in GEWEX.

I recall the birth of Coordinated Enhanced Observing Period at the beginning of the millennium, based on the urgent need to bring together all relevant sources of observations (i.e., remotely sensed and in-situ) with models to make greater progress on understanding and modelling the global energy and water cycle, with a major emphasis on regional and seasonal scales. CEOP mission objectives have evolved significantly during this relatively short period, from an observation and model data integration function to contributions to science and society. Since January 2007, CEOP also accepted a new role in promoting research on the use of model prediction ensembles and associated statistics and comparing them with observations, and making these results available to other researchers for further analysis and use. CEOP promotes the use of coupled climate models to study region-specific climate, weather, and water resources problems, especially in climatically sensitive regions of the Earth (e.g., high latitudes and elevations). A major scientific effort is focused on reducing uncertainties associated with the climatically sensitive and key hydrological processes in these regions, and their proper representation in the climate system models. CEOP has also devoted considerable efforts and resources to assemble and make available sustained regional reference observations of key meteorological and radiation parameters, together with analysis tools and methods, standards for archiving, distributing, analysis, and visualization of these observations for scientists around the world.

CEOP contributions to GEWEX are highly supportive of the WCRP mission objectives, to "support climate-related decision making and planning adaptation to climate change by developing science required to improve: (1) climate predictions; (2) understanding of human influence on climate; and (3) use this scientific knowledge in an increasing range of practical applications of direct relevance, benefit and value to society" (WCRP Strategic Framework 2005–2015). This is also demonstrated very well by the seminal contributions that WCRP-sponsored scientists and programs/projects make to international environmental assessments such as the Intergovernmental Panel on Climate Change.

As we consider the future with the heightened attention to climate change and variability and its impacts on every aspect of world-wide social, economic, and infrastructure areas, the need for improved understanding of the Earth's climate system and its associated variability and changes, especially at regional and seasonal scales, with greater emphasis on availability of the resulting knowledge and information, is crucial. WCRP and its associated projects, especially GEWEX, CEOP and their associated network of scientific leadership, are well-positioned to respond to the emerging scientific challenges and opportunities in this decade and beyond. WCRP takes pride in CEOP's past accomplishments, and looks forward with great anticipation to their future contributions towards furthering our knowledge of the complex Earth's water and energy cycle, and to make this knowledge available through its network of partnerships (e.g., the Earth System Science Partnership, and World Meteorological Organization programs, such as, Regional Climate Outlook Forums and Regional Climate Centers) to decision makers and managers for the purpose of managing the risks associated with climate variability and change on extreme events such as droughts, floods, and monsoons, and their impact on water resource availability and distribution worldwide.

CONTENTS

WCRP World Climate Research Programme WMO IOC ICSU International Council for Science

IN MEMORIAM

• Dr. JOHN OWEN ROADS •
20 January 1950 - 21 June 2008

John Roads, Research Professor at the University of California, San Diego, Scripps Institute of Oceanography (SIO), Co-Chair of the GEWEX Coordinated Energy and Water Cycle Observations Project (CEOP), and former Chair of the GEWEX Hydrometeorology Panel, died on Saturday, 21 June, following a 2-year battle with leukemia.

John's passing marks the loss of not just a leading climate scientist but also of a dear friend and colleague who had a special gift for reaching out to other disciplines, individuals, and students to convey his vision and achieve success. His drive and commitment to the goals and objectives he helped define for GEWEX and CEOP remained strong up to the point where he was physically unable to continue his work. We are fortunate to have known John and will miss him deeply.

A trust fund has been established in John's name, which will enable SIO graduate students to attend climate science conferences. Donations should be made out to "UC Regents" with a reference to the "John Roads Memorial Scholarship fund" and can be mailed to: Scripps Institution of Oceanography, UC San Diego, 9500 Gilman Dr., # 0210 La Jolla, CA 92093-0210.

THE UNCERTAINTY OF GLOBAL ANALYSES

Michael G. Bosilovich[1], David Mocko[1,2], and John O. Roads[3]

[1]NASA GSFC Global Modeling and Assimilation Office, Greenbelt, MD, USA; [2]SAIC, Greenbelt, MD, USA; [3]Scripps Institute for Oceanography, San Diego, CA, USA

Early in the formulation of the Coordinated Enhanced Observing Period Phase 1 (CEOP1), the global modelling groups were planning the collection of analysis and forecast data from many systems to support CEOP1 science and also to define the envelope of uncertainty in the operational analyses (Bosilovich and Lawford, 2002). Data contributions from seven international numerical weather prediction centers or modelling research centers (with one center providing two separate models) resulted in eight systems with global fields for the CEOP1 period (Oct 2002–Dec 2004). These have recently been processed to a common framework (spatio-temporal gridding) to facilitate their comparison with observations and their use in CEOP science activities. The resulting homogenization of the global model data is termed the Multi-model Analysis for CEOP (MAC).

Each model data contribution was provided in GRIB1 binary format, with few other similarities. The spatial grids were different, and the output data resolutions ranged from relatively fine to coarse (roughly from 0.4 to almost 2 degrees). In addition, the timing of the contributions was quite variable between models. In this first version of the MAC, a single consistent time series of data was developed from each system's data closest to the analysis time. Another significant complication was the occasion of missing data, where some centers' data was not complete in time and could not be recovered. Also, a few systems did not extrapolate meteorological data to pressure higher than the surface values, opting instead for undefined values in high elevations. A full description of the procedures to homogenize the data is posted online at *http://gmao.gsfc.nasa.gov/research/modeling/validation/ceop.php*.

The resulting MAC data is available at 6-hourly intervals, daily and monthly means over the 27-month period, with a total of 48 surface and upper-air meteorological, flux, and column-integrated variables, in both NetCDF and GRIB1. An ensemble mean and standard deviation of the data has also been produced. In development and validation of a data assimilation or reanalysis system, there are many sources of model data for comparisons (such as the existing long reanalyses from the National Centers for Environmental Prediction (NCEP), the European Centre for Medium-Range Weather Forecasts (ECMWF) and the Japanese Meteorological Agency (JMA)). However, each of these has known and likely some unknown deficiencies. So, the MAC can provide a range of analyses for comparison. In addition, we might also hypothesize that, because

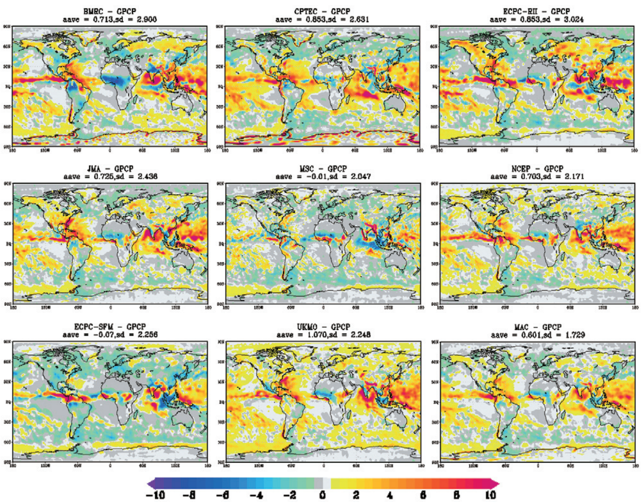

Figure 1. July 2004 monthly mean precipitation from the MAC (bottom row, right) and the eight individual models compared to GPCP precipitation.

the assimilated observations provide a strong point of correlation among analyses, the ensemble of analyses may be a better data product for evaluation and validation than any one of the contributing members (e.g., the Global Soil Wetness Project (GSWP), Dirmeyer et al., 2006).

The initial comparisons of MAC ensemble data with observation data have been promising. Figure 1 shows the monthly mean maps of the MAC ensemble average and each contributing member difference from the Global Precipitation Climatology Project (GPCP) merged precipitation for July 2004. The figure brings out some deficiency in each analysis, such as too much continental precipitation in the Experimental Climate Prediction Center's (ECPC) Reanalysis II system, but not enough in their seasonal forecast model system. Since all the analyses have high precipitation over the tropical Pacific Ocean, the ensemble average has a high bias. This result points to a limitation in the MAC ensemble, that correlated biases will continue to manifest in the resulting average. To quantify the error with respect to GPCP, we also computed the standard deviation of the global difference maps (Figure 2). This figure shows that the monthly mean precipitation of the ensemble has lower error than any of the contributing members across the time period.

Bosilovich et al. (2008) provides an expanded evaluation of the MAC ensemble, including Taylor diagrams, regional daily precipitation, and radiation observations (from the Surface Radiation Budget), and the early results are equally encouraging. The MAC data has been made open to the CEOP community for both evaluation of the method to produce it, and for use in CEOP science activities. Feedback on the data is welcome, as a second version of the data is planned for early 2009, where anticipated CEOP contributions from ECMWF and NASA/GSFC GMAO will be incorporated. These results will contribute to defining the need to continue a similar modelling effort into the

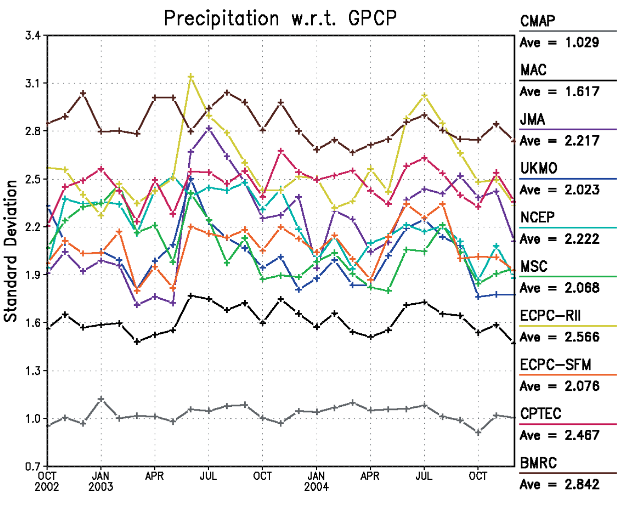

Figure 2. Standard deviation time series of the global difference plotted against monthly GPCP data. CMAP monthly precipitation is also shown for reference.

Coordinated Energy and water cycle Observations Project. In addition, the development of the MAC may help define the contributions to be requested from numerical weather prediction and modelling research centers.

References:

Bosilovich, M. G., and R. Lawford, 2002. Report on the Coordinated Enhanced Observing Period (CEOP) International Workshop, *Bull. Amer. Met. Soc.*, 83, 1495–1499.

Bosilovich, M. G., D. M. Mocko, and J. O. Roads, 2008. A Multi-model Analysis for the Coordinated Enhanced Observing Period (CEOP), In Preparation for *J. Hydromet.*

Dirmeyer, P. A. and co-authors, 2006. Multi-model Analysis and Implications for our perception of the land surface, *Bull. Amer. Met. Soc.*, 87, 1381–1395.

DATA AVAILABLE FROM THE INTER-CONTINENTAL TRANSFERABILITY STUDY

Burkhardt Rockel and Beate Geyer

GKSS Research Centre, Geesthacht, Germany

Within the Inter-Continental Transferability Study (ICTS, Rockel et al., 2005, *http://icts.gkss.de*) several institutes (see Table 1) take part in the investigation on the performance of regional climate models (RCMs) for seven regions around the globe (see Figure 1) with the main intentions described by Takle et al. (2007). These regions were chosen to cover the areas of the Regional Hydroclimate Projects (RHP) in CEOP. Participating institutes performed simulations with their RCM for a 5-year period (2000–2004) with the same standard model configuration for all regions. This standard configuration is taken from one usually applied to the "home" region of the model (i.e., where the model is normally used). This non-adaptation has consequences for the model performance and shows the weaknesses of the models in those regions that lay in a different climate zone than the "home" domain. This has been shown based on the example of precipitation by Meinke et al. (2007) and Rockel and Geyer (2008) for the Regional Spectral Model (RSM) and the Climate version of the Local Model (CLM3), respectively.

Each institute provided daily values for several quantities from their model runs on a common latitude-longitude

Acronym	Description	Institution
CLM3	Climate version of the Local Model	GKSS Research Centre, Germany
CRCM	Canadian Regional Climate Model	OURANOS, Canada
GEM-LAM	Global Environmental Multi-scale Limited Area Model	RPN/MSC and University of Quebec, Canada
RCA3	Rossby Centre Atmospheric climate model version 3	Rossby Centre, SMHI, Sweden
RSM	Regional Spectral Model	Experimental Climate prediction Center, U.S.

Table 1. Institutions providing results for the data archive

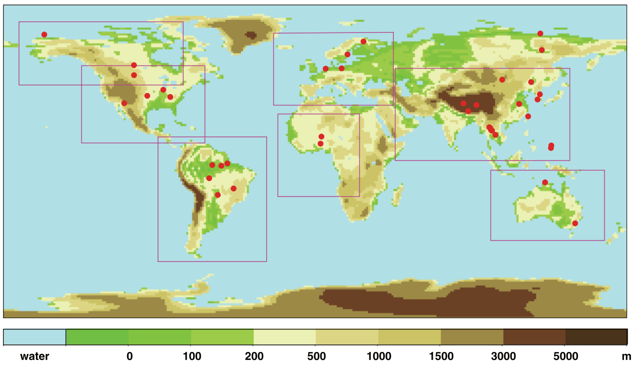

Figure 1. Common domains (rectangles) and CEOP reference sites (red dots)

grid with a grid mesh of 0.5 degrees. Additionally, 3-hourly values were provided as Model Output Location Time Series (MOLTS) for grid boxes covering 39 reference site locations (plus eight adjacent grid boxes). Thus all reference sites are taken into account except the two stations in Siberia that do not fall into any of the seven model domains.

The data was converted at the Gesellschaft für Kernenergieverwertung in Schiffbau und Schiffahrt (GKSS) Research Centre into a common format (netCDF, CF-conventions) and transferred to the official CEOP data archive at the World Data Centre for Climate (WDCC) in Hamburg, Germany (Touissant et al., 2006). The data is freely available to the scientific community. Again, the present data are from simulations where no adaptation of the RCMs to each region was made; this has to be taken into account in the interpretation of the results.

For detailed information on ICTS visit *http://icts.gkss.de*. Data can be downloaded via *http://cera-www.dkrz.de/WDCC/ui/BrowseExperiments.jsp?key=ICTS*. The supplied metadata include detailed information on the contact person of each data set.

References:

Rockel, B., I. Meinke, J. Roads, W. J. Gutowski Jr., R. W. Arritt, E. S. Takle, and C. Jones, 2005. The Inter-CSE Transferability Sudy, *CEOP Newsletter*, 8, 4–5.

Rockel B., and B. Geyer, 2008. The Performance of the Regional Climate Model CLM in Different Regions, Based on the Example of Precipitation, *Meteorol. Z.*, 17, 2008 (in print).

Meinke, I., J. Roads, and M. Kanamitsu, 2007. Evaluation of RSM-simulated Precipitation During CEOP, *J. Meteor. Soc. Japan*, 85A, 145–166.

Takle, E. S., J. Roads, B. Rockel, W. J. Gutowski Jr., R. W. Arritt, I. Meinke, C. G. Jones, and A. Zadra, 2007. Transferability Intercomparison: An Opportunity for New Insight on the Global Water Cycle and Energy Budget, *Bull. Amer. Soc.*, 88, 375–384.

Toussaint, F., M. Lautenschlager, and H. Luthardt, 2006. The WDC-Climate as CEOP Model Data Center, *CEOP Newsletter*, 9, 3–4.

EXPERIMENTAL DROUGHT MONITORING FOR AFRICA

Justin Sheffield[1], Eric F. Wood[1], Dennis P. Lettenmaier[2] and Annukka Lipponen[3]

[1]Princeton University, Princeton, NJ, USA; [2]University of Washington, Seattle, WA, USA; [3]UNESCO, International Hydrological Programme, Paris, France

Drought is among the most damaging of natural disasters in human, environmental, and economic terms. Its consequences are perhaps nowhere more urgent than in Africa, where the Intergovernmental Panel on Climate Change (IPCC) projections of increased future drought frequency show perilous implications for the livelihood of residents who depend heavily upon ecosystem services. International efforts to alleviate the effects of drought, such as the U.S. multi-agency Famine Early Warning System (FEWS), have struggled with an incomplete observational basis for monitoring and forecasting drought over Africa. The Group on Earth Observations (GEO) has identified water resources management as a critical area in which improved information and prediction capabilities are needed, including drought.

Through its International Hydrological Programme (IHP), the United Nations Educational, Scientific, and Cultural Organization (UNESCO) supports an international scientific cooperative program in water research and education. During the GEWEX CEOP 2006 meeting, UNESCO IHP personnel discussed with the authors the possibility of developing a demonstration drought monitoring and prediction system for Africa, which would respond to the needs of UNESCO members, contribute to IHP activities and capacity building, and respond to GEO drought needs. The activity we report here is also a contribution of the GEWEX Hydrologic Applications Project (HAP).

The result of those discussions is the African Drought Monitor (ADM), developed jointly by Princeton University and the University of Washington, which is now accessible at *http://hydrology.princeton.edu/monitor*. The ADM constitutes a first element in addressing a GEWEX HAP goal of forecasting drought evolution, recovery, and impacts over Africa.

The ADM has the objective of providing near-real time (2–3 days latency) drought monitoring products based on large-scale hydrological model output, and making these available for evaluation by UNESCO-IHP's partners in Africa and other African-based groups identified in consultation with UNESCO.

Specifically, the ADM:
1. Provides near-real time fields of soil moisture and other hydrologic variables over Africa using observation-forced simulations of the terrestrial hydrologic cycle.
2. Provides drought-oriented products that quantify the current state of drought in the context of the region's climatology.

3. Monitors where drought thresholds are crossed for soil moisture, and continues to track drought evolution in time until the nowcasts indicate that the drought has dissipated.

Sheffield et al. (2004) developed a drought index for the continental U.S. based on a 50-year retrospective simulation of the Variable Infiltration Capacity (VIC) land surface model. Drought severity was assessed based on VIC soil moisture quantiles, which effectively normalize drought characteristics over different Climatological regimes. A variation of this approach incorporated into Princeton University's Drought Monitoring and Hydrologic Forecasting System (Luo and Wood, 2007) and the University of Washington's U.S. Surface Water Monitor (Wood and Lettenmaier, 2006) is used as one element of the U.S. Drought Monitor, which merges quantitative and qualitative assessments of drought.

For Africa, a similar procedure was utilized to develop the ADM. The background climatology for drought assessment is based on long-term (1950–2000) VIC land surface model simulations of terrestrial hydrology forced by the meteorological forcing dataset of Sheffield et al. (2006). The final bias-corrected and downscaled forcings are applied at 1.0 degree latitude-longitude spatial resolution. Such observation-forced simulations offer a way

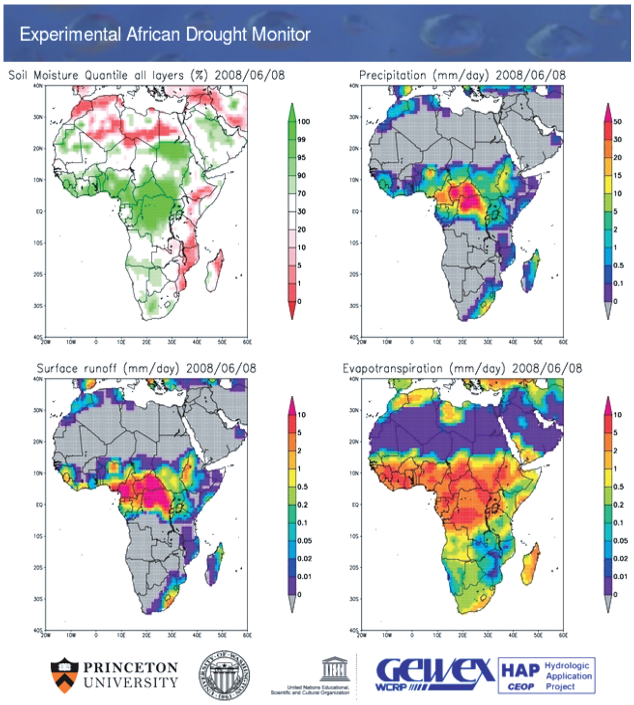

Figure 2. Snapshot of the web interface to the drought monitor showing maps of current conditions (soil moisture percentiles relative to a 50-yr climatology) and other hydrologic fields such as daily precipitation, surface runoff and evapotranspiration.

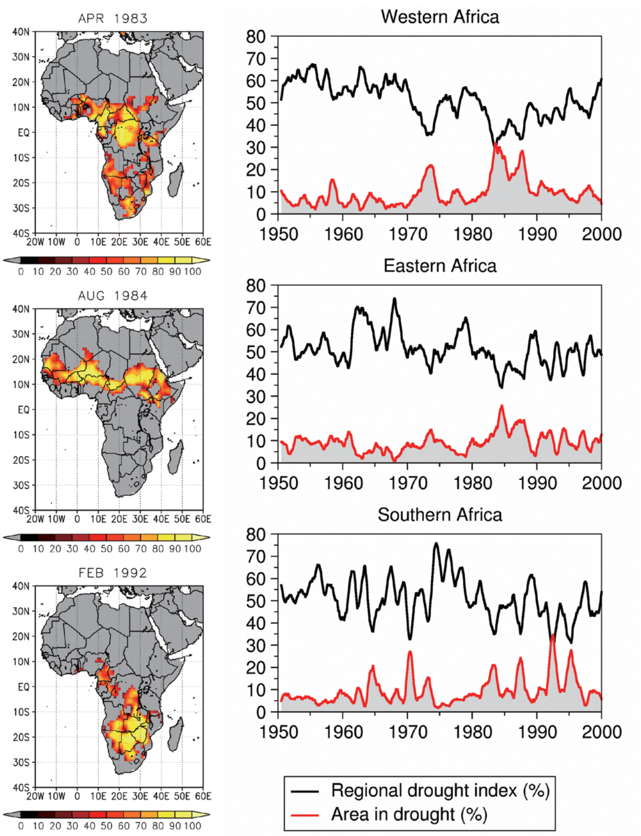

Figure 1. (left) visuals show spatial distribution of drought severity (as percentiles of total column soil moisture relative to 1950–2000 climatology) for major 20th century drought events; (right) ADM drought index time series and area in drought for three regions of Africa

of analyzing historical soil moisture over large time and space scales in the absence of direct observations. The realtime drought indices used in the ADM are based on the calculated soil moisture and runoff fields relative to their seasonal climatologies. Figure 1 shows the historic time series of the ADM Drought Index and Africa in drought regions. Also shown are maps of monthly drought severity during these drought events.

Real-time drought monitoring is challenging because of the necessity to rely on data streams from various providers and locations, and we thus use observations from several sources. Precipitation is the most critical factor in forcing, and is taken from the Precipitation Estimation from Remotely Sensed Information using the Artificial Neural Networks (PERSIANN) system. Surface air temperature and wind speed are gridded from Global Telecommunication System stations. Downward radiative fluxes and humidity are indexed to surface air temperature and its diurnal range. Backup meteorological data are taken from the National Centers for Environmental Protection (NCEP) Global Forecast System analysis fields when primary data are unavailable or fail quality control checks. Figure 2 shows current drought and hydrologic conditions at the time of writing from the ADM web page.

Inconsistencies between our 50-year model climatology and the near real-time data pose a major challenge. For instance, the PERSIANN satellite-based precipitation is generally higher than climatology, which tends to bias the drought products. We are currently adding additional satellite-based real-time precipitation streams (namely, the NCEP Climate Prediction Center CMORPH product and NASA's Tropical Rainfall Measuring Mission (TRMM) TMPA-RT product) that will give an indication of the uncertainty in the real-time products. We are also working to extend our climatology period (currently to 2000) to provide a longer overlap period, and allow us to implement bias adjustment procedures.

The experimental African Drought Monitor offers the community near-real time, quantitative drought and water cycle monitoring based on physical quantities such as soil moisture—the only such observation-based system available for Africa to our knowledge. The ADM builds on NASA-supported science and satellite data products that are also central to GEWEX and HAP's goal of providing GEWEX data and science products to water resources managers and related users. For Africa with its sparse hydrometeorological network, we believe that our strategy of structuring the ADM around satellite and weather model products is the most realistic pathway forward, and constitutes an important demonstration of the Global Earth Observation System of Systems (GEOSS) concept. Development of the system in collaboration with UNESCO IHP assures evaluation and use of the ADM by stakeholders in Africa. Furthermore, the ADM constitutes a quantitative monitoring/nowcast system, and as such is a crucial first step for future development of a seasonal hydrologic forecasting system.

References:

Luo, L., and E. F. Wood, 2007. Monitoring and Predicting the 2007 U.S. drought. *Geophys. Res. Lett.*, 34, L22702, doi:10.1029/2007GL031673.

Sheffield, J., G. Goteti, F. Wen, and E. F. Wood, 2004. A Simulated Soil Moisture Based Drought Analysis for the USA. *J. Geophys. Res.*, 109, D24108, doi:10.1029/2004JD005182.

Sheffield, J., G. Goteti, and E. F. Wood, 2006. Development of a 50-yr, High Resolution Global Dataset of Meteorological Forcings for Land Surface Modeling. *J. Clim.*, 13, 3088–3111.

Wood, A. W., and D. P. Lettenmaier, 2006. A Testbed for New Seasonal Hydrologic Forecasting Approaches in the Western U.S. *Bull. Amer. Met. Soc.*, 87(12), 1699–1712, doi:10.1175/BAMS-87-12-1699.

CEOP KICK-OFF MEETING ON HIGH ELEVATIONS
16–17 April, 2008, Padua, Italy

Gianni Tartari[1] and Emanuela Manfredi[2]

[1]Water Research Institute, Milan, Italy; [2]Ev-K2-CNR Committee, Bergamo, Italy

The meeting was organized by the Everest-K2-Consiglio Nazionale delle Ricerche (Ev-K2-CNR) Committee and hosted by the Institute of Atmospheric Sciences and Climate (ISAC-CNR), convened following the "High Elevations" (HE; *http://www.ceop-he.org*) working group meeting in early 2008. HE is a new element of "regional focus" within CEOP, which aims to contribute to an understanding of the water and energy cycles in high elevation regions and to study their role within the climate system on a regional and global scale. At the meeting, presentations by HE Steering Committee (SC) members focused on Tibet and the Himalayas, Central Asia, Caucasus, the Trans-African Alpine Zone, North America and the Western Andes Cordillera, and the European Alps, as well as international monitoring networks [CEOP-Reference Sites, the World Meteorological Organization (WMO)/Global Atmosphere Watch (GAW), Atmospheric Brown Clouds (ABC) in Europe, and the North American Monsoon Experiment (NAME) site].

The SC members discussed the HE-Scientific Plan, defining the goals and addressing HE plans for improving knowledge in climate sciences and the hydrological cycle in high altitude areas. Discussions centered around the topics: (a) definition of "high elevations"; (b) identification of significant high elevations sites for the study of physical and dynamic processes to understand the regional and global climate system, and establishment of characteristics of a representative HE station; (c) new components to be taken into account within the local and global climate and circulation system: cryospheric research, free troposphere and aerosols, monsoons, radiative forcing, links to the hydrological cycle, climate variability; (d) methods: down-scaling and back trajectory analysis (large and regional transport), development of numerical models with complex topography, drilling of shallow and deep ice core in the field; and (e) observation data analysis: transportation of water vapor, aerosol, atmospheric compounds and mineral dust, comparisons of long-term trends in the temperature, humidity and precipitation at different high elevations with different climatic zones, and development of an HE database to collect data from existing observations.

The meeting made it possible to identify activities for the HE group, including: investigating significant processes concerning the water and energy budget at high elevations and defining an interdisciplinary approach for carrying out high elevations research; studying synergies between meteorological-climate and hydrological studies in order to improve the management of water resources; understanding how the climate and hydrological cycle associated with high elevations affects global climate change, including climate variability; and, creating an electronic archive of high altitude monitoring stations. The Draft CEOP-HE Scientific Plan will be presented at the 2nd CEOP Annual Meeting in Geneva, Switzerland, 15–17 September 2008.

CEOP EXTREMES WORKSHOP
21–23 May, 2008, Vancouver B.C., Canada

Ronald Stewart[1], Richard Lawford[1] and Barrie Bonsal[2]

[1]University of Manitoba, Winnipeg, Canada; [2]University of Saskatchewan, Saskatoon, Canada

The GEWEX/CEOP Extremes Workshop was attended by 26 experts from 8 countries. Its main objective was to "advance the CEOP Extremes effort." The meeting was supported by the Drought Research Initiative, Environment Canada's Pacific Weather Centre, and WCRP.

The presentation part of the workshop provided global and regional overviews on research and data aspects of hydrometeorological extremes. These were followed by discussions intended to clarify focal points, assess current status, and make suggestions for moving forward.

It was evident that numerous scientific issues need to be addressed in connection with extremes, including: the lack of a fundamental understanding of the means through which all extremes develop and evolve; the character of drought that enables it to last for years while being continuously dry or interspersed with heavy precipitation; the lack of understanding of the means through which extremes may be inter-related; and the role played by extremes in the climate system needs to be better understood.

It was recognized that four general goals exist for extremes work and that it is appropriate for GEWEX to lead in addressing them. The goals include: (1) data sets, case studies and process studies; (2) a statistical and physically-based analysis of extreme events based primarily on data; (3) a unified model for predicting extremes; and (4) an accurate assessment of the effects of climate change on extremes and their impacts.

A number of actions were recommended to move forward. These include developing inventories of events, carrying out studies of similar phenomena in different regions, exploiting satellite and radar products, carrying out comparative studies using model and observational products, and producing a review article on extremes. The extremes effort should furthermore contribute to and benefit from the Group on Earth Observations (GEO) and Global Water System Project (GWSP) activities.

This workshop was an important step in the CEOP and WCRP extremes efforts. The next step will involve setting priorities for moving forward in a logical, stepwise manner. The presentations and a detailed workshop summary are available on the extremes web site (*http://www.drinetwork.ca/extremes*) and the CEOP home page.

NEW GLASS CHAIR

Dr. Bart van den Hurk of the Royal Netherlands Meteorological Institute (KNMI) assumed chairmanship of the GEWEX Global Land/Atmosphere System Study (GLASS) in June 2008. He had been co-chairing GLASS with Dr. Andrew Pitman of the Climate Change Research Centre, University of New South Wales, who recently stepped down. Dr. Martin Best (U.K. Met Office) will now act as co-chair of GLASS. Dr. van den Hurk has been a member of GLASS since 2004 and has been involved in LoCo, the Local coupled land-atmospheric modelling project under GLASS. Dr. Pitman will remain a member of GLASS; he is acknowledged for his many activities as its chair in the recent years.

CONFERENCE ANNOUNCEMENTS

20-24 July 2009, the 3rd International AMMA Conference, Ouagadougou, Burkina Faso
Contact: Ouaga2009@amma-int.org

24-28 August 2009, The 6th International Scientific Conference on the Global Energy and Water Cycle and the 2nd Integrated Land Ecosystem-Atmosphere Processes Study Science Conference with Joint Sessions, Melbourne, Australia
Water in a Changing Climate: Progress in Land-Atmosphere Interactions and Energy/Water Cycle Research. See *http://www.gewex.org and http://www.ileaps.org*

GEWEX NEWS

Published by the International GEWEX Project Office

Peter J. van Oevelen, Director
Dawn P. Erlich, Editor
Cathryn E. Kulat, Assistant Editor

International GEWEX Project Office
8403 Colesville Rd, Suite 1550
Silver Spring, MD 20910, USA

E-mail: gewex@gewex.org
Web Site: *http://www.gewex.org*

This issue is published with support of EDITORIA (University of Tokyo), JAXA, and JST
CEOP home page: *http://www.ceop.net*
CEOP International Coordination Function:
Sam Benedict (sam.benedict@gewex.org)
Petra Koudelova (petra@hydra.t.u-tokyo.ac.jp)

STATUS OF THE JAXA DISTRIBUTED DATA INTEGRATION SYSTEM

Satoko Miura
Japan Aerospace Exploration Agency (JAXA)/
Remote Sensing Technology Center of Japan (RESTEC), Tsukuba, Japan

The purpose of the "JAXA Distributed Data Integration System" is to provide user-friendly access to satellite, in-situ, and model output data. The system has been operational since June 2005, and was upgraded in March 2008. Now there are two entry points on the JAXA Working Group on Information Systems and Services (WGISS) Test Facility for CEOP (WTF-CEOP) web site (*http://jaxa.ceos.org/wtf_ceop*): one for the "Flood monitoring service for Hue, Vietnam" and the other for the "Distributed Data Integration Prototype System" (new version as of March 2008).

"The Flood monitoring service for Hue, Vietnam" is a new prototype system, which focuses on a serious flood that occurred in 2004. Users can acquire various information such as the area covered by water, precipitation amount, streamflow information, and population density during the flood period in order to understand the damage and also estimate the risk of future floods.

The "Distributed Data Integration Prototype System" handles satellite data, in-situ data, global gridded model output, and Model Output Location Time Series (MOLTS) data. Its basic functions are not changed, but the data search interface has been greatly improved compared to the previous version. Tutorial videos and user's manuals for this revised prototype have been prepared and can be downloaded from the web site.

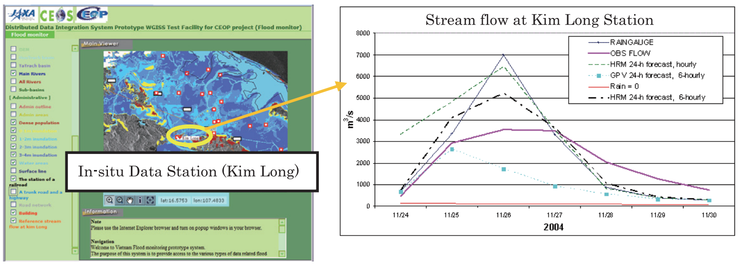

Figure 1. Flood monitoring service at Hue, Vietnam

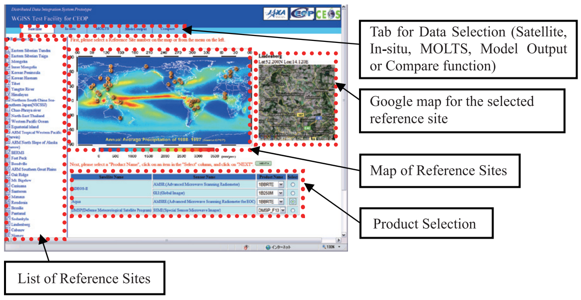

Figure 2. Distributed Data Integration Prototype System (Revised version)

CEOP SATELLITE DATA GATEWAY OPENS

Toshio Koike
The University of Tokyo, Tokyo, Japan

It is essential to integrate data from satellites observing both land and ocean in generating new CEOP data sets for the overall water cycle. Within the Committee on Earth Observation Satellites (CEOS), the Working Group on Information Systems and Services (WGISS) aims to coordinate and monitor the development of the systems and services, that manage and supply the data and information from participating organizations' missions. Under this coordination framework, the Japan Aerospace Exploration Agency (JAXA), the National Aeronautics and Space Administration (NASA), the European Space Agency (ESA), and the National Oceanic and Atmospheric Administration (NOAA) are providing their satellite data sets to CEOP. The University of Tokyo is archiving all of the CEOP satellite data in cooperation with JAXA, a coordinator of the CEOP satellite data archive in CEOS/WGISS.

In addition to the CEOP Centralized and Distributed Data Integration System, a new CEOP Satellite Data Gateway provides easy access to the satellite data. Three scaletypes—global, monsoonal, and reference site—of satellite data sets are available. A dataset consists of a raster (GRID) data file in the band sequential format (BSQ) and a metadata file in XML. At this moment, more than one million scenes, including AMSR, AMSR-E, SSM/I, TMI, PR, and GLI are available. MODIS, AIRS, ASAR, MERIS, PALSAR, PRISM, and AVNIR2 are going to be open. Please visit *http://monsoon.t.u-tokyo.ac.jp/ceop2/satellite/* and get the data.

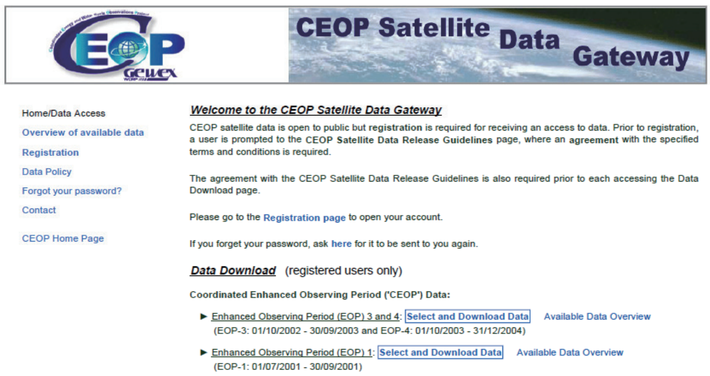

Figure 1. CEOP Satellite Data Gateway home page