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Report of Issues/Actions/Recommendations from the Coordinated Enhanced Observing Period (CEOP) Implementation Planning Kick-off Meeting
6-8 March 2001, Tokyo, Japan
Final Version, 27 July 2002

1. GENERAL TOPICS

The Coordinated Enhanced Observing Period (CEOP) was initially motivated by the World Climate Research Programme (WCRP) Global Energy and Water Cycle Experiment (GEWEX) international efforts focusing on the measurement, understanding and modeling of water and energy cycles within the climate system. The requirements of GEWEX, the Climate Variability and Predictability (CLIVAR) initiative, the Climate and Cryosphere (CliC) Project and the other WCRP core projects as well as the climate research community at large have been taken fully into account in planning the assembly of a co-coordinated data set that will serve numerical modeling and analyses needs. Plans are for CEOP to assist research into the global atmospheric circulation and changes in water resources. CEOP has gained the interest of other international organizations outside of the WCRP community, as evidenced by the proposal for an Integrated Global Water Cycle Observations (IGWCO) theme within the framework of the International Global Observing Strategy Partnership (IGOS-P), which has re-affirmed CEOP as 'the first element of the IGWCO'. IGOS is a partnership between international bodies concerned with global environmental issues, including, among others, space agencies belonging to the Committee on Earth Observation Satellites (CEOS).

Professor T. Koike, the Lead Scientist for CEOP, on behalf of Dr David Carson, Director of WCRP and Dr Soroosh Sorooshian, Chairman of the GEWEX Scientific Steering Group (SSG), arranged for the initial launching meeting of the formal CEOP implementation process to be held at the Earth Observation Research Center (EORC) of the National Space Development Agency (NASDA), in Tokyo, Japan, from 6-8 March 2002. Dr T. Ogawa, Director of EORC, hosted the meeting. More specifics about CEOP and the Kick-off meeting can be found through the CEOP Internet site: http://monsoon.t.u-tokyo.ac.jp/ceop/.

Each action identified in the report is referenced with a sequential identification number designated in the form of "**action A1, A2,** etc.", to simplify the process of referring to any specific item in the process of review and update of the report. The dates for accomplishing these actions were goals set at the time of the meeting, but it was understood and accepted by the participants that, in all cases, additional factors may intervene to alter the priority and timing of completion of any one specific item. An on-going process of coordination and review of work in CEOP, through regular monthly teleconference calls, was agreed to at the meeting. This process will continually address the most important implementation issues and their timeline for accomplishment. Each of the main items associated with the action plans developed at the meeting is referenced to the CEOP Implementation Plan. The Plan, which was finalized following recommendations formulated at a CEOP Implementation Workshop held at the Goddard Space Flight Center (GSFC) in March 2001, was published in May 2001 and can be found at: http://www.gewex.com/ceop/ceop_ip.pdf.

Through the assistance of the CEOP Coordination Office in Tokyo, all of the presentations at the meeting, as referenced in the body of this summary can be accessed on the Internet at: http://monsoon.t.u-tokyo.ac.jp/ceop/meeting/kickoff/presentation/index.htm by clicking on the presenters name.

A list of participants is given in Appendix A, the agenda has been attached in Appendix B, a list of acronyms is given in Appendix C, a summary of the actions is given in Appendix D and an Executive Summary of the main outcome of the meeting is given in Appendix E.

1.1 Overall CEOP Organization/Coordination

The existing projects and sub-activities in CEOP have been grouped under four main scientific and technical thrusts namely Water and Energy Simulation and Prediction, Monsoon Systems, Satellite Data Integration and Data Management. A Science Steering Committee (SSC) has been established to guide the work of the four main working groups and a CEOP Advisory Committee (AC) is to be organized to provide additional oversight and connections to the main supporting agencies. A CEOP Coordination unit, consisting of a, NASDA funded, International CEOP Coordination Office and a, NASA supported, International Coordinator Function, has been established. This structure is depicted in Figure 1. The main activities of CEOP are outlined in the CEOP Implementation Plan, which can be accessed at: http://www.gewex.com/ceop/ceop_ip.pdf.

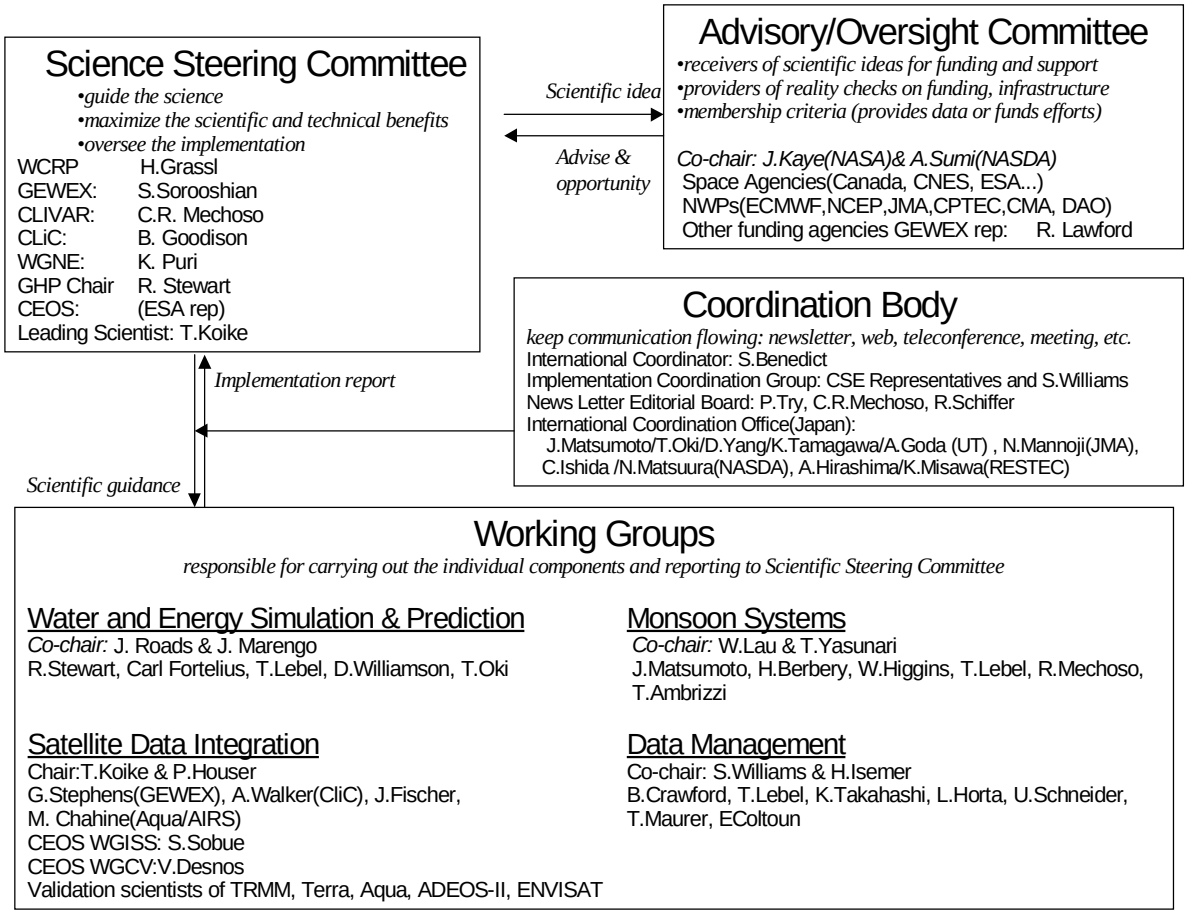

Figure 1 : CEOP Organization structure

The actions and recommendations, which are identified in this report, came out of the presentations and discussions at the CEOP Implementation Kick-off meeting. The items are presented for review and comment. The underlying concept is that, through their participation in the meeting and the review of this material, a final set of activities will be endorsed by the CEOP SSC and become a CEOP action plan for the next 1 to 3 year period. The SSC will assist the CEOP Working Groups (CWG's) and other implementing individuals and groups, to set priorities for the completion of relevant milestones and will establish a review process for ensuring that the work is undertaken in an integrated manner that will result in an orderly advancement of the main goals of CEOP. The SSC in cooperation with the Advisory Committee will establish metrics for and maintain oversight of the status of CEOP progress. The CEOP Coordination unit will be responsive to the SSC and the CWG's in their efforts to meet their responsibilities.

1.2 WCRP/GEWEX Strategy and Goals relevant to CEOP

ISSUE/DISCUSSION: CEOP was initiated by the GEWEX Hydrometeorology Panel (GHP) to take advantage of the five most comprehensive GEWEX Continental-Scale Experiments (CSEs) namely, GCIP (Mississippi River Basin), BALTEX (Baltic Sea region), MAGS (Canadian Mackenzie River Basin), LBA (Amazon region) and GAME (Asian monsoon region). CEOP was designed as a pilot initiative to advance progress on the GHP scientific focus, which relates to assisting GEWEX to demonstrate skill in predicting variability in water resources and soil moisture on time scales up to seasonal and annual as an element of WCRP's prediction goals for the climate system. Implementation of CEOP was also prompted by the continued evolution of the current suite of operational meteorological satellites and the timing of a new generation of Earth observing satellites, as promoted by the Committee on Earth Observation Satellites (CEOS). Availability of these new tools, coupled with the progress being made by the individual GEWEX CSE's, in cooperation with their National Numerical Weather Prediction (NWP) Centers, provides an outstanding opportunity to derive a large potential benefit from a more coordinated observation period.

An initial set of invited speakers at the meeting included Drs Y. Furuhama (NASDA), N. Sato (JMA), S. Sorooshian (GEWEX-SSG), R. Stewart (GHP), B. Goodison (CliC), R. Mechoso (CLIVAR) and R. Lawford (GAPP and IGOS). Jointly, these speakers focused on the need for CEOP to develop within a broad international framework. There is a need to respond to the challenges and priorities that relate to variations

in the earth's water and energy budgets and the cycling rate of the hydrological cycle as posed by the International Panel on Climate Change (IPCC). To do this, an increase in the participation of the international scientific community is required and CEOP must collectively join with the components of WCRP, especially CLIVAR and CliC Projects along with the Working Group on Numerical Experimentation (WGNE) and the Working Group on Coupled Modeling (WGCM), to focus on the measurement, understanding and modeling of water and energy cycles within the climate system.

ACTIONS/RECOMMENDATIONS: CEOP was defined by the SSC as an element of WCRP, initiated by GEWEX. It was reaffirmed that as a part of the transition from its Phase I to Phase II strategy GEWEX provided the most viable framework for the continued planning and execution of CEOP as a part of WCRP. The **GEWEX-SSG Chairman** accepted action (**A1**) to ensure that CEOP will be integrated with the main GEWEX Phase II activities including its global data activities designed to provide a more complete description of the processes driving the global energy budget and water cycle along with development of related model improvements necessary to enable better representations of these processes and their prediction. The focus will be more on wet processes, greater exploitation of satellite data, and expanded efforts related to water resource applications.

Through its integration in Phase II of GEWEX CEOP will broaden its international participation and find greater consensus for activities by furthering cooperation with other elements of WCRP, including CLIVAR and CliC, as well as exposure to continuing of selected on-going data sets to provide overlap and context for the new series of satellites. Another element of the GEWEX Phase II strategy, from which CEOP can benefit and contribute are the efforts to establish the global transferability of the coupled land-atmospheric and cloud parameterization schemes.

By this method, the, NASA funded, International GEWEX Project Office (IGPO), will be able to assist the elements of the CEOP Coordination unit, to provide the necessary infrastructure to respond to the day to day needs for implementation of the CEOP action plan. The GEWEX SSG, with inputs from the other WCRP contributors to CEOP, will represent CEOP at the meetings of the Joint Scientific Committee (JSC) for WCRP.

1.3 CEOP links to Agencies

ISSUE/DISCUSSION: Following arguments presented by GEWEX to space agencies, during its first phase, significant steps have been made by space agencies to meet GEWEX needs for satellite data necessary to advance global climate studies in line with WCRP and GEWEX/CEOP objectives. CEOP has been timed to take account of the fact that data have begun to arrive from the first of the new series of earth system satellites. This group of satellites includes several, which have already been launched such as TERRA, TRMM, AQUA and ENVISAT, and others such as ADEOS II, Cloudsat and CALIPSO, which are planned. The operational satellites are also of critical importance to on-going and planned GEWEX initiatives.

ACTIONS/RECOMMENDATIONS: It was recommended that **WCRP** in concert with the **CEOP Science Steering Committee (SSC)** and the **CEOP Advisory Committee (CAC)** take the action (**A2**) to again **emphasize in a letter the importance of the continuity of the measurements from the suite of operational geostationary and polar orbiting satellites.** Furthermore, that they emphasize the need for funding Agencies to provide the on-going support required for the operational services to assist with free and open access of these measurements to the research community including funding for the collection, formatting and distribution of the data to meet specific research requirements such as those embodied in CEOP. The letter should recognize that the operational satellites together with the earth observing missions currently planned by NASA, ESA, NASDA and other national and international space agencies and climate research institutes, will provide the framework for the main thrust of CEOP as part of the second phase of GEWEX and, simultaneously, will fulfil several of the main requirements of WCRP as a whole.

2. CEOP SCIENCE STEERING COMMITTEE (SSC) DELIBERATIONS

Dr H. Grassl, SSC Chairman, convened a working session of the CEOP SSC to address a number of issues including establishing its own terms of reference; discussing the make-up and role of the CEOP Advisory Committee (CAC); finalizing the CEOP Data Policy statement; setting minimum standards for temporal sampling of CEOP Reference Site parameters, maximizing the science and technology benefits from CEOP, especially associated with setting a goal for delivery of a CEOP seasonal data product; providing inputs on the CEOP publications including the CEOP Brochure and other matters related to the efficient organization and management of CEOP to achieve the main science objectives.

2.1 SSC Terms of Reference

ISSUE/DISCUSSION: The SSC will work in concert with the CEOP Working Group Chairs to ensure adequate international representation is provided for in the activities of the WG's. The SSC will also assist with establishing priorities, setting milestones and integrating the work of the WG's. The SSC will work with the CEOP AC to raise the awareness of funding agencies in support of relevant CEOP science. Periodic reviews of CEOP science will be planned and undertaken by the CEOP SSC, these will take the form of teleconferences, brief meetings and broader CEOP Science Workshops.

ACTIONS/RECOMMENDATIONS: **Dr Grassl** agreed to undertake **action A3** to formalize the work on the SSC into a set of Terms of Reference (TOR). The **CEOP Coordination Function** will provide support to Dr Grassl to develop the SSC TOR and distribute them for review by **30 April 2002**.

2.2 Composition and Role of the CEOP Advisory Committee (AC)

ISSUE/DISCUSSION: It was confirmed that a CEOP AC was necessary and had a vital role to play in the further implementation of CEOP. The AC may be composed of as many as 20-30 members from Agencies, Universities and related climate research institutes and should have as its primary role the advocacy of funding support for the CEOP infrastructure and for initiatives of relevance to CEOP implementation, as prioritized by the CEOP SSC. The AC will work with the CEOP SSC to maintain oversight of CEOP implementation from the perspective of ensuring that CEOP becomes aware of new funding initiatives that are relevant to its science and technical goals and that links are made to allow CEOP to exploit such initiatives.

ACTIONS/RECOMMENDATIONS: To initiate the activation of the CEOP AC **Dr Koike**, accepted **action A4,** to **send a letter** to Dr Carson, the Director of WCRP, by **30 April 2002**, asking him to invite Drs Sumi and Kaye to become Co-Chairs of the CEOP AC. In due course, the Co-Chairs of the AC would be asked to develop the TOR for the AC and to nominate members to the AC. The nominees would be invited to participate through a separate letter from Dr Carson, to each of them, sent on behalf of the AC Co-Chairs. This process should be completed and the AC constituted by **1 July 2002**.

2.3 Revision of the CEOP Reference Site Data Policy

ISSUE/DISCUSSION: Drs Isemer and Williams, Co-Chairs of the CEOP Data Management Working Group (DMWG), with the support and input of all the CEOP Reference Site Spokespersons, had drafted The CEOP Reference Site Data Policy. The policy, based in a large part on the framework of the Data Policy established by the contributors to the Baseline Surface Radiation Network (BSRN) activity within WCRP and suggested for CEOP use by the BALTEX CSE participants, was reviewed and modified by the SSC. The revised version of the Policy was accepted by the participants at the meeting, with the exception of the MAGS Spokesperson, and has now been posted in final draft form on the CEOP Data Management Internet page http://www.joss.ucar.edu/ghp/ceopdm/. Specifically, the MAGS Spokesperson has so far not confirmed that the 15 months turn around period for category 2 data, is acceptable to MAGS researchers hence, the document remains designated as a "final draft".

ACTIONS/RECOMMENDATIONS: Dr **Goodison**, as MAGS Spokesperson at the meeting accepted **action A5** to clarify the data release criteria in the current version of the CEOP Reference Data Policy document and report his determination to Drs Isemer and Williams by **1 April 2002**. Control of both the satellite data and model output products will have to be incorporated into or added as addenda to the CEOP Reference Site Data Policy to form a complete CEOP Data Policy Document. **Drs Williams and Isemer** accepted **action A6** to extend work on this issue to include incorporation of inputs on both Satellite and Model data products into a single CEOP Data Policy Document. A draft of such a document should be ready by **mid-2002**.

2.4 Changes to the CEOP Brochure

ISSUE/DISCUSSION: Dr Yang with support from the IGPO distributed a draft of the CEOP Brochure for comment prior to the time of the meeting. It was felt that the Brochure had reached a significant level of sophistication and that Dr Yang was to be commended for his work on this important CEOP item. The SSC suggested a number of changes to the Brochure including: identification of additional reference sites, recognizing the value of the operational satellites, revising the caption on the front page and adding reference to activities of other elements of WCRP (e.g. CLIVAR's North American Monsoon Experiment 'NAME' and Monsoon Experiment South America 'MESA").

ACTIONS/RECOMMENDATIONS: Dr **Yang** accepted **action A7** to incorporate the changes and provide a final version for publication by **15 March 2002**. This action has been **closed**. The final version of the brochure is in publication and should be ready for distribution by the end of March 2002.

2.5 Temporal Resolution of CEOP Reference Site Data, Possible Minimum CEOP Reference Site Criteria and Contributions to CEOP by the GEWEX CSE's in Australia and Africa

ISSUE/DISCUSSION: The SSC was asked to determine what minimum temporal resolution should be applied in sampling of CEOP Reference Site data. It was decided that a one-hourly sample rate should be considered the minimum temporal limit for data to be collected and archived for CEOP applications. Any data taken at a higher resolution should be accepted and archived as appropriate.

ACTIONS/RECOMMENDATIONS: All **CSE Spokespersons and Reference Site managers** were asked to undertake **action A8** to make every attempt to meet the temporal limit of at least hourly samples of all of the parameters collected at their site for CEOP.

ISSUE/DISCUSSION: In the ensuing discussion, the issue was raised as to whether or not there was a need to establish criteria for the designation of a specific site to be a CEOP Reference site. A precedent for such criteria had been established in GEWEX for determining whether an experiment had reached a level of implementation sufficient for it to be designated as a GEWEX Continental Scale Experiment (CSE). This process was put in place to ensure that a specific experiment would contribute directly to the global objectives of GEWEX and, thereby, to the broader scientific goals of WCRP. Other experiments were welcomed to contribute to the global hydrometeorological science being undertaken in GEWEX for WCRP as affiliate experiments, if they were in a climatically interesting region and if they held the possibility of obtaining support to eventually raise their level of contribution to meet the full CSE status.

ACTIONS/RECOMMENDATIONS: The SSC asked **Drs Williams and Isemer,** Co-Chairs of the CEOP DMWG, to undertake **action A9**, to set a minimum standard definition for a CEOP Reference Site. The SSC will want to have such a minimum site policy established by at least **mid-2002**. **Benedict** will assist with this action by drafting for review, by the **end of April 2002**, a set of standards for sites, that are based on site contributions and noting that in all cases the SSC will reserve the right to review additions to the current list of 33 official CEOP sites. This action should be undertaken as the CEOP Reference Site Characteristics Table on the Internet reaches its nearly final disposition. It was noted that the subject Table can be found at: http://www.joss.ucar.edu/ghp/ceopdm/ under "CEOP Reference Site Station Characteristics", or directly at: http://www.joss.ucar.edu/ghp/ceopdm/rsite.html.

ISSUE/DISCUSSION: In a related matter, the issue of contributions of CEOP Reference Sites from each of the GEWEX CSE's was opened. It was noted that as a newly designated CSE a contribution to the CEOP Reference site list would be expected from within or near the Murray Darling (MD) Basin in Australia. Additionally, because the GEWEX Continental Scale Affiliate (CSA) Experiment, Couplage de l'Atmosphère Tropical et du Cycle Hydrologique (CATCH) was evolving toward full CSE status under the designation of the African Monsoon Multidisciplinary Analyses (AMMA) initiative, a formal contribution to CEOP reference site data collection was also to be expected from AMMA. It was noted that AMMA is explained in documentation available on the Internet at: http://medias.obs-mip.fr:8000/amma/english/index_en.html.

ACTIONS/RECOMMENDATIONS: The **GEWEX SSG Chairman** was asked to contact **Dr M. Manton**, as the MD Basin CSE Spokesperson, to obtain a formal response regarding a CEOP contribution from the MD initiative and to contact **Drs J. Polcher, T. Lebel and J.L. Redelsperger** for a similar formal response in regard to a reference site data contribution from CATCH/AMMA. These contacts are grouped under **action A10** and are to be completed by mid-July 2002.

2.6 Water Resources Issues at the World Summit on Sustainable Development (WSSD)

ISSUE/DISCUSSION: Material was provided that would be reviewed and negotiated for possible inclusion in documentation of the results of the World Summit on Sustainable Development (WSSD). An important element of this material, which is being considered a the PrepCom III meeting (25 March-5 April 2002, New York City, NY) is the statement on water resources and atmospheric and climate change, especially that: "…It is important to improve the accuracy of seasonal forecasting of monsoons and the understanding of the regional water cycle and promote regional cooperation in joint research on climate observation…". Another important part of the material is the statement that notes the need to: "…Assist developing countries to monitor and assess water resources quantity and quality, including development of water resources databases, including remote sensing and satellite data, and link data collection and mapping efforts, including development and application of relevant indicators." These statements were

introduced for consideration with the support of the Japanese delegations to these meetings and the participants at the meeting were asked to support the noted statements for inclusion in the final WSSD results documentation.

ACTIONS/RECOMMENDATIONS: The SSC asked **all participants** at the meeting to take action (**A11**) to support, through appropriate national channels, the inclusion of the noted statements as part of the results of the WSSD as they are negotiated at the PrepCom III meeting (25 March-5 April 2002, New York City, NY).

2.7 Endorsement of CEOP Seasonal Dataset

ISSUE/DISCUSSION: A discussion was had on whether or not to go forward with plans, as described in the CEOP Implementation Plan, to produce a 3-month dataset for the CEOP Initial Period (July through September 2001). The SSC concluded that the concept of such a dataset was valid as a pilot activity for the longer CEOP datasets planned later in the project.

ACTIONS/RECOMMENDATIONS: The **CEOP DMWG** accepted **action A12** to produce the CEOP seasonal dataset for the period 1 July to 1 October 2001 and to have it ready for release by **early 2003**.

3. CEOP DATA MANAGEMENT WORKING GROUP DELIBERATIONS

ISSUE/DISCUSSION: A great deal of additional information was made available concerning the characteristics of the CEOP reference sites at the meeting. This information is being placed in the CEOP Reference Site Table at: http://www.joss.ucar.edu/ghp/ceopdm/rsite.html.

Sufficient information was also exchanged to allow the drafting and endorsement of the CEOP Reference Site Data Access policy to accommodate the particular CEOP circumstances for collection, formatting, quality checking, and timely distribution of specific coordinated data products (See Item 2.3 above).

Work is also underway to take all the available information associated with the current Reference Site database and to describe the characteristics of a CEOP data set for the period July through September 2001 as endorsed by the SSC (See Item 2.7 above). An action plan was developed at the meeting that included all the necessary tasks to lead to the production and release of this CEOP Initial Period, Seasonal Dataset. This exercise should provide CEOP with the nature and quality of a strawman data set assembled from data that is available or which is expected to become available from, at least a subset of, the current set of reference sites, and that could be released, in due course, within the guidelines of a CEOP data accessibility policy.

ACTIONS/RECOMMENDATIONS: Following the deliberations of the CEOP DMWG the following **action plan (A13)** was presented by Drs **Williams and Isemer** and endorsed by the SSC and the other participants at the meeting.

(i) **CSE Spokespersons and individual reference site managers** will provide reference sites documentation and sample data to the CEOP Central Data Archive (CDA) at UCAR, through **Dr Williams**, by **15 April 2002**.

(ii) The CDA at UCAR, (**Dr Williams**) will compile the reference site information and sample data, and update the CDA website table by 15 May 2002.

(iii) In accordance with the agreement on resolution (hourly) and the decision to attempt to formulate minimum data requirements for CEOP Reference Sites, the **CDA** at UCAR will build a composite CEOP reference site data set by 30 June 2002.

(iv) The **CEOP Data Management WG** will review and evaluate technical issues associated with development of composite reference site data set by **30 September 2002**.

(v) The **CSE CEOP Spokespersons with individual reference site managers** will submit final reference site data for CEOP EOP-1 Dataset (1 July-1 October 2001) to the CDA before **January 2003**. Drs **Williams and Isemer** will track these submittals and provide the SSC with **monthly updates** as to their progress.

(vi) The **CDA** will produce/distribute the CEOP, EOP-1 Dataset by **end of first quarter of 2003**.

4. SATELLITE DATA INTEGRATION WORKING GROUP (SDIWG) DELIBERATIONS

The CEOP Satellite Data Integration Working Group has been organized and making progress on the satellite data integration issues for CEOP.

An activity under development by NASDA and the University of Tokyo (UT) was presented. It has been reconfirmed that a 500 tera-byte data archival system at UT will be available for the CEOP satellite data integration work. A scheme that utilizes the NASDA/UT capability for production and archiving of satellite data products for CEOP reference sites was presented as a three phased process.

It was also noted that NASDA has proposed that a CEOP CEOS Working Group on Information Systems and Services (WGISS) Test Facility (CEOP-WTF) be developed to assist with the derivation of CEOP special products from each satellite sensor.

Presentations were also made that demonstrated work being undertaking in relation to Land Data Assimilation System (LDAS) projects that are developing at both Continental and global (GLDAS) scales. These projects are expected to lead to more accurate reanalysis and forecast simulations by NWP models.

Finally, an action plan for moving forward with the main milestones to be undertaken by the CEOP Satellite Data Integration Working Group was developed at the meeting.

4.1 CEOP Satellite Data Integration Center Development, Archiving and Distribution Scheme

ISSUE/DISCUSSION: The plan presented for the CEOP Satellite Data Integration Center (SDIC) emphasized a three phased approach that began with small group of satellite instruments associated with a small number of CEOP reference sites located in Asia for the first phase with a larger number of instruments and sites (in Asia) for the second phase (2003) and a final phase with more instrument products associated with a globally distributed set of reference sites (2004). The system was demonstrated at the meeting. There was some concern expressed that this development process did not sufficiently recognize the requirements of the overall CEOP research community. It was suggested that satellite data for all of the reference sites should be made available at the same time. CEOP investigators who are looking forward to using these data sets will want access to the satellite data for sites in their regions prior to 2004. In addition, it was felt the development of the data system itself would benefit from additional exposure to international review and support. There is a large pool of intellectual resources and possible funding for work to exploit data from the new satellite data instruments that could be accessed in an internationally cooperative manner for the purpose of implementing such a large data system.

ACTIONS/RECOMMENDATIONS: A recommendation was made that the phased development process for the CEOP SDIC needed to be clarified. Dr **Koike** accepted **Action A14** to verify the schedule for the delivery of satellite data and if necessary to amend it to provide data for all reference sites simultaneously, or otherwise to revise the priority for providing data for an internationally distributed set of reference sites as appropriate to ensure access to these data sets by the broadest possible community of CEOP researchers. In conjunction with this action the actual development and demonstration of capabilities of the system should be examined to determine if it could not benefit from broader exposure to the international development and user community. Dr Koike agreed to respond to these concerns by the **end of May 2002**.

4.2 WGISS Test Facility (WTF) for CEOP

ISSUE/DISCUSSION: NASDA has requested that the CEOS Working Group on Information Systems and Services (WGISS) consider a proposal for implementing a WGISS Test Facility (WTF) for CEOP. It was determined that this proposal is now being coordinated with a similar proposal for a Satellite Calibration and Validation (Cal/Val) WTF. Both proposals have similar requirements. The participants at the meeting agreed that this seemed to be a good opportunity to ensure close cooperation between CEOP and the satellite Cal/Val community and recommended that the NASDA representatives to the WGISS further develop the proposal as appropriate. Dr Koike agreed to keep the CEOP SSC informed of progress on this topic and its impact on the CEOP satellite data collection and archiving process.

4.3 Global Land Data Assimilation Scheme (GLDAS) Application to CEOP

ISSUE/DISCUSSION: Plans for the Global Land Data Assimilation Scheme (GLDAS), were presented by Drs Houser, Bosilovich and Peters-Lidard from the NASA/GSFC in the USA. The project is planned during the CEOP timeframe with the goal of developing a 1/4 degree resolution, near-real time

GLDAS, which makes use of various new satellite- and ground-based observation systems within a land data assimilation framework, in order to produce optimal output fields of land surface states and fluxes. GLDAS will include four components Land modelling, land surface observation, and land surface data assimilation and calibration and validation. GLDAS is relevant to CEOP since the data have application in regional climate analysis, model initialization, and comparison with results from field campaigns and modeling experiments.

ACTIONS/RECOMMENDATIONS: A number of issues were raised in regard to the further development of GLDAS and its application in CEOP. To meet the global requirements of CEOP the current scheme needs to be expanded to include ocean/atmosphere components. There is an issue of the need for a central archive point from which the GLDAS data can be freely distributed. One proposal is that a NASA data center be used for that purpose, but this has not been confirmed. Since there will be a large amount of data generated by the GLDAS scheme the availability and funding for a large capacity computational facility is important. The actual resolution of the data to be provided is also an issue in terms of computational, storage and distribution tasks. These issues require further discussion and final resolution with respect to CEOP. Drs **Houser and Koike** as Co-Chairs of the Satellite Data Integration Working Group agreed to accept the action (**A15**) to continue to guide the GLDAS development process in a manner that gives priority consideration to the CEOP requirements for these products and to the issues raised by the participants at the meeting. The CEOP SSC asked to be kept informed of **progress on this action** at quarterly intervals the first report is due by the **end of May 2002**.

4.4 Satellite Data Integration Working Group Action Plan

ISSUE/DISCUSSION: A number of items and related milestones were address by the Satellite Data Integration Working Group during parallel WG sessions at the meeting. **Dr Jürgen Fischer** summarized these items, on behalf of Drs Koike and Houser, for consideration by the SSC and other participants at the meeting.

ACTIONS/RECOMMENDATIONS: Following the deliberations of the CEOP SDIWG a number of issues were raised that will require a more detailed action plan to be developed for their completion. Dr **Fischer** agreed to assist the **SDIWG Co-Chairs** in the action (**A16**) to further develop the plans for: Finalizing the definition of the satellite derived properties and defining of “CEOP” data format(s) in addition, to defining the related priority research areas to be undertaken as part of the application of the CEOP integrated satellite data products. These two efforts could possibly be completed by **30 September 2002.** Description of the algorithms which are applied to the CEOP integrated satellite data products is necessary with a definition of priority parameters that must be considered in the initial analyses of the CEOP integrated satellite data products. The SDIWG felt that those issues could be settled by **31 July 2003**. It was estimated that the first results of analyses with the CEOP integrated satellite data products for specific regions could possibly be available by **31 July 2003** and in conjunction with the initial analyses, clarification of access (Password protected, high speed link available for external users? etc.,) to the data could be settled and implemented by **30 September 2003**. These items require further discussion in the context with the CEOP reference data management scheme so that a single unified approach could be implemented for both data types. The SSC asked to be kept informed of progress on completion of the tasks outlined during the meeting.

5. MONSOON SYSTEMS WORKING GROUP DELIBERATIONS

ISSUE/DISCUSSION: A CEOP Monsoon Systems Working Group has been organized to address the accomplishment of one of the main CEOP aims associated with the documenting of the seasonal march of the monsoon systems, assessing the monsoon systems driving mechanisms, and investigating the possible physical connections between such systems. The specific issues related to these objectives, which are being defined and incorporated into the CEOP scientific strategy were addressed at the meeting.

The result of discussions included the initial definition of a CEOP Inter-monsoon Model Validation Project (CIMVP). The project was conceived to respond to the Sections 7.3.1 and 7.4 in the CEOP Implementation Plan. CIMVP will be an international research project to validate and assess the capabilities of climate models in simulating physical processes in monsoon regions around the world. The objectives are to provide better understanding of fundamental physical processes underpinning the diurnal to annual cycles in monsoon land and adjacent oceanic regions of Asia, Australia, North America, South America and Africa and to demonstrate the synergy and utility of CEOP integrated satellite data, in situ observations and assimilated data in providing a pathway for model physics evaluation and improvement.

The CIMVP research will be focused on the simulations of the most basic cycles i.e., the diurnal, intra-seasonal and annual cycles, in the climate system. Realistic simulations of these cycles are needed to evaluate and improve model physics and to increase reliability of regional climate simulations. Initially model integrations will be performed for summer and winter periods coinciding with EOP-1 and EOP-2. Various hydro-climate processes pertaining to the diurnal to annual cycles in the monsoon regions such as temperature, wind, rainfall, cloudiness, water vapor, surface heat fluxes and surface and subsurface soil wetness will be examined.

Detailed validations will be carried out in the CEOP reference sites, where detailed data with high temporal resolutions, as well as MOLTS are available. Aspects of intra-seasonal variability including onsets, active/break cycles and withdrawal processes, which are characteristic of the different monsoon regions, and possible teleconnections among them, will also be investigated. A data archive/distribution center will have to be associated with CIMVP.

ACTIONS/RECOMMENDATIONS: The SSC asked Drs **Lau** and **Yasunari**, as Co-Chairs of the CEOP Monsoon Systems Working Group, with assistance from Dr **Matsumoto**, to take action (**A17**) to move forward with the development of a specific action plan for accomplishing CIMVP including identification of participants, funding considerations, archival/distribution facilities and a detailed timeline. It was the desire of the SSC to have this activity plan completed by the **end of May 2002** and to have CIMVP underway by the **end of 2002**.

6. WATER AND ENERGY SIMULATION AND PREDICTION WORKING GROUP DELIBERATIONS

ISSUE/DISCUSSION: A CEOP Water and Energy Simulation and Prediction (WESP) Working Group has been organized to address the accomplishment of one of the main CEOP aims associated with the use of enhanced observations to better document and simulate water and energy fluxes and reservoirs over land on diurnal to annual temporal scales and to better predict these on temporal scales up to seasonal for water resource applications.

ACTIONS/RECOMMENDATIONS: Following the deliberations of the CEOP WESP-WG a number of issues were raised that will be undertaken or extended as contributions to CEOP in response to specific elements of the CEOP Implementation Plan. All of the proposed activities require more detailed action plans to be developed that focus on specific deliverables and timelines. The WG must also bridge the technical/scientific gap that was evident between the model based and process study oriented elements of the proposed initiatives. Drs **Roads and Marengo** as Co-Chairs of the WESP-WG, with assistance from Dr **Stewart**, Chair of the GEWEX Hydrometeorology Panel (GHP), were asked to take action (**A18**) to clarify these matters by the **end of May 2002**. The specific items noted at the meeting for consideration in this action are:

(i) Comparisons between NCEP reanalyze and the ARM reference sites using MOLTS Data from various NWP Centers applying the Climate Change Prediction Program (CCPP) -ARM GCM Analysis of Tendency Errors (CAGATE) Concept. (IP Sect. 6.1.1; Roads/Fiorino; Start mid-2002);

(ii) Diagnosis of HIRLAM weather prediction system, including comparison to the Cabauw, Lindenberg and Sodankyla reference sites in the framework of BALTEX. (IP Section 6.1.3.1; Fortelius at FMI, Start as CEOP Project by mid-2002);

(iii) Intercomparisons of different reference (vegetation/land use) sites in GAME-CEOP. (IP Section: 6.1.3.2 C. Cho/S. Korea, W. Dong and H. Liu/IAP-China, K. Yang/Tokyo). Start by mid-2002 as a GAME Phase II contribution to CEOP);

(iv) Intercomparisons of different reference (vegetation/land use) sites in LBA. (IP Sect: 6.1.3.4; J. Marengo, mid '02.);

(v) USA LDAS, GLDAS, Proposal to add ocean surface and atmosphere to be submitted as CEOP contribution by mid-2002: (IP Sect: 6.2.1; Houser);

(vi) Current activities focusing on analyses and comparisons between reanalyses and observations to be further expanded to encompass predictions of Water and Energy Budget variables to improve model physics including both regional and global climate models in the intercomparisons. (IP Section: 6.1; Stewart/Roads/Marengo to document/implement);

(vii) Plan and implement a WESP Workshop at a venue that is to be determined. (Roads/Stewart/Marengo to organize by the end of 2002);

7. CEOP SCHEDULE

The observation and data collection phase extends from 1 July 2001 to 31 December 2004 (See Figure 2). The implementation of this phase will be divided into four Enhanced Observing Periods (EOPs). The four periods are designed to start at a relatively low level for EOP-1 as an enhanced seasonal observing period focusing on a selected set of reference sites 1 July to 30 September 2001. EOP-2 from 1 October 2001 to 30 September 2002 will entail a coordinated "Build-up Period" in which CEOP participants begin to make contributions as their capability for model output and satellite data is implemented. The primary focus will be on the collective 2-year data set beginning with EOP-3 (1 October 2002-30 September 2003), which will cover the first of two annual cycles with emphasis on a data set suitable for a synoptic climatology case study. EOP-4 will cover the second annual cycle and beyond (1 October 2003-31 December 2004) with provisions for some intensive water and energy-cycle experiments using coordinated Intensive Observing Periods (IOPs) as part of the major activities. It was decided to extend the second annual cycle observing period to the end of 2004 to allow for analyses based on water-year as well as prediction/ forecasting year frameworks, i.e. seasonally based versus strictly calendar based periods.

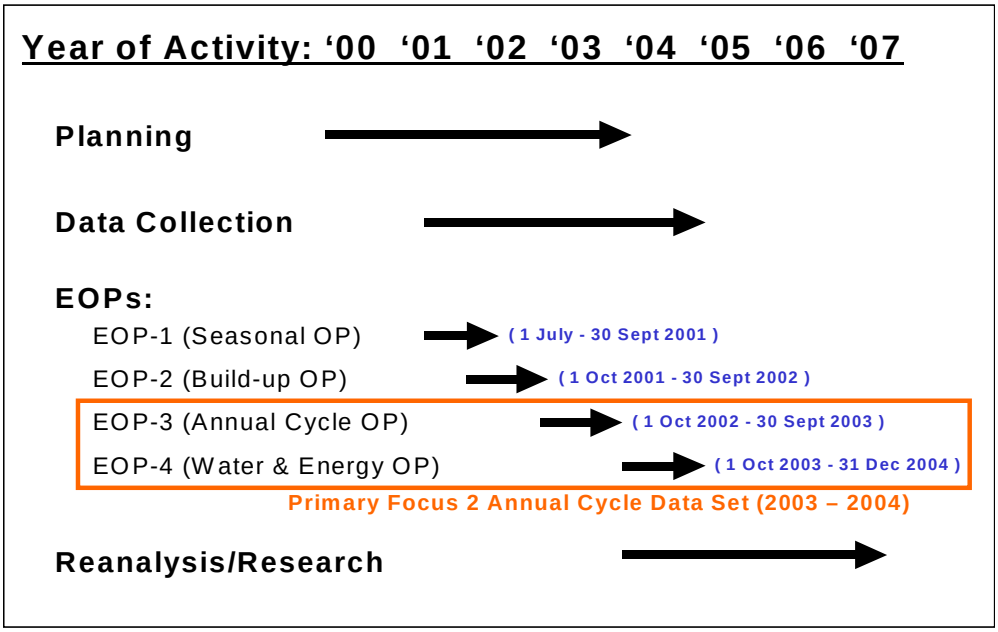

Figure 2 : CEOP Data Collection and Analysis Schedule

8. NEXT CEOP IMPLEMENTATION PLANNING MEETING (APRIL 2003)

The Second Formal CEOP Implementation Planning meeting will be held from 2-4 April 2003, in Berlin, Germany. The meeting is being planned by Drs Fischer and Grassl. Support of the meeting in various forms is expected from ESA, NASA, NASDA and WMO/WCRP and others.

APPENDIX A

List of Participants in the CEOP Kick-off meeting

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APPENDIX B

PROVISIONAL AGENDA AND EXPLANATORY MEMORANDUM FOR THE INITIAL INTERNATIONAL IMPLEMENTATION PLANNING MEETING FOR THE COORDINATED ENHANCED OBSERVING PERIOD (CEOP), A COMPONENT OF THE WORLD CLIMATE RESEARCH PROGRAMME (WCRP), GLOBAL ENERGY AND WATER CYCLE EXPERIMENT (GEWEX) ENDORSED BY THE COMMITTEE ON EARTH OBSERVATION SATELLITES (CEOS), INTEGRATED GLOBAL OBSERVERVING STRATEGY PARTNERS (IGOS-P)

NASDA/EORC, TOKYO, JAPAN, 6-8 MARCH 2002
(REV-2b, 6 March 2002)

Wednesday, 6 March 2002:

9.00 – 9.30 **REGISTRATION**

9.30 **1.** **OPENING OF SESSION AND OVERVIEW OF CEOP INTERNATIONAL FRAMEWORK**
(Remarks in this section should be held to 10-15 minutes)

1.1 Welcome from NASDA/EORC Hosting Organization Representative (Y. Furuhama)

1.2 Welcome from the JMA/NWP Department Representative (N. Sato)

1.2 Assessment/Perspective of CEOP as part of WCRP/GEWEX (S. Sorooshian, R. Stewart)

1.4 CEOP Associations with Other Elements of WCRP (B. Goodison, R. Mechoso, K. Puri)

1.5 CEOP as a contribution to the CEOS/IGOS-P Water Initiative (R. Lawford)

11.15 **BREAK**

11.30 2. CEOP INTRODUCTION/SCIENCE OVERVIEW BY CEOP LEAD SCIENTIST **(T. KOIKE)**

The CEOP Science Strategy and how it will be addressed at the meeting will be introduced. Satellite and *in situ* data Integration and assimilation topics will be introduced with model related issues. CEOP is seeking to achieve a database of common measurements from both in situ and satellite remote sensing measurements, as well as matching model output that includes Model Output Location Time Series (MOLTS) data along with four-dimensional data analyses (4DDA; including global and regional reanalyses) for a specified period. In this context, carefully selected reference stations are linked closely with the existing network of observing sites involved in the GEWEX Continental Scale Experiments (CSEs), which are distributed around the world.

12.15 **3.** **CEOP IMPLEMENTATION STRATEGY SUMMARY** (S. Benedict)

A key aspect of CEOP is to coordinate the regional observations by the different GEWEX Continental Scale Experiments (CSEs) that have been established within the framework of the GEWEX Hydrometeorology Panel (GHP) to facilitate global and transferability studies. The enhanced observations of sub-surface (soil), surface (radiation and precipitation), near surface (flux tower), atmospheric soundings (raob and profiler), and 3D (radar and aircraft) made at the CSE CEOP reference sites will provide CEOP with the basic resources necessary to achieve its main scientific objectives. The CEOP science objectives take into account the requirements of GEWEX, CLIVAR, and other WCRP core projects as well as the climate research community at large and the CEOP coordinated database will also serve numerical modeling and analysis needs.

Wednesday, 6 March 2002 - Continued

12.30 **LUNCH**

13.30 **4.** **CEOP DATA MANAGEMENT WORKING GROUP STRATEGY OVERVIEW/UPDATE**
(S. Williams/H-J Isemer)

A great deal of information has recently been made available concerning the characteristics of the CEOP reference sites. This information has been placed in the CEOP Reference Site Table at: http://www.joss.ucar.edu/ghp/ceopdm/rsite.html. Sufficient information has also now been obtained to allow a first draft version of a CEOP data access policy to accommodate the particular CEOP circumstances for collection, formatting, quality checking, and timely distribution of specific coordinated data products. Work is also underway to take all the available information associated with the current Reference Site database and to describe the characteristics of a CEOP data set for the period July through September 2001. This exercise should provide CEOP with the nature and quality of a strawman data set that might be able to be assembled from data that is available or which is expected to become available from, at least a subset of, the current set of reference sites, and that could be released, in due course, within the guidelines of a CEOP data accessibility policy.

14.00 **5.** **CSE/CEOP REFERENCE SITES BRIEFLY INTRODUCED**

(5 minutes is the maximum time allotted to each site introduction presentation)

A critical facet of CEOP is its data collection and organization to support advanced climate research. Of the three types of data (*in situ*, satellite and model output) that are the basis of CEOP, the *In situ* data gathered from the reference sites and reference hydrological basins from the CSE regions around the world is the most fundamental component of the CEOP strategy. The CEOP reference sites located in the six most comprehensive GEWEX CSEs namely, GAPP (Mississippi River Basin), BALTEX (Baltic Sea region), MAGS (Canadian Mackenzie River Basin), LBA (Amazon region), CAMP (Asian monsoon region) and CATCH (Western African Monsoon Region), are being provided, through Multi-National commitments, to improve the collective contribution of the CSEs to the global requirements of CEOP. Other candidate continental scale basin studies are also being considered from contributions to CEOP. Representatives will briefly introduce the sites in their regions:

- BALTEX (Grassl/Isemer/Tammelin/Poikonen/Others)
- MAGS (Stewart/Goodison)
- GAPP (Lawford/Williams)
- LBA (Marengo/Manzi/Horta/Carioca de Araujo)
- GAME/CAMP (Koike/Others)
- CATCH (TBD)
- OTHER CANDIDATE SITES (TBD)

15.30 **BREAK**

15.45 **5.** **CSE/CEOP REFERENCE SITES BRIEFLY INTRODUCED - CONTINUED**

(5 minutes is the maximum time allotted to each site introduction presentation)

Wednesday, 6 March 2002 - Continued

17.00 **6.** **CEOP WATER AND ENERGY SIMULATION AND PREDICTION STRATEGY OVERVIEW** (J. Marengo, R. Stewart, C. Fortelius, Others)

A CEOP Water and Energy Simulation and Prediction (C-WESP) Working Group has been organized. This Group plans to address the accomplishment of one of the main CEOP aims associated with the use of enhanced observations to better document and simulate water and energy fluxes and reservoirs over land on diurnal to annual temporal scales and to better predict these on temporal scales up to seasonal for water resource applications. Specific issues related to these objectives, which are being defined and incorporated into the CEOP scientific strategy will be addressed.

18.00 **ADJOURN**

Thursday, 7 March 2002:

9.30 **7.** **CEOP SATELLITE DATA INTEGRATION STRATEGY OVERVIEW** (T. Koike, J. Fischer, P. Houser and M. Bosilovich will present by remote telecon/cast, Others)

A CEOP Satellite Data Integration (CSDIN) Working Group has been organized and is making progress on the satellite data integration activity under development by NASDA and the University of Tokyo (UT). It has been reconfirmed that a 500 tera-byte data archival system at UT will be available for the CEOP satellite data integration work. NASDA has also proposed that a CEOP CEOS/WGISS Test Facility (CEOP-WTF) be developed to assist with the derivation of CEOP special products from each satellite sensor. Groups are undertaking Land Data Assimilation System (LDAS) projects that are developing at both Continental and global (GLDAS) scales. These projects are expected to lead to more accurate reanalysis and forecast simulations by NWP models.

10.30 **8.** **CEOP MONSOON SYSTEMS STRATEGY OVERVIEW** (T. Yasunari, W. Lau, R. Mechoso, Others)

A CEOP Monsoon Systems (CMONS) Working Group has been organized. - This Group plans to address the accomplishment of one of the main CEOP aims associated with the documenting of the seasonal march of the monsoon systems, assessing the monsoon systems driving mechanisms, and investigating the possible physical connections between such systems. - The specific issues related to these objectives, which are being defined and incorporated into the CEOP scientific strategy will be addressed. Others,

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11.00 **BREAK**

11.15 **8.** **CEOP MONSOON SYSTEMS STRATEGY OVERVIEW** (T. Yasunari, W. Lau, R. Mechoso, Others) - Continued

11.45 **9.** **ORGANIZATION OF CEOP PARALLEL WORKING GROUP SESSIONS ON OBSERVATIONS AND RESEARCH** (All Participants)

Parallel working sessions will be set up in Plenary to address specific implementation issues associated with the main CEOP Implementation Working Group topics. Participants can divide between the groups as they wish and may “float” between sessions if their interests are shared across the defined topics.

Thursday, 7 March 2002- Continued

12.15 **LUNCH**

13.15 **10. MEETING OF CEOP WORKING GROUