GEWEX WCRP

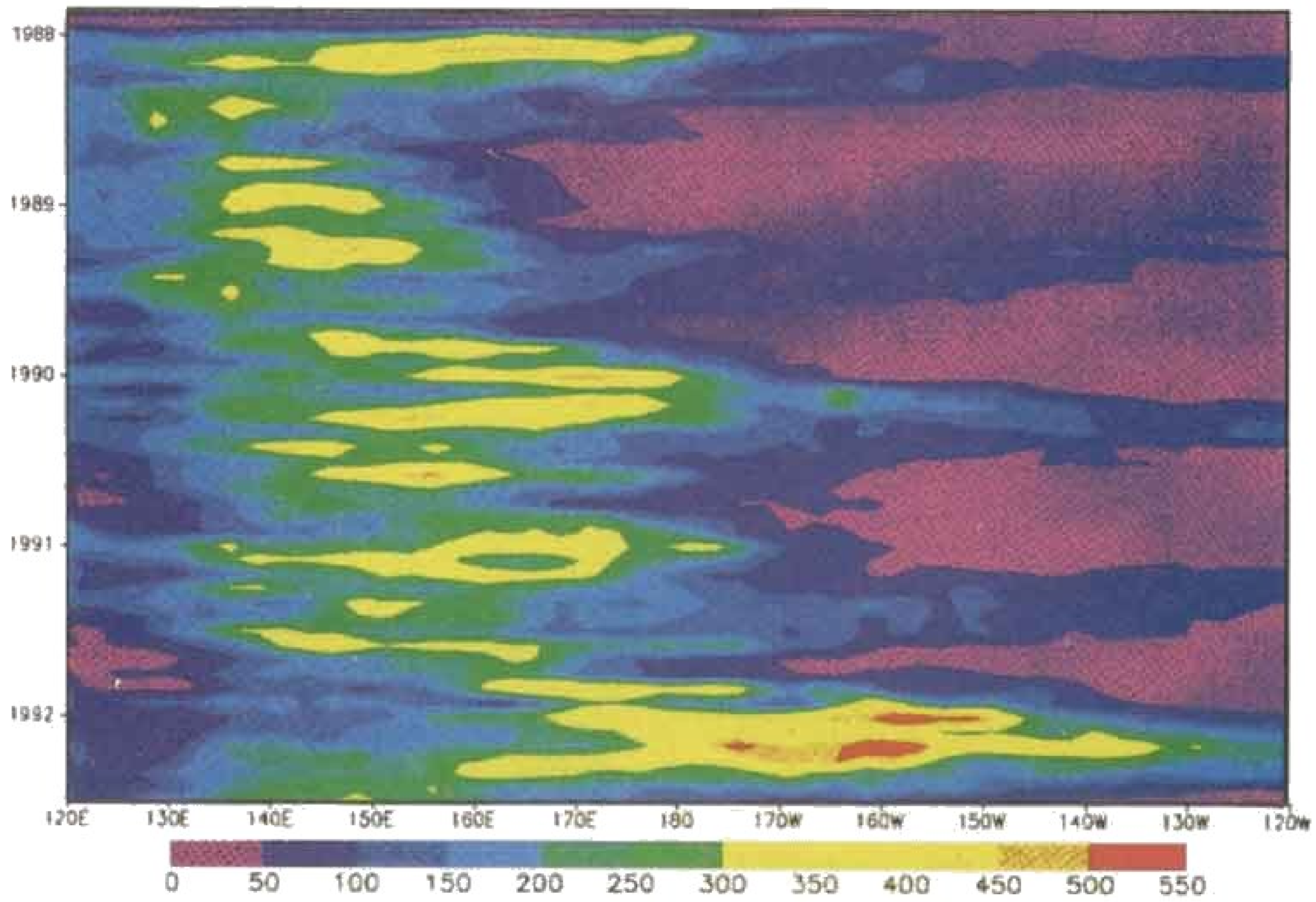
Global Energy and Water Cycle Experiment

NEWS

Vol. 6, No. 1 February 1996

World Climate Research Programme–WCRP

GPCP Precipitation (mm/month)



The new Global Precipitation Climatology Project data set shows significant interannual variability (note the 1989 and 1990 El Nino effect) in this time and longitude depiction of precipitation for latitude zone 5°N to 5°S (December 1987 data were not available). See article on page 4.

GLOBAL SOIL WETNESS RESULTS USING ISLSCP CD-ROM

Teruyuki Nishimura
University of Tokyo

Nobuo Sato
Japan Meteorological Agency

The global distribution of soil wetness and snow water equivalent was computed to 1x1 degree grids by integrating a land surface parameterization scheme [modified version of the Simple Biosphere Model (SiB)] as a pilot study of the International Satellite Land Surface Climatology Project (ISLSCP) Global Soil Wetness Project.

The vegetation and soil parameters used in the original version of SiB were adopted. The

(Continued on page 3)

WHAT'S NEW IN GEWEX

COMMENTARY

GEWEX NEWS EDITORIAL POLICY

Moustafa T. Chahine
Chairman, GEWEX Scientific Steering Group

In this issue of the GEWEX News you will find an article by V. Ramanathan, F. Valero and R. Cess addressing the subject of "excess solar absorption in cloudy atmospheres". We are publishing this article in response to the statement adopted by the GEWEX Radiation Panel (membership listed below), on the "anomalous shortwave absorption in clouds," which was published in the previous issue of GEWEX News.

GEWEX News, although not a substitute for peer-reviewed literature, does serve as a forum for the views and recommendations of established GEWEX Panels. GEWEX News has a wide distribution and thus serves to increase the awareness of the community at large of important positions adopted by the scientific panels of GEWEX. However, in cases where the topic evokes a considerable amount of scientific debate, we will be happy to publish contesting views.

Beyond this we believe that the main scientific debate should continue in the traditional scientific journals. In addition, the scientific community has consistently made use of the opportunities afforded by small meetings and workshops to conduct productive interactions. To this end, the International GEWEX Project Office is supportive of such meetings and will facilitate a meeting on the subject of "additional absorption of solar radiation in cloudy atmospheres".

GEWEX Radiation Panel Members

A. Arking	R. Saunders
J. Curry	A. Slingo
R. Kandel	G. Stephens, Chair
V. Khvorostyanov	L. Stowe
J. Morcrette	R. Stuhlmann
T. Nakajima	T. VonderHaar

GEWEX Home Page
http://www.cais.com/gewex/gewex.html

THE INTERNATIONAL GEWEX PROJECT OFFICE HAS MOVED

To help us reduce our operating expenses, the National Oceanic and Atmospheric Administration has kindly offered to house the IGPO within their Office of Global Programs. NASA will continue to provide primary support for IGPO while the new facilities will provide co-location with the GEWEX Continental-scale International Project Office and provide added synergy to benefit other GEWEX projects. Our new address, telephone, facsimile and e-mail are below:

International GEWEX Project Office
1100 Wayne Avenue
Suite 1210
Silver Spring, Maryland 20910, USA
Telephone: 301-427-2089 Ext. 521
Facsimile: 301-427-2222
E-mail: gewex@cais.com

In This Issue

THE GLOBAL SOIL WETNESS RESULTS USING ISLSCP CD-ROM

(Continued from page 1)

atmospheric forcings were taken from near-surface meteorology forecast output from the European Centre for Medium-Range Weather Forecasting (ECMWF) Model. The downward longwave and shortwave radiation are based on satellite observations from the International Satellite Cloud Climatology Project (ISCCP). GEWEX Precipitation Climatology Project (GPCP) precipitation data was converted to 6-hourly values using a normalization scheme based on the U.S. National Centers for Environmental Prediction (formerly (National Meteorological Center) re-analysis precipitation. All of these data sets are included on the ISLSCP Initiative-I CD-ROM.

Model integration began at 00 GMT January 1, 1987. The time integration for the year 1987 was repeated twice, then proceeded to 1988 until 18 GMT December 31, 1988. The simulated runoff results are compared with climatological precipitation and shown in Figure 1. Observed river discharge data are compared to the simulated runoff in Figure 2.

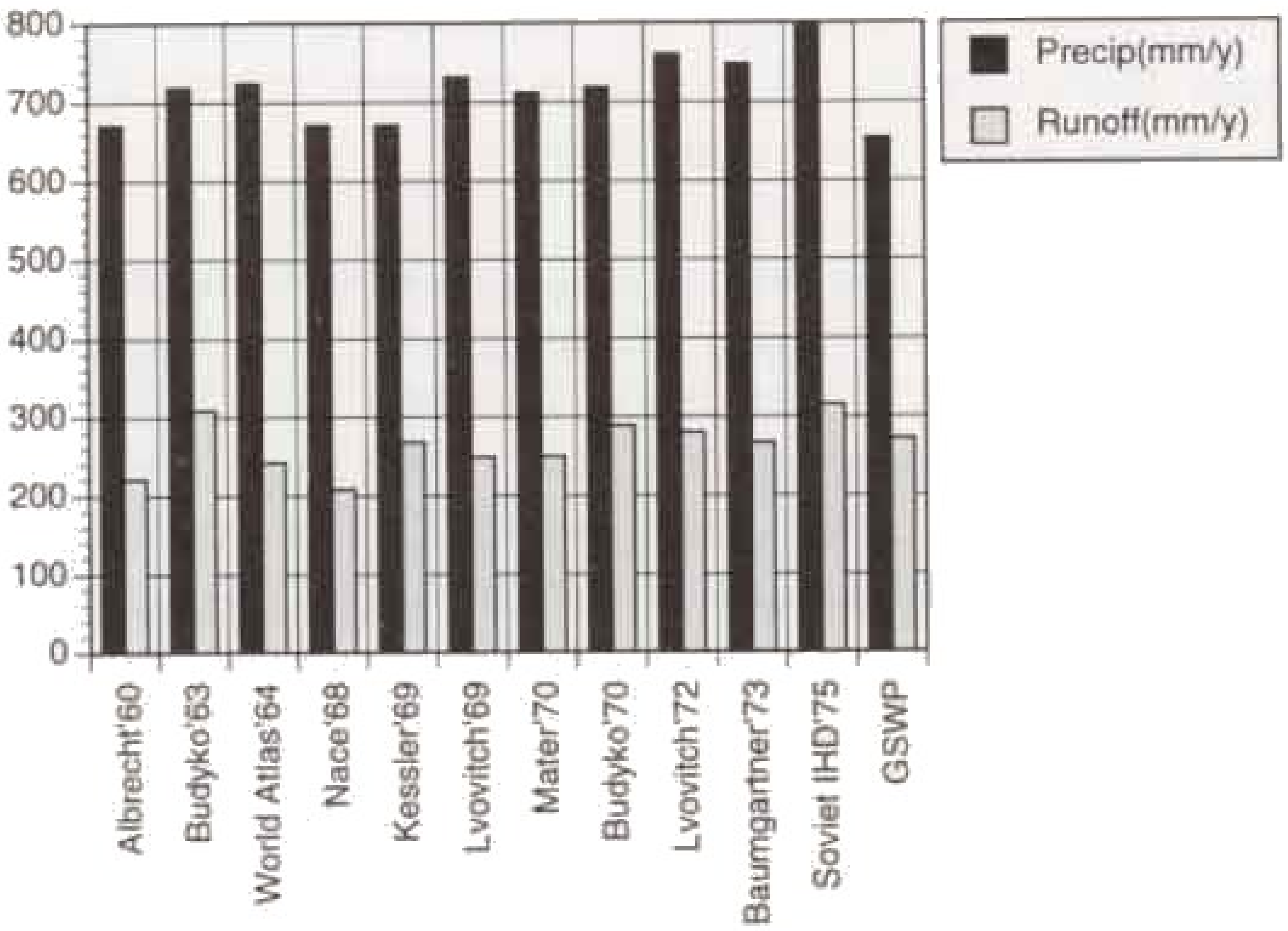


Figure 1. Climatological precipitation and runoff over global land in mm/year estimated by eleven authors. Yearly precipitation averaged for the year 1987 and 1988 derived by GPCP and used as atmospheric forcing in the Global Soil Wetness Project and simulated runoff by an offline modified SiB are shown in the far right column.

The validity of large-scale evaporation was checked by comparing simulated runoff over large river basins with climatological river discharge data. Although the annual amount of runoff was comparable with the climatological values, its seasonal change was quite different from observed river discharge data, suggesting the need for a river routing model.

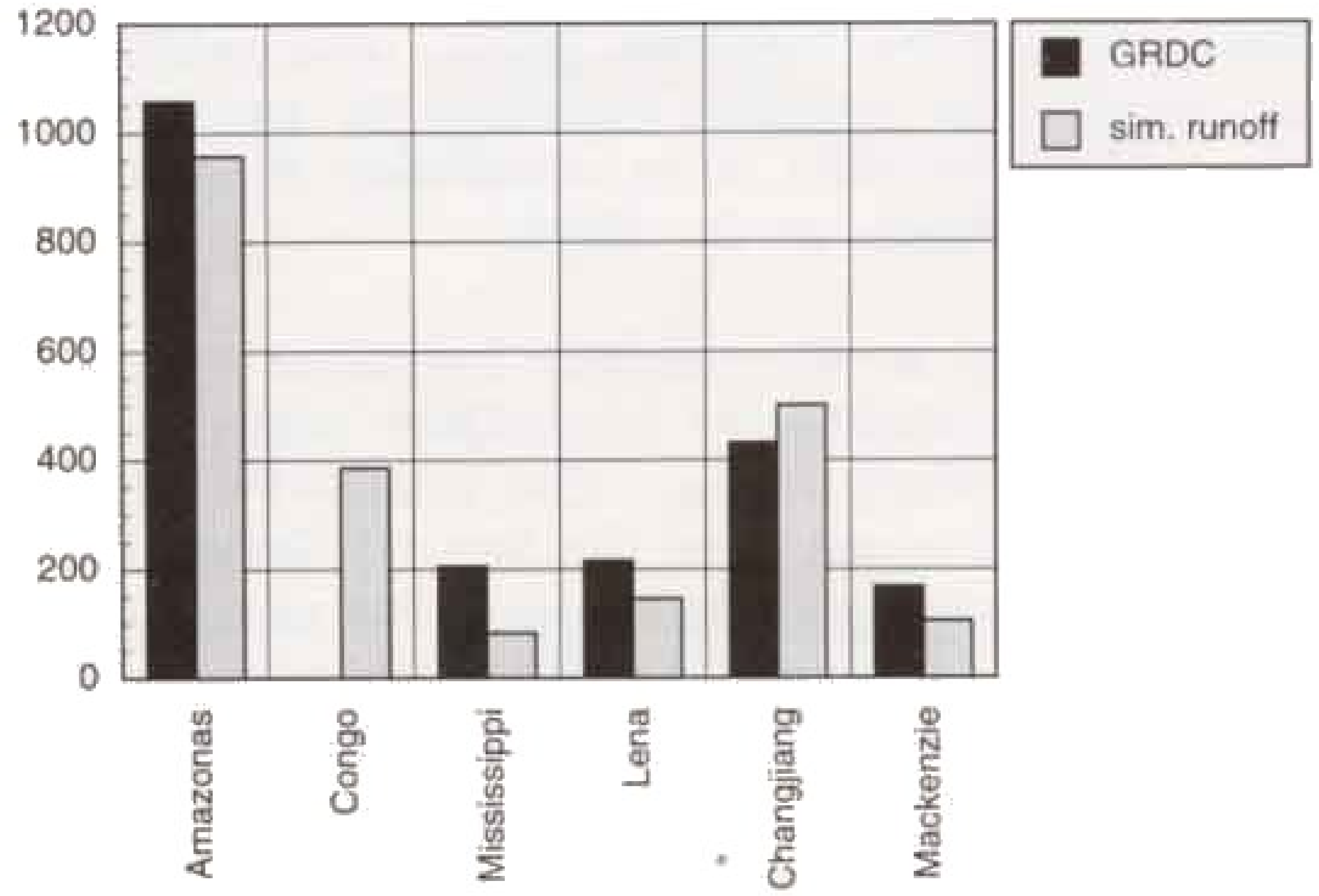


Figure 2. Runoff (mm/year) simulated by an offline SiB for 1987 and 1988, and observed river discharge data archived at the Global Runoff Data Center.

The simulated snow water equivalent and its temporal variation was also reasonable in comparison with observed snow depth when an appropriate snow density was assumed.

The difference between the evapotranspiration, sensible heat flux and soil moisture in the summer of 1987 and the summer of 1988 was also examined. The early summer dryness in 1988 over the U.S. midwest was the most conspicuous.

BSRN NEWSLETTER

The Baseline Surface Radiation Network Project has started a newsletter. To receive a copy, contact Ellsworth Dutton at the following address: NOAA/CMDL/R/E/ CGI, 325 Broadway, Boulder, Colorado 80303, USA, E-mail: edutton@cmdl.noaa.gov.

NEW GLOBAL PRECIPITATION CLIMATOLOGY PROJECT DATA SET

Arnold Gruber
NOAA, National Environmental Satellite Data and Information Service

A monthly mean 2.5 degree gridded precipitation data set for the period July 1987 through December 1992 is now available. The data set was produced by blending gauge, and infrared and microwave satellite estimates of precipitation. The procedure is an adaptation of earlier work by Huffman, et al., 1995.

The biases in the infrared estimates are removed by adjusting to coincident microwave estimates of precipitation. The microwave estimates were obtained from the Special Sensor for Microwave/Imaging (SSM/I) instrument aboard the Defense Meteorological Satellite Program series of satellites and utilize a scattering model for over land estimates and an emission model for over ocean estimates. The adjustment procedure also preserves the superior temporal coverage of the infrared estimates, which are based on geostationary satellite 3-hourly data. The final analysis step adjusts the merged satellite data to the gauge observations, then combines them with weighting that depends on the esimtated local error of each field. The gauge data are analyses from the Global Precipitation Climatology Centre (see following article) and reflect approximately 6,700 gauges which have been carefully quality controlled.

Preliminary time series analysis have shown that these data are capable of defining the seasonal and interannual variability of the precipitation field. For example, the zonal average precipitation in the tropics shows a well defined annual cycle; precipitation maxima occuring in the summer months of each hemisphere and minima in the winter months. The intensity is, however, larger in the northern hemisphere than in the southern hemisphere, a consequence of the summer monsoon circulation and the tendency for the Intertropical Convergence Zone (ITCZ) over the oceans to remain north of the equator. The range of the annual cycle variation in the tropics (20N-20S) is about 8 mm/day.

In mid-latitudes centered near 40N-40S, there is a well defined but weaker annual cycle (range about 1-2 mm/day) with winter season maxima that is apparently associated with variations in storm track precipitation. Over continental areas of the northern hemisphere there is a well defined annual cycle with winter minima and summer maxima.

The interannual variability is also well depicted, particularly, in the tropics, where time longitude sections at 5N-5S show the 1989 cold phase of the El Nino and the extended warm phase that began in the winter of 1989/1990 (see figure on first page).

Preliminary comparisons to the National Centers for Environmental Prediction (NCEP)/National Center for Atmospheric Research (NCAR) and NASA Data Assimilation Office re-analysis precipitation fields have also been conducted. Over the tropical oceans, the re-analyses tend to underestimate the ITCZ and overestimate the dry zone precipitation. In mid-latitudes the models tend to underestimate the oceanic storm track precipitation. This data set will be included in the NCEP/NCAR Re-analysis CD-ROM which will be distributed with the March issue of the *Bulletin of the American Meteorological Society*. Also, it is planned to have this data set and supplementary information not on the CD-ROM, available on anonymous ftp through the NOAA National Climate Data Center. A separate announcement will be made when it is available.

Users may provide comments about the data set to Arnold Gruber, Manager of the Global Precipitation Climatology Project (GPCP) at agruber@orbit.nesdis.noaa.gov. For more information about GPCP, see the GPCP Home Page on the WWW: http://orbit-net.nesdis.noaa.gov/gpcp/

References

Huffman, G.J., R.F. Adler, B. Rudolf, U. Schneider, P.R. Keehnet, (1995). Global Precipitation Estimates Based on a Technique for Combining Satellite-Based Estimates, Rain Gauge Analyses, and NWP Model Precipitation Information. J. Clim. 8(II), 1284-1295.

The author wishes to acknowledge the contributions of Robert Adler, Phil Arkin, Al Chang, Ralph Ferraro, Norm Grody, George Huffman, John Janowiak and Bruno Rudolf for producing the GCIP Version 1 Precipitation Data Set.

GLOBAL PRECIPITATION CLIMATOLOGY CENTRE ACTIVITIES

Bruno Rudolf
Deutscher Wetterdienst, Germany

The Global Precipitation Climatology Centre (GPCC) was established in August 1988 and is operated by the Deutscher Wetterdienst, National Meteorological Service of Germany at the request of the World Climate Research Programme. It is one of the principal elements of the GEWEX Global Precipitation Climatology Project (GPCP).

The specific functions of GPCC comprise:

(a) Acquisition, collection and storage of precipitation data worldwide.

(b) Quality-control and correction (coding errors, systematic measuring errors) of the conventionally measured data.

(c) Calculation of gridded area-mean precipitation totals for the land surface based on conventionally measured data.

(d) Estimating the accuracy or error of the gridded data.

(e) Merging the results from different sources (rain gauges, satellites, models) in order to obtain complete global gridded precipitation data sets.

(f) Publication of methods and results, dissemination of the gridded data sets to the International Council of Scientific Unions World Data Centres of Meteorology.

With regard to the large spatial and temporal variability of precipitation, a dense station network is required for precipitation analyses based on rain gauge (point) measurements, even for analyses on a global scale. To reliably estimate monthly precipitation for the land-surface on a 2.5 grid, data from at least 40,000 stations worldwide are necessary (Rudolf, 1993).

About 200,000 rain gauge stations are operated worldwide in national networks. Precipitation data from only about 4,500 stations are globally exchanged and distributed via the WMO World Weather Watch Global Telecommunication System (GTS). On a voluntary basis, institutes from more than 110 countries, as well as international projects have supplied additional monthly precipitation data of about 38,000 stations to the GPCC. Before these data may be used in the analysis, a high level quality-control is necessary to meet the desired error range in the gridded product. The computer-assisted but partly subjective control causes a delay in the integration of these data into products.

GPCC has produced a 9-year data set for 1986-1994 that includes monthly precipitation totals on a 2.5° grid. In order to produce this data set, an interim data base of about 6,700 stations was defined, which includes the data available from GTS and by the Food and Agriculture Organization.

Beginning in 1996, GPCC will provide near-real time monthly gridded data sets based on global reports from GTS for about 4,500 stations. Reanalysis with a higher spatial resolution (1° grid) based on all delivered national data is planned to start in 1996. GPCC is also planning to derive information on the portion of precipitation types (solid/liquid) in total precipitation, as well as to evaluate the temporal and spatial variability of precipitation within individual months and grid cells based on synoptic data and additional daily data from national sources.

Gridded GPCC products can be obtained via ftp from the World Data Centre A for Meteorology at the National Climate Data Center in Asheville, North Carolina at:

ftp.ncdc.noaa.gov/pub/data/gpcp/gpcc

or from the GPCC Home Page on the World-wide Web in the Global Climate Observing System On-Line Data Information System (GOLDIS) at:

http://www.wmo.ch/web/goldis/gpcchome.html

References:

Rudolf, B. 1993. Management and Analysis of Precipitation Data on a Routine Basis. Proceedings Intern. WMO/IAHS/ ETH Symp. on Precipitation and Evaporation (Ed. M. Lapin, B. Sevruk), Vol. 1, 69-76, Slovak Hydromet Inst., Bratislava.

BAMS Appoints New Special Editor for Hydrology

AMS has appointed Soroosh Sorooshian, Professor and Head, Department of Hydrology and Water Resources, University of Arizona, and Chairman of the National Research Council GEWEX Panel, as a new special editor for Hydrology of the Bulletin of the American Meteorological Society.

EXCESS SOLAR ABSORPTION IN CLOUDY ATMOSPHERES

V. Ramanathan[1], F.P.J. Valero[1], and R.D. Cess[2]

[1]Scripps Institution of Oceanography
[2]State University of New York

One of the most insidious and nefarious properties of scientific models is their tendency to take over, and sometimes supplant reality. Erwin Chargaff

Do cloudy skies absorb more solar radiation, when compared with that in the surrounding clear skies? Even a qualitative answer to this question has eluded experimentalists and modelers for nearly four decades. The fundamental reason is a systematic discrepancy between the models and the observations (Stephens and Tsay, 1990; and Liou, 1992). Model clouds are brighter and less absorptive than observed clouds. As summarized in Liou's (1992) book, "Reflectance and absorptance computed from theoretical programs.... are generally higher and lower respectively than observed data. The largest cloud absorptance derived from theoretical calculations has an upper limit of $\simeq$ 20%.... However, the observed cloud absorptance could be larger than 30%." The discrepancy was largely attributed to uncertainties in the observations.

What is the implication of this discrepancy to climate? To answer this question, we must consider the effect of clouds on the solar absorption by the atmospheric column between the surface and the top of the atmosphere (TOA) (at least the tropopause), as opposed to the details of the absorption of a particular cloud layer. Why is the column absorption important? A fundamental quantity in climate studies is the average solar energy absorbed by the Earth's surface. Since earth radiation budget satellites yield the surface-atmosphere column solar absorption, knowledge of the atmospheric column solar absorption can be used to obtain the surface absorption as a difference between the two. Let us begin with models first, since we lack global scale surface or atmospheric observations.

Modern day general circulation models *(GCMs) conclude that cloudy skies absorb the same amount of solar radiation as clear skies.* This is remarkable since clouds, by scattering and absorbing solar radiation, significantly alter the solar radiation; yet, in the models the various effects cancel each other such that clouds reflect solar radiation to space and transmit the rest to the surface without altering the atmospheric solar absorption.

How do we test this GCM prediction? Conceptually it is simple. We need earth radiation budget measurements from space or from the tropopause to estimate the energy reflected to space and collocated radiometers at the surface or well below the cloud layers to estimate the transmitted radiation. The difference between the two measurements can yield the absorbed radiation in the atmospheric column. Comparison of the atmospheric solar absorption under clear and cloudy skies can be used to examine whether clouds enhance the solar absorption.

Three independent observational studies (Cess, et al., 1995; Pilewskie and Valero, 1995; and Ramanathan, et al., 1995; over a dozen international groups participated in the three papers), employing variants of the above technique with independent instruments and independent measuring platforms (ranging from high altitude aircraft, satellites, ships, buoys and atmospheric soundings), have failed to confirm the GCM result. For the cloud systems in the tropical Pacific, which is one common feature of the three studies, they conclude that cloudy skies absorb about 8% more (or about 35 $W.m^{-2}$ more) of the TOA solar insolation when compared with clear sky values.

An article by Stephens (also see Stephens, 1996) in an earlier issue of this newsletter, which is a summary of a panel report, has raised scientific questions about the three observational studies. These questions and critiques have been rebutted in detail in a peer reviewed journal (Cess and Zhang, 1996; and Pilewskie and Valero, 1996).

In summary, ***climate models are missing a large heat source in the tropical atmosphere and are compensating for it by overestimating the solar energy absorbed by the sea surface and the land surface. Globally (Cess et al., 1995), GCMs that constrain their planetary albedos with satellite data, may overestimate the solar energy reaching the surface by as much as 8%, or equivalently 25 $W.m^{-2}$.***

Re-evaluation of the Surface Solar Energy Budget: Within the last 5 years, two independent observational studies (Ohmura and Gilgen, 1993; Gleckler and Weare, 1995) have re-evaluated the surface solar energy budget. Both of these studies are in support of the above three studies with respect to the sign, as well as the magnitude of the discrepancy between observations and models. The Ohmura and Gilgen (1993) study uses the global energy balance archive (GEBA) data set and concludes: "The global annual mean shortwave solar radiation is estimated at 142W.m^{-2} or 42% of the extra-atmospheric solar radiation, 17 W.m^{-2} smaller than the previous estimates." The 142 W.m^{-2} is the net (down - up) short-wave radiation at the surface. The discrepancy is even larger (closer to 25 W.m^{-2}) if we compare with just the model estimates. As summarized in Kiehl and Trenberth (1996), model estimates are closer to 170 W.m^{-2} or 50% of the TOA solar insolation; these numbers are to be compared with the GEBA data set values of 142 W.m^{-2} or 42%.

The Gleckler and Weare study, which employs the Comprehensive Ocean-Atmosphere Data Set (COADS) focuses on just the world oceans and concludes: "Preliminary comparison of zonal average fluxes suggest that most atmospheric general circulation models produce excessively large ocean surface fluxes of net solar heating...." The global extent of the problem (as opposed to just the tropics) is also hinted in this study, which compares 30 GCM simulations with observations: for example, it finds: "... in the mid-latitudes very few models have shortwave fluxes in the range of the observations."

Clearly, there is a serious gap in our knowledge. The accumulated evidence is overwhelming to re-examine the treatment of radiation in GCMs.

Is this anomalous or excess absorption? Anomalous means "deviating from a general rule or accepted notions of order" (Webster's dictionary). As far as we know, there is no rigorous proof that clouds should have no net effect on the atmospheric column absorption, when compared with clear sky absorption. Our notion of zero net effect is largely based on radiation models. Some of the fundamental flaws of our radiation models, at least those used to assert the zero net cloud effect, is that they assume: 1) clouds are flat plates with horizontally homogeneous properties, 2) cloud drops and crystals are made of pure water; and, 3) the absorption is by Lorentzian lines with arbitrarily specified wavelength cut-offs, and 4) poor treatment of aerosol effects. These assumptions have served us well in the past, but we should not be surprised if they have outlived their usefulness. We need more sophisticated laboratory, *in-situ* and remote observations; we also need models of realistic cloud shapes and sizes. In the mean time, it is safe to consider this phenomenon as simply "excess absorption" to point out that there is excess solar absorption in cloudy atmospheric columns, when compared with clear sky column absorption.

References

Cess, R.D., et al., 1995. Absorption of Solar Radiation by Clouds: Observations Versus Models. *Science* 267:496-499.

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SUMMARY OF THE EIGHTH SESSION OF THE GEWEX SCIENTIFIC STEERING GROUP

15-19 January 1996
Irvine, California

Sam Benedict
World Meteorological Organization

A new organizational structure was formulated for GEWEX that arranges the existing sub-activities and projects into the areas of Atmospheric Radiation Processes, Land Surface Processes and Hydrology, and Modelling and Prediction, that are of major concern to GEWEX. Within this framework, the Joint Scientific Committee for WCRP will be asked to endorse a GEWEX Hydrometeorological Panel (GHP), to coordinate plans and focus on the scientific issues related to the development and implementation of the GEWEX Continental-Scale Experiments. The GEWEX International Satellite Land Surface Climatology Project, which will play a major role in the GHP, announced the release of an Initiative-I multi-disciplinary land surface climatology data set on CD-ROM.

The GEWEX Radiation Panel (GRP) reported on the release of a global 5-year GEWEX Water Vapor (GVaP) pilot data set, a 5-year Global Precipitation Climatology Project (GPCP) data set and on the status of efforts to define a GEWEX multi-sensor international cloud, aerosol and radiation mission. The GRP report also noted that the International Satellite Cloud Climatology Project has completed reprocessing of 3 years of cloud products as part of its reanalysis effort.

Reporting as elements of the GEWEX Modelling and Prediction Panel, the GEWEX Numerical Experimentation Panel advised the SSG of its continued efforts to promote GEWX modelling needs, the GEWEX Project for Intercomparison of Land-Surface Parameterization Schemes presented its latest findings and the GEWEX Cloud System Study noted its achievements toward improving cloud resolving models. It was also proposed that the Working Group on Numerical Experimentation (WGNE) work closely with the modelling and prediction component of GEWEX to define cooperative model developments and numerical experimentation studies.

The National Earth Observing Programmes of the USA, Europe and Japan were reviewed and gaps in current plans identified. Connections to the Global Ocean-Atmosphere-Land Surface (GOALS) component of the WCRP Climate Variability and Predictability Programme were more clearly delineated and cooperation with other WCRP initiatives including the Arctic Climate System Study (ACSYS) were advanced. The International GEWEX Project Office (IGPO) report included plans for the Second International Scientific Conference on the Global Energy and Water Cycle.

Actions and recommendations included development of crosscutting themes for the GEWEX Panels, interfaces with ACSYS and GOALS, a sea surface temperature pilot study, a validation data set project for precipitation and downward radiation measurements over the oceans, an aerosol climatology project, and GVaP Phase-II plans.

AEROSOLS IN NEW CAGEX DATABASE

The Clouds and Earth Radiant Energy System (CERES), Atmospheric Radiation Measurement (ARM) GEWEX Experiment (CAGEX) Version 1 data base has been significantly expanded and now includes shortwave fluxes and aerosols, as well as the longwave fluxes, clouds, and soundings in the original Version 0. Version 1 uses a 3x3 grid every 30 minutes between 1409 UTC and 2239 UTC (daylight) for 26 days, starting April 5, 1994.

CAGEX is designed to test, develop, and validate retrievals of the surface and atmospheric radiation budget (the vertical profile of radiative fluxes) through the remaining life cycle of CERES, and to make the resultant data set available to the GEWEX community. CAGEX provides a data set with (1) soundings, aerosols, and satellite-based cloud properties sufficient to calculate fluxes, (2) longwave and shortwave flux profiles, and (3) ARM measurements used to validate some of the specified inputs and calculated fluxes. The CAGEX home page is on http://snowdog.larc.nasa.gov:8081/cagex.html. FTP anonymous access is through snowdog.larc. nasa.gov on the directory "pub" and then "CAGEX."

For more information or to provide comments on this new data base contact: Thomas Charlock, NASA Langley Research Center, E-mail: t.p.charlock@larc.nasa.gov, or Tim Alberta, E-mail: lberta@snowdog.larc.nasa.gov.

SECOND INTERNATIONAL SCIENTIFIC CONFERENCE ON THE GLOBAL ENERGY AND WATER CYCLE

U.S. National Academy of Sciences
Washington, DC
17-21 June 1996

UPDATE

We are pleased to announce that we have received over 300 abstracts from 26 countries for the Conference. The larger than expected volume of abstracts and the many inquiries we have received by those planning to attend has required us to reconsider our original plans for conducting the Conference.

To provide a more prominent position within the conference for the large number of high quality abstract submissions, the GEWEX Scientific Steering Group has decided to establish poster sessions as the primary forum for the scientific results. All accepted abstract submissions will be presented as posters each afternoon of the conference.

Each morning will consist of selected keynote and invited review presentations. At the end of each morning session a poster session chairperson will present a short preview of the afternoon poster presentations and the type of results provided by those sessions. The afternoon poster presentations will continue the theme of the morning session and provide the scientific results. The preliminary program on the next page reflects these changes.

We hope that the authors will accept our apologies for the delay in notifying them about these program changes. The large number of abstracts itself slowed down the processing and was further complicated by unusual circumstances in Washington, including snow storms, flooding, government office closing and the move of the International GEWEX Project Office.

Conference Registration

Registration deadline is 24 May 1996. The registration fee is $275.00. The registration fee includes conference preprint volume, and social activities. **For convenience of participants an early conference registration can be accomplished at the Key Bridge Marriott Hotel on Sunday afternoon, 16 June 1996 from 1600 to 2000**. The meeting registration will begin at 0730 on Monday, 17 June 1996.

Hotel Information

A block of sleeping rooms have been reserved at the Key Bridge Marriott, 1401 Lee Highway, Arlington, Virginia. Single occupancy: $103.87; Double occupancy: $122.10 and subject to applicable state and local taxes (9.75%) per room per night. To make reservations, please contact the hotel: (Telephone: 703-524-6400; Telefax: 703-524-8964) and mention "**GEWEX**" to receive the special rate.

Conference Information

For additional information about the conference, see our worldwide web conference page at

http://www.cais.com/gewex/conf.html

or contact the conference coordinator:

Judy Cole
Science and Technology Corporation
101 Research Drive
Hampton, Virginia 23666-1340 USA
E-mail: cole@stcnet.com
Phone: 804-865-7604
Fax: 804-865-8721

Conference Schedule

Extended Abstracts Due:	1 May 1996
Hotel Reservations:	24 May 1996
Registration Deadline:	24 May 1996
Conference:	17-21June 1996

SECOND INTERNATIONAL SCIENTIFIC CONFERENCE ON THE GLOBAL ENERGY AND WATER CYCLE

U.S. National Academy of Sciences
Washington, D.C.
17-21 June 1996

PRELIMINARY PROGRAM

Sunday, 16 June 1996

1600 - 2000 Conference Registration at Key Bridge Marriott Hotel

Monday, 17 June 1996

0730 - 0900 Conference Registration at National Academy of Sciences

0900 - Introduction and Scientific Overview
Moustafa Chahine, GEWEX Scientific Steering Committee
- Keynote Speaker
Edward Frieman, Scripps Institution of Oceanography

Theme A: Flood and Drought Prediction: Global Modeling of the Coupled Land-Atmosphere System: Impact on Regional Precipitation and Water Cycle

1030 - Opening Presentation - Anthony Hollingsworth, European Center for Medium-Range Weather Forecasting
- Invited Review Presentations
- Introduction to Poster Session

1230 LUNCH

1500 Poster Hall Open (Theme A)

1800 Reception

Tuesday, 18 June 1996

Theme B: Regional Water Resources and Climate: Use of climate information for managing water resources. Determining continental-scale budgets, runoffs, precipitation and land surface characteristics.

0900 - Opening Presentation - Soroosh Sorooshian, University of Arizona
- Invited Review Presentations
- Introduction to Poster Session

1200 LUNCH

1400 - 1700 Poster Hall Open (Theme B)

Guests at the Key Bridge Marriott Hotel are encouraged to visit the Conference Registration Desk on Sunday between 1600 - 2000.

Wednesday, 19 June 1996

Theme C: Cloud, Water Vapor, Aerosol and Precipitation Interactions: Measurement and modeling of the cloud and radiative elements contributing to climate variation.

0900 - Opening Presentation - Graeme Stephens, Colorado State University
- Invited Review Presentations
- Introduction to Poster Session

1200 LUNCH

1400 - 1700 Poster Hall Open (Theme C)

1900 Banquet

Thursday, 20 June 1996

Theme D: The Water and Carbon Cycle Connection: Influence of precipitation and radiation on the biogeochemical processes affecting climate.

0900 - Opening Presentation - Piers Sellers, NASA/Goddard Space Flight Center
- Invited Review Presentations
- Introduction to Poster Sessions

1200 LUNCH

1330 - 1500 Poster Hall Open (Theme D)

1500 - 1630 Poster Hall Open (Theme E)

Friday, 21 June 1996

Theme E: Ocean-Atmosphere-Ice Exchanges: Measurement and incorporation of ocean, snow and sea ice characteristics into energy and water budget studies.

0900 - Opening Presentations - Peter Webster and Judith Curry, Colorado State Univ.
- Invited Review Presentations

1100 - The Direction of Research on the Global Energy and Water Cycle, and the Impact of Space Systems/Measurements - Panel Discussion

1230 Conference Adjourns

PLANS FOR AUGMENTING DOE/ARM/CART SOUTHERN GREAT PLAINS SITE

Jeanne M. Schneider
NOAA/National Severe Storms Laboratory

A unique collaboration is underway between the Department of Energy's Atmospheric Radiation Measurement (ARM) Program, the Cooperative Institute for Mesoscale Meteorological Studies (CIMMS) at the University of Oklahoma, Oklahoma State University, NOAA, and the GEWEX Continental-scale International Project (GCIP) at the ARM Cloud and Radiation Testbed (CART) Southern Great Plains (SGP) Site. Discussions at the GCIP meetings in Norman, Oklahoma, in October 1993 focused on both the potential of and shortcomings (from a GCIP point of view) of the instrumentation planned for the SGP Site. It was agreed that the data from the 22 Extended Facilities at this site (which were designed to measure near surface atmospheric fluxes) would be more valuable to GCIP scientists if they were augmented with soil water measurements through and below the rooting zone. ARM was willing to host such instrumentation, and subsequent discussions led to a successful proposal from scientists at CIMMS and the National Severe Storms Laboratory (NSSL) to NOAA's Office of Global Programs to develop and install robust, automated soil moisture profiling systems at the SGP Site. A 2-year effort is now underway.

A key component of the plan is coordination of the ARM installation with similar installations now in the Little Washita watershed and across the Oklahoma Mesonetwork. The goal is to develop overlapping networks on three different physical scales, simultaneously observing soil water, soil temperature, and some measure of the atmospheric fluxes of heat and water. While the actual instrument configuration and placement will vary between the three networks, the plan is to share a common soil water sensor (the Campbell Scientific 229-L heat dissipation matric potential sensor).

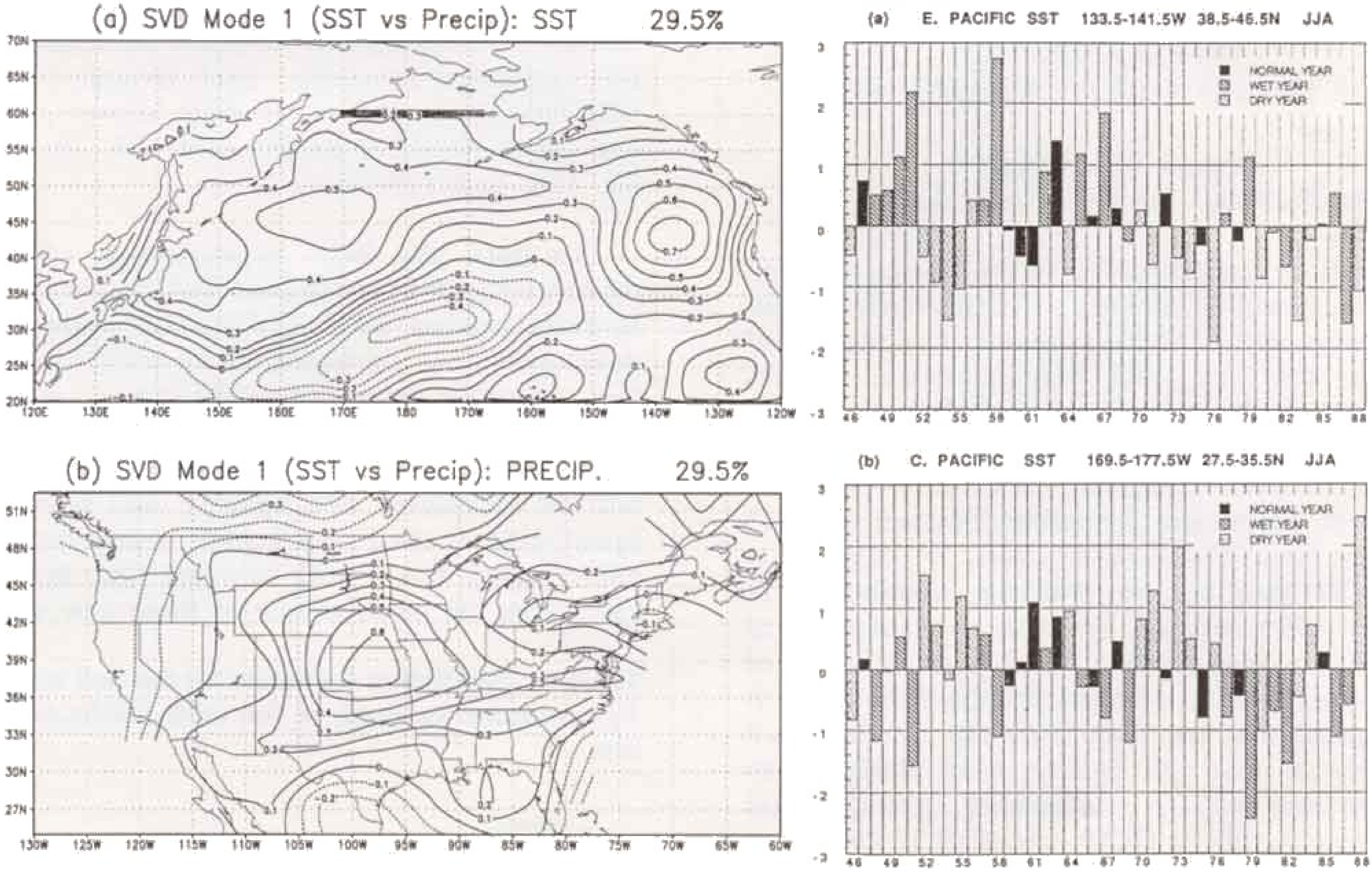
Installation of these soil water systems at the ARM/CART SGP site will occur in three phases (see Table 1), providing an opportunity to adapt the system design according to field experience. The locations for each installation phase were chosen to complement the ARM Extended Facility installation schedule. Each Extended Facility will have two profiles of eight sensors, located one meter apart, at depths of 5, 15, 25, 35, 60, 85, 125, and 175 cm.

To date, the SGP augmentation effort has developed system installation and data ingest plans in collaboration with ARM/CART management; developed and implemented an efficient laboratory calibration procedure for the sensors; completed soil sampling for determination of soil characteristics at the Phase I and II sites (Phase III sites will be completed this Spring); and have begun installation at the Phase I sites. Early results are encouraging, but it will be some time before we can gauge the performance of these new systems.

Table 1. Installation Schedule for the Soil Water and Temperature Systems at the DOE ARM/CART SGP Site.

Extended Facility Name	County, State	Local Surface Type
PHASE I - to be completed in March, 1996		
Central Facility	Grant, OK	pasture, wheat
Ringwood	Major, OK	pasture
Cordell	Washita, OK	rangeland
Meeker	Lincoln, OK	pasture
Ashton	Sumner, KS	pasture
Plevna	Reno, KS	rangeland
Elk Falls	Elk , KS	pasture
PHASE II - to be installed during late Spring, 1996		
Pawhuska	Osage, OK	native prairie
Byron	Alfalfa, OK	alfalfa
Vici	Dewey, OK	wheat
Cyril	Caddo, OK	wheat
Coldwater	Comanche, KS	rangeland
Larned	Pawnee, KS	wheat
Tyro	Montgomery, KS	alfalfa
Hillsboro	Marion, KS	pasture
PHASE III - to be installed during Fall, 1996		
Morris	Okmulgee, OK	pasture
Seminole	Seminole, OK	pasture
Fort Cobb	Caddo, OK	irrigated peanuts
Le Roy	Coffey, KS	soybeans, wheat
Halstead	Harvey, KS	wheat
Towanda	Butler, KS	alfalfa
Okmulgee	Okmulgee, OK	forest

OK and KS are abbreviations for Oklahoma and Kansas



The squared covariance explained by this mode is 29.5%. The values shown are correlation coefficients with a contour interval of 0.1. The maps illustrate that the north Pacific SST anomalies are strongly tied to the Great Plains precipitation in summer. The two bar graphs are the eastern and central Pacific SST indices based on area averaged SST over the key region. The stipling indicates the corresponding precipitations over the United States Great Plains.

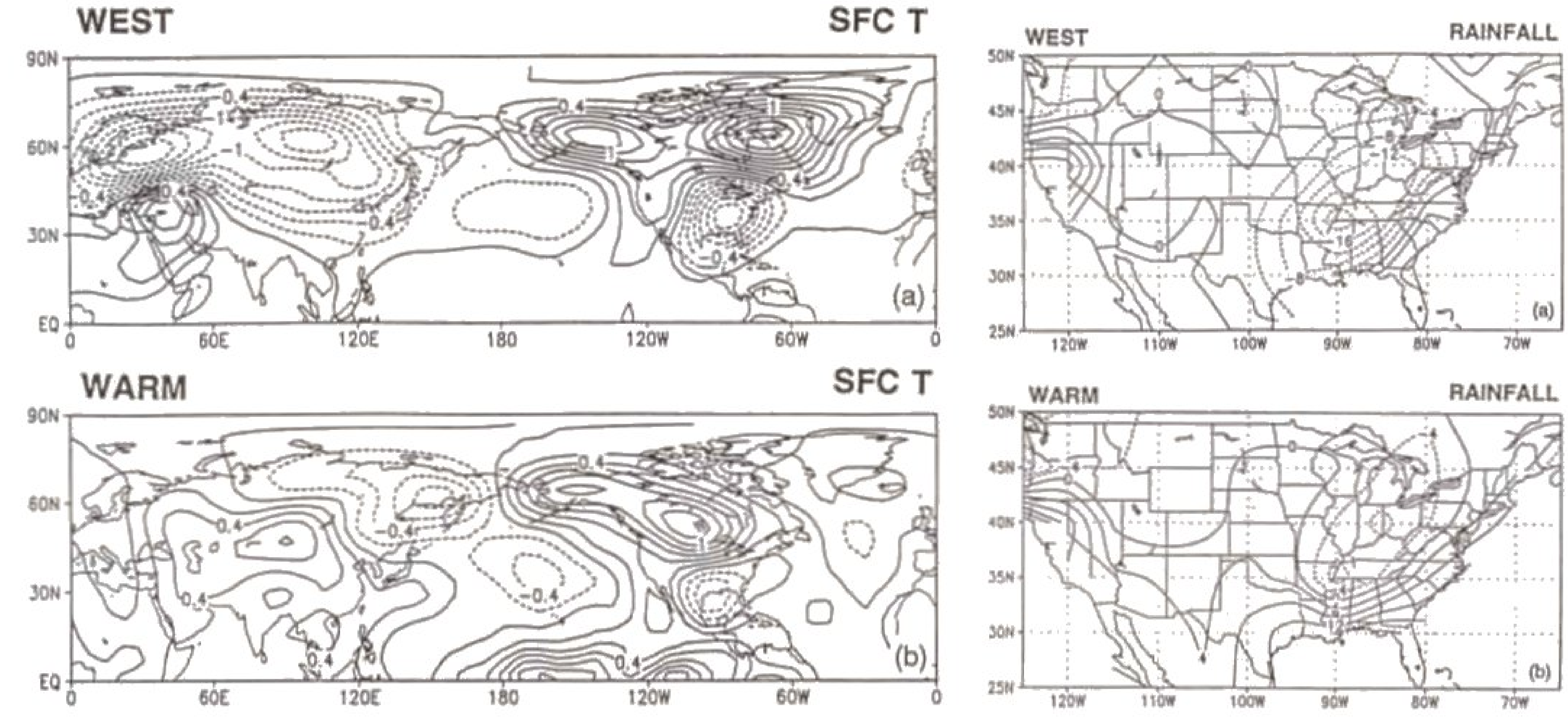
RELATIONSHIP BETWEEN NORTH PACIFIC SST ANOMALIES AND U.S. PRECIPITATION ANOMALIES

[1]Mingfang Ting and [1]Hui Wang
[2]Martin P. Hoerling and [2]Taiyi Xu
[3]Arun Kumar

[1]University of Illinois at Urbana-Champaign
[2]CIRES, University of Colorado
[3]NOAA/National Centers for Environmental Prediction

In a recent study (Ting and Wang, 1996), the relationship between North Pacific sea surface temperature (SST) anomalies and Great Plains precipitation anomalies during the June, July and August season was explored. The precipitation data used were from the Oak Ridge National Laboratory's Historical Climatology Network for the period 1946-1988. The SST data were from the Geophysics Fluid Dynamics Laboratory (GFDL) analyses of the Comprehensive Ocean-Atmosphere Data Set (COADS) for the same period. A singular value decomposition (SVD) between North Pacific SST and the United States precipitation was performed. The maps in the figure above illustrate the first singular mode, which shows the pattern of precipitation is co-varying with the SST. The squared covariance between the two fields explained by this mode is about 30%. **The maps illustrate a large single positive precipitation anomaly over the Great Plains to be associated with positive SST anomalies over the eastern North Pacific and negative SST anomalies over the central North Pacific.**

The eastern and central north Pacific SST indices were constructed based on the area average of the SST centered at the maximum SST anomalies on the SVD map. The bar graphs in the figure above illustrate the normalized SST indices over the two regions and the associated wet and dry conditions over the United States Great Plains. **With very few exceptions, a wet year over the Great Plains is accompanied by**



Composite surface temperature over the northern hemisphere and rainfall over the United States based on the zonal wind index (westerly phase indicates westerly anomalies at 35°N and easterly anomalies at 55°N) and the equatorial SST index (warm phase indicates El Nino). Contour intervals are 0.2°C for surface temperature and 4 mm/mon for precipitation.

above normal SST over the eastern North Pacific and below normal SST over the central North Pacific and vice versa.

For the winter season, the United States precipitation is believed to be largely associated with the tropical SST anomalies, the so called El Nino and El Viejo (O'Brien and Sittel, 1995). However, the large mid-latitude natural variability may also contribute significantly toward the anomalous United States precipitation.

In Ting et al. (1996), the winter time teleconnection patterns during extreme phases of the zonal mean circulation (u-bar) were studied. The seasonal mean anomalies associated with the mid-latitude u-bar were compared to those associated with the El Nino/Southern Oscillation (ENSO) during the 1947-1994 period. This revealed that a significant fraction of the Northern Hemisphere wintertime stationary wave variability is associated with meridional shifts in the mid-latitude westerlies. These are reminiscent of the index cycle pattern characterized by out-of-phase u-bar anomalies at 35°N and 55°N, and are shown to occur largely independent of the interannual variability in tropical Pacific sea surface temperatures. The composite surface temperature and the United States precipitation associated with the extremes in zonal mean circulation and the tropical Pacific SST are shown above. The maps in the figure clearly show a wave number one pattern having out-of-phase temperature anomalies between Eurasia and North America and out-of-phase precipitation anomalies between eastern and western United States associated with the meridional shift of zonal mean wind, and composite amplitudes considerably larger than those experienced during a composite ENSO event.

References:

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Ting, M., M. P. Hoerling, T. Xu, and A. Kumar, 1996. Northern Hemisphere Teleconnection patterns during extreme phases of the zonal mean circulation. Submitted to J. Climate.

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RELATIONSHIPS BETWEEN SPIN-UP TIME AND THE TIME SCALE OF FORCING DATA

Zhenglin Hu, Shafiqul Islam and Christos Matsoukas

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Recently, IGPO (1994) noted that the average of 14 participating land surface models (LSMs) in the Regional Interaction of Climate and Ecosystem (RICE) and Project for Intercomparison of Land Surface Parameterization Schemes (PILPS) Workshop generally outperformed all individual schemes. This suggests that individual LSMs capture some aspects of the complex land atmosphere transfer well, but no single scheme yet captures the entire system consistently. Thus, there is a distinct need to compare different schemes in terms of their representation of land surface and atmospheric processes.

As different LSMs represent processes differently, it is necessary to create a representative model environment that can be used as a test-bed for each of the LSMs. The spin-up of a LSM may be defined as an adjustment process during which the model is approaching equilibrium (IGPO, 1994; Yang et al., 1995). The spin-up time scale of land surface models has been little studied and, at this time, there is no definitive estimate of spin-up time for land surface models. Recently reported spin-up time scales of several years for land surface processes (e.g., IGPO 1994, Yang et al., 1995) are significantly larger than previously reported spin-up time scales (e.g. Henderson-Sellers and McGuffie, 1990; Islam et al., 1993). The existence of such a long spin-up time could essentially preclude testing of a LSM within a mesoscale model environment, because we need to integrate the model longer than the spin-up time scale, otherwise the resulting model environment will not be equilibrated and the analysis of results can be misleading. At least two international initiatives: GEWEX and the International Global Biosphere Program (IGBP) are actively involved in testing and refining LSMs within a mesoscale model environment. Therefore, it is necessary to explore some underlying reasons for such a wide discrepancy in the estimated spin-up time scales for LSMs.

We hypothesize that the time scale of forcing data will dictate the spin-up time scales for land surface models. For example, IGPO (1994) and Yang et al. (1995) used a single year of repeated forcing to reach an equilibrium. Such perfectly identical states between years cannot be realized in nature and this was done primarily for computational convenience. We speculate that yearly forcing data with annual cycles would require several annual cycles to force the model to equilibrium. Similarly, if we use monthly forcing data repeatedly the model would take several months to equilibrate, while forcing data with diurnal cycle would take several diurnal cycles to equilibrate.

Experiments were performed with a commonly used LSM, the Biosphere-Atmosphere Transfer Scheme (BATS) (Dickinson et al.,1993) for two different soil-vegetation environments: a tropical forest and a temperate grassland. Two experiments were carried out: a WET experiment, at which the soil moisture content was initialized at full capacity and a DRY experiment, at which the initial moisture content was set to 10% of the full capacity (Matsoukas et al., 1995). For the forcing data, we have used the Phase 1(a) of the PILPS data set (IGPO, 1993; Yang et al., 1995). In these experiments, we use a definition of spin-up time suggested by Yang et al., (1995):

$$|LE^{n+1} - LE^{n}| < 0.1 \text{ Watts } m^{-2} \text{ and } |H^{n+1} - H^{n}| < 0.1 \text{ Watts } m^{-2}$$

where LE^n and H^n are the latent and sensible heat fluxes respectively, for year, month or day n. If the above criteria are satisfied then the spin-up time is taken to be year, month or day n. Table 1 shows the dependence of spin-up time on the time scale of forcing data.

As expected, the yearly forcing data gave results similar to those of Yang et al., (1995). However, for all three cycles of the forcing data examined, we see a correlation between the cycle of the forcing data and the spin-up time (Matsoukas et al., 1995). For example, for tropical forests with dry initialization, yearly forcing data take 20 years, monthly data from July take 2 months, and daily data for July 15 take 12 days to reach an equilibrium. **For all cases examined, the daily forcing data has the shortest equilibration time (spin-up time on the order of days), while the yearly forcing data has the longest equilibra-**

tion time (spin-up time on the order of years). These results suggest that for testing and evaluating land surface schemes, it may be necessary to integrate GCMs for several years while it is sufficient to integrate mesoscale models for several days.

Table 1: Dependence of spin-up time on the time scale of forcing data.

	WET	DRY
Yearly Cycle		
Full Data Set		
Tropical Forest	3 years	21 years
Grassland	3 years	14 years
Monthly Cycle		
January		
Tropical Forest	2 months	14 months
Grassland	23 months	25 months
July		
Tropical Forest	31 months	2 months
Grassland	2 months	4 months
Daily Cycle		
January 15		
Tropical Forest	55 days	17 days
Grassland	17 days	14 days
July 15		
Tropical Forest	52 days	12 days
Grassland	18 days	21 days

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Dickinson, R.E., A. Henderson-Sellers, P.J. Kennedy, and F. Giorgi, 1993. Biosphere-Atmosphere Transfer Scheme (BATS) Version 1(e) as Coupled to the NCAR Community Climate Model, NCAR Tech. Note TN-387-STR, 72 pp.

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INTERNATIONAL WORKSHOP ON ENERGY/WATER CYCLE IN SIBERIA AND GAME

Yakutsk, Russia
17-19 August 1995

Tetsuo Ohata
The University of Shiga Prefecture

This meeting was jointly organized by the Institute of Geography (Moscow), the Institute of Permafrost (Yakutsk), the Institute of Physical-Technical Problems of the North (Yakutsk) and the Japan National Committee for the GEWEX Asian Monsoon Experiment (GAME), and was held at the Insitute of Permafrost, Yakutsk. The main purpose of the meeting was to review past scientific studies related to GAME objectives and to discuss main study topics, and to exchange information on problems related to regional experiments and analysis. There were 10 participants from Japan and approximately 25 from Russia, and 22 papers were presented.

Main conclusions from the workshop:

- Past *in situ* studies in this area have clarified annual characteristics of the components of the atmosphere-vegetation-ground (permafrost) independently.
- Few studies have been made about the relation to the atmosphere land surface interactions.
- Hydrometeorological conditions within the Lena River Basin are complex. Experimental sites in the wet areas (south, west) need to be established early.
- Because ground moisture and ice conditions vary alot within a small area (<1000 km^2), a measurement network within the area should be reconsidered.
- In addition to process studies of the annual energy/water cycle in this region, the response of land surfaces to the recent warming, including the lower troposphere, should be studied.
- Hydrometeorological data in this region is widely dispersed. Besides the data filed at the World Data Center in Obminsk, there is a certain amount of local data that needs to be collected.
- Cooperation between the existing experimental study sites of several institutes in this region should be promoted.
- Usage of satellite data such as LANDSAT, NOAA and ADEOS2 could be applied to the GAME objectives.

The Russian GAME Committee was established by the Russian Academy of Sciences in July 1995. The implementation plan for GAME/SIBERIA will be mainly made jointly between the Russian and Japanese GAME Committees.

MACKENZIE GEWEX STUDY SCIENCE AND PLANNING WORKSHOP

Toronto, Ontario
14-15 November 1995

Terry Krauss

National Hydrology Research Centre
Saskatoon, SK

A workshop on the Mackenzie GEWEX Study (MAGS) was held at the headquarters of the Atmospheric Environment Service (AES), Toronto, Ontario on November 14-15, 1995. This science workshop is planned as an annual event where all MAGS researchers are expected to report on their scientific results and to participate in the planning of MAGS activities. More than 60 people attended the 2-day workshop which consisted of 38 scientific presentations and 7 discussion sessions. The workshop agenda, list of attendees and abstracts are available on the Canadian GEWEX Web Site are at:

http://www.on.doe.ca/GEWEX/gewex_homepage.html

The workshop provided an opportunity for everyone to appreciate our challenges and our progress. Dr. Ronald Stewart, AES, provided an overview of the International GEWEX program and the role of MAGS in achieving the goals set by the GEWEX Hydrometeorology Panel (GHP) for the years 2000 and 2005. Dr. Kent Moore (University of Toronto) summarized the MAGS Science and Implementation Plan.

A number of key issues were identified during the scientific presentation and discussion sessions at the workshop. Improved observations of key variables for the Mackenzie Basin such as precipitation, discharge, radiation, evapotransipiration, upper air moisture and fluxes, and improved land cover data are required for diagnostic studies and validation. Modelling priorities were identified as surface moisture and energy fluxes and boundary layer development, clouds and precipitation on small and medium scales, topographic influences, cold season hydrometeorological processes, and hydrological modelling of wetlands, lake effects, and ice conditions. Priority areas for remote sensing were identified as algorithm development for snow cover products in northern forested regions, cloud and humidity retrieval techniques and model assimilation, improved land cover and vegetation products, cloud profiling radar techniques, and weather radar and satellite precipitation measurements.

An important milestone for the Canadian GEWEX program by the year 2000, within the overall GHP strategy, is the realization of a quantitative understanding of the controls that the large scales have on the Mackenzie Basin water and energy cycles, including discharge into the Arctic Ocean, through the development and application of coupled models.

As one measure of the progress of the Canadian GEWEX program towards achieving our international commitments, a simple statement will be issued each year in conjunction with our Science Workshop. For November, 1995 the statement was: *Preliminary assessments of the water budgets of the Mackenzie Basin, as well as initial energy studies, have been carried out, but critical variables have not been measured adequately. We are completing the identification of key processes, we are carrying out background climatologies, and we are improving the representations of physical processes in our models.*

INTERNATIONAL WORKSHOP ON PRECIPITATION DATA SETS

Washington, DC
6-8 December 1995

Arnold Gruber
NOAA/National Environmental Satellite Data and Information Service

The Global Precipitation Climatology Project (GPCP) sponsored workshop provided guidance for future activities to make global precipitation data sets more useful to the user community. Although, the workshop focused on the requirement for identification and partitioning of rainfall types (convective, stratiform, warm, solid), it also reiterated the need for 1 x 1 degree spatial and daily temporal resolution for total precipitation.

With regard to snow, it was recognized by the participants that improved snow detection algorithms and corrections of gauge data are needed to reduce precipitation errors in high latitudes. While it is possible to determine snow and other forms of solid precipitation from gauges by using current weather reports, there is no known satellite method for directly sensing snow. Improvements in "warm" rain detection are also required, especially in orographic regions, where current GPCP remote sensing techniques are not particularly effective. This may require additional gauges and the development of new remote sensing algorithms.

A discussion on the need for the vertical distribution of latent heating indicated that partitioning precipitation into convective and stratiform may be the only feasible way to obtain this information. However, there was no agreement on precisely how to define those terms, especially since the circulation models themselves do not use a standardized definition of convective and stratiform. It was stated that while current remote sensing techniques for explicitly identifying precipitation type require considerable development and evaluation, it is possible to provide qualitative distinctions through the use of ancillary information such as ISCCP 3-hourly products, surface synoptic reports and spatial properties of precipitation within a grid box. Other requirements and recommendations dealt with the need for providing statistical information such as fractional coverage in time and space within a grid box, as well as fractional coverage exceeding a given threshold. This would make global climatological data sets more useful to land surface and hydrological modelers who require observations on time and space scales not achievable by GPCP.

It is well established that any new or improved product developments require extensive validation from ground truth sites. Recommendations with regard to validation included the need to establish the error characteristics of the validating data, greater use of high resolution gauge and radar data for validating convective and stratiform classification, and increased collaborative opportunities with the GEWEX Continental-scale International Project (GCIP) and other GEWEX regional experiments for validating products. Also, a recommendation was made to develop a mobile validation facility that can be used to support specific validation activities, such as algorithm intercomparison projects.

GEWEX CLOUD SYSTEM STUDY SCIENCE PANEL

Washington, D.C.
11-15 December 1995

Keith Browning
Joint Centre for Mesoscale Meteorology
University of Reading

The 4th Session of the GEWEX Cloud System Study (GCSS) Science Panel was held at the International GEWEX Project Office. The focus of the GCSS continues to be the use of observationally-validated Cloud Resolving Models (CRMs), to develop better understanding of the coupled processes within cloud systems, and, to develop improved parameterization schemes for GCMs by comparing single-column models with domain-averaged diagnostics from the CRMs.

Results presented to the Panel showed good progress in mobilizing the CRM community toward the first of the above goals. The maturity of CRMs is now such that they are capable in some circumstances of producing sufficiently realistic realizations of cloud systems to be a useful tool for addressing the second of the above goals. Accordingly, the GCSS is entering a new phase, involving not only basic research studies, but also 'fast track' activities involving the GCM community and single-column models.

The Panel heard that CRMs, after a period of relative neglect by funding bodies, is now beginning to attract support in the USA, Canada, Europe and Australia. The European Commission, for example, has just approved a project called EUCREM (European Cloud Resolving Modelling) involving 11 groups in 5 countries.

The GCSS operates through four working groups. Working Group 1, chaired by Bill Cotton, is concerned with boundary-layer cloud systems. At its 1995 workshop, held at DeBilt in the Netherlands, the group conducted model intercomparisons using the First Lagrangian case of the Atlantic Stratocumulus Experiment (ASTEX). It also carried out more idealized intercomparisons to indicate the sensitivity of cloud top entrainment to the resolution of CRMs.

Working Group 2, concerned with cirrus cloud systems, is now led by a new chairman, Dave Starr, and this group is expected to build up momentum during 1996.

Working Group 3, dealing with precipitating extratropical layer cloud systems, is led by Ron Stewart. It held its 1995 workshop in New York and is developing a broad program of modelling and observational activities leading up to participation in field experiments in New Zealand Southern Alpine Experiment (SALPEX), USA (GCIP) and the North Atlantic Fronts and Atlantic Storm Track Experiment (FASTEX).

Working Group 4, concerned with precipitating convectively-driven cloud systems, is led by Mitch Moncrieff. In addition to participating in the Australian Maritime Continental Thunderstorm Experiment (MCTEX) and assisting Dave Randall in organizing a workshop in Alberta which brought together the GCM and GCSS communities, he and members of his group reported considerable progress in the application of CRMs using existing data sets from GATE and TOGA-COARE. **An encouraging finding is that a relatively simple CRM driven by large-scale measurements relating to Convectively Available Potential Energy (CAPE), vertical shear and large-scale ascent, is capable of generating broadly realistic cloud systems with bulk diagnostics that are both internally consistent and in agreement with observations**. These studies of tropical maritime convection will be extended to mid-latitude continental convection in collaboration with the GCIP and ARM programs.

The four GCSS working groups are open to all scientists in all countries and much of the activitiy is conducted via the World Wide Web. If you are interested in becoming involved, please contact one of the chairman:

Bill Cotton (E-mail: cotton@isis.atmos.colostate.edu)
Dave Starr (E-mail: starr@climate.gsfc.nasa.gov)
Ron Stewart (E-mail: rstewart@dow.on.doe.ca)
Mitch Moncrieff (E-mail: moncrief@ ncar.ucar.edu); or
Keith Browning, GCSS Panel Chairman (E-mail: kabrowning@meto.govt.uk).

HEIHE BASIN FIELD EXPERIMENT (HEIFE) DATA AVAILABLE

Zuo Hongchao and Hu Yinqiao
Lanzhou Institute of Plateau Atmospheric Physics

HEIFE is a Sino-Japanese cooperative investigation on atmosphere-land surface interactions at the Heihe River Basin in Western China. The experimental area is 70 km x 90 km in the Heihe River Basin with an average elevation of 1500 m above sea level. This region is in the arid hinterland of the Eurasia continent, and is one of the most significant global dust sources and a desertification threatened area. The HEIFE River flows through the oasis and disperses in the desert. In the HEIFE area, micrometeorological, automatic weather stations and ground-water level stations were erected separately in oasis, desert and Gobi with distinct underlying surfaces. Also, routine weather stations and hydrological stations provided observations.

Field observations were divided into the following periods: (i) Pilot Observing Period (POP) in September 1988, (ii) Formal Observing Period (FOP) from June 1990 to October 1991, (iii) Four Intensive Observing Periods (IOP), which were 16-30 April, 1-31 August, 1-10 October and 1-15 December in 1991, and (iv) Bio-meteorological Oasis Observing Period 1 April to 31 July 1992.

For the HEIFE Version 0 data set or additional information, contact: Professor Hu Yinqiao, Lanzhou Institute of Plateau Atmospheric Physics, Lanzhou 730000, P.R. China, Tel: 0931-8825311-2245, Fax: +89-0931-8821158.

WCRP/GEWEX MEETINGS CALENDAR

For calendar updates, consult the GEWEX Home Page http://www.cais.com/gewex/gewex.html

6-9 March 1996—GAME SCIENTIFIC PANEL, Tokyo, Japan.

11-16 March 1996—GEWEX JOINT SCIENTIFIC COMMITTEE, Toulouse, France.

15-19 April 1996—INTERNATIONAL WORKSHOP ON RESEARCH USES OF ISCCP DATASETS, NASA Goddard Institute for Space Studies, New York, NY, USA. For details contact Dr. William B. Rossow, Goddard Institute for Space Studies, 2880 Broadway, New York, NY 10025; Tel.: 212/678-5567; Fax: 212/678-5552; E-mail: clwr@nasagiss.giss.nasa.gov.

6-10 May 1996—EUROPEAN GEOPHYSICAL SOCIETY XXI GENERAL ASSEMBLY, The Hague, The Netherlands. For information contact EGS Office, Postfach 49, Max-Planck-Str. 1, 37189 Katlenburg-Lindau, Germany, Tel.: 49-5556-1440; Fax: 49-5556-4709; E-mail: EGS@LINAXI.DNET.GWDG.DE.

15-17 May 1996—INTERNATIONAL WORKSHOP ON MACRO-SCALE HYDROLOGICAL MODELING, Nanjing, China. One page abstracts due before 30 September 1995. For further information contact Prof. Jold, Water Resources Development and Utilization Laboratory, Hohai University, Nanjing China. Tel: 86 25 330 4195 (after voice in Chinese dial 0544); Fax: 88 25 33 15375 .

28-31 May 1996—GPCP WGDM ANNUAL MEETING, at the University of Iowa.

3-5 June 1996—BALTEX SCIENCE STEERING GROUP MEETING, Sopot, Poland.

10-12 June 1996—SCALING UP HYDROLOGICAL VARIABLES USING REMOTE SENSING, Wallingford, U.K. For information, contact Dr. John Stewart, Institute of Hydrology, Crowmarsh Gifford, Wallingsford, Oxfordshire, OX10 8BB, U.K.; Tel: 44-1491-838800; Fax: 44-1491-832256.

17-21 June 1996—SECOND INTERNATIONAL SCIENTIFIC CONFERENCE ON GLOBAL ENERGY AND WATER CYCLE, U.S. National Academy of Sciences, Washington, DC. For additional information, contact IGPO, 1100 Wayne Avenue, Suite 1210, Silver Spring, Maryland 20910, U.S.A., Tel: 1-301-427-2089 Ext. 521; Fax: 1-301-427-2222; E-mail: gewex@cais.com.

12-16 August 1996—4TH INTERNATIONAL CLOUD MODELING WORKSHOP, AND THE 3RD GCSS BOUNDARY LAYER WORKSHOP, Clermont-Ferrand, France. For information contact Roy Rasmussen, NCAR, Box 3000, Boulder, Colorado, USA; Fax: (303) 497-8401; E-mail: rasmus@ucar.edu or Andrea Flossman, Laboratoire de Meteorlogie Physique, Universite Blaise Pascal/CNRS, 24 Avenue des Landais, F-63177 Aubiere Ceex, France; Fax: (33) 73 27 16 57; E-mail: flossman@opgc.univ-bpclermont.fr.

19-23 August 1996—12TH INTERNATIONAL CONFERENCE ON CLOUDS AND PRECIPITATION, Zurich, Switzerland. For information, contact Prof. P.R. Jonas, Dept. of Pure and Applied Physics, UMIT, P.O. Box 88, Manchester, M60 1QD, U.K.

19-24 August 1996—INTERNATIONAL RADIATION SYMPOSIUM: CURRENT PROBLEMS IN ATMOSPHERIC RADIATION, Fairbanks, Alaska. For information contact Sharon Kessey, Geophysical Institute, University of Alaska, P.O. Box 757320, Fairbanks, Alaska 99775, USA. Tel: 970-474-7360, Fax: 970-474-7290, E-mail: sharon@kaja.gi. alaska.edu.

26-29 August 1996—GEWEX HYDROMETEOROLOGY PANEL MEETING, Toronto, Canada.

2-5 September 1996—THE SECOND WORKSHOP ON THE BALTIC SEA ICE CLIMATE, Oteepaeae, Estonia. For information contact Arvo Jaervet, Department of Geography, Vanemuise 46, EE-2400 Tartu, Estonia, Tel: 372-7-430-605, Fax: 372-7-430-853, E-mail: arvo@geogr.ut.ee.

9-13 September 1996—SEVENTH CONFERENCE ON MESOSCALE PROCESSES, Reading, U.K. For information, contact Bradley Smull, NOAA/NSL, 325 Broadway, Boulder, Colorado, U.S.A.; Tel: 1-303-497-6886; Fax: 1-303-497-6930; E-mail: smull@mrd3.mmm.ucar.edu, or Susan Ballard, Joint Centre for Meteorology, University of Reading, P.O. Box 240, Reading RG6 2FN, U.K.; Tel: 44-734-318794; Fax: 44-734-318791; E-mail: spballard@email.meto.govt.uk.

14-17 October 1996—GCSS EXTRA-TROPICAL LAYER CLOUDS WORKSHOP, Geesthacht, Germany. For information, contact Dr. Ronald Stewart, Climate Processes and Earth Observation Division, Atmospheric Environmental Service, 4905 Dufferin Street, Downsview, Ontario, Canada M3H 5T4; Tel: 416-739-4122; Fax: 416-739-5700; E-mail: rstewart@dow.on.doe.ca.

21-23 October 1996—GCSS PRECIPITATING CONVECTIVE CLOUD SYSTEMS MODEL INTERCOMPARISON WORKSHOP, NASA Goddard Space Flight Center, Greenbelt, Maryland, USA. For information contact Mitch Moncrief, NCAR, P.O. Box 3000, Boulder, Colorado 80307; Tel: 303-497-8960; Fax: 303-497-8181; E-mail: moncrief@ncar.ucar.edu.

GEWEX REPORTS AND DOCUMENTS

(Available from IGPO)

INTERNATIONAL GEWEX WORKSHOP ON COLD-SEASON/REGION HYDROMETEOROLOGY, Summary Report and Proceedings, Banff, Alberta, Canada, September 1995, IGPO Publication Series No. 15.

PROJECT FOR INTERCOMPARISON OF LAND-SURFACE PARAMETERIZATION SCHEMES (PILPS), Soil Moisture Simulation. December 1994, IGPO Publication Series No. 14.

LAND-SURFACE CLIMATOLOGIES OF AMIP-PILPS MODELS AND IDENTIFICATION OF REGIONS FOR FUTURE INVESTIGATION (PILPS Phase 3A). November 1994, IGPO Publication Series No. 13.

GEWEX CONTINENTAL-SCALE INTERNATIONAL PROJECT (GCIP) Major Activities Plan for 1995, 1996, and Outlook for 1997. December 1994, IGPO Publications Series No. 12.

GEWEX CLOUD SYSTEM STUDY (GCSS) SCIENCE PLAN. May 1994, IGPO Publication Series No. 11.

GEWEX PAMPHLET (fivefold glossy).

UTILITY AND FEASIBILITY OF A CLOUD PROFILING RADAR: Report of the GEWEX Topical Workshop, 29 June–1 July 1993, Pasadena, California. April 1994, IGPO Publication Series No. 10.

IMPLEMENTATION PLAN FOR GEWEX CONTINENTAL-SCALE PROJECT (GCIP), VOLUME III: Strategic Plan for Data Management. March 1994, IGPO Publication Series No. 9.

IMPLEMENTATION PLAN FOR GEWEX CONTINENTAL-SCALE PROJECT (GCIP), VOLUME II: Research. June 1994, IGPO Publication Series No. 8.

GCIP PAMPHLET (trifold glossy).

IMPLEMENTATION PLAN FOR THE GEWEX CONTINENTAL-SCALE INTERNATIONAL PROJECT (GCIP), VOLUME I: Data Collection and Operational Model Upgrade. May 1993, IGPO Publication Series No. 6.

A PRELIMINARY SCIENCE PLAN FOR A LARGE-SCALE BIOSPHERE-ATMOSPHERE FIELD EXPERIMENT IN AMAZON BASIN: Report on Workshop convened 18–20 June 1992 at NASA Goddard Space Flight Center, Greenbelt, Maryland, U.S.A.

INTERNATIONAL SATELLITE LAND SURFACE CLIMATOLOGY PROJECT (ISLSCP) WORKSHOP REPORT, 23–26 June 1992, Columbia, Maryland, U.S.A.

GEWEX CONTINENTAL-SCALE INTERNATIONAL PROJECT (GCIP) DATA WORKSHOP: Summary report on 5–8 May 1992 Workshop. June 1992, IGPO Publication Series No. 4.

GEWEX CONTINENTAL-SCALE INTERNATIONAL PROJECT (GCIP) ATMOSPHERIC SCIENCE COMPONENT: Report on Atmospheric Subpanel Workshop, 18-19 March 1992. May 1992, IGPO Publication Series No. 3.

IMPLEMENTATION PLAN FOR THE PILOT PHASE OF THE GEWEX WATER VAPOR PROJECT (GVaP). March 1992, IGPO Publication Series No. 2.

NEW WORLDWIDE WEB SITES OF INTEREST TO THE GEWEX COMMUNITY

GEWEX Hydrological Panel (GHP) home page:

http://www.on.doe.ca/GEWEX/GHP/ghp.html

Large Scale Biosphere-Atmosphere Experiment in Amazonia (LBA) home page:

http://yabae.cptec.inpe.br/lba

Global Climate Change Information Programme:

http://www.doc.mmu.ac.uk/aric/gcciphm.html

Atmospheric Research and Information Centre:

http://www.doc.mmu.ac.uk/aric/arichome.html

POSITION CHANGE

Professor Ann Henderson-Sellers has been appointed to the position of Deputy Vice-Chancellor- Research and Development, at the Royal Melbourne Institute of Technology. She will continue to lead the Project for Intercomparison of Land-Surface Parameterization Schemes.

Participants at GEWEX Cloud System Study Workshop, in Washington,D.C., USA, 11-15 December 1995. See page 17 for workshop summary. Shown above from left to right are: David Starr, USA; Mitch Moncrieff, USA; Peter Jonas, UK; William Cotton, USA; Ronald Stewart, Canada; Martin Miller, UK; Brian Ryan, Australia; Keith Browning, UK; Jean-Luc Redelsperger, France; Masanori Yamasaki, Japan; Sam Benedict, WMO/WCRP.

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IGPO Director is New President of AMS

On January 31, 1996 at the 76th Annual Meeting of the American Meteorological Society, Dr. Paul D. Try, IGPO Director, commenced his duties as President of the Society. Of special interest to the GEWEX scientific community is that the primary theme Dr. Try has established for the 77th Annual Meeting of the AMS (February 2-7, 1997; Long Beach, California) is interdisciplinary science, with a special emphasis on hydrology.

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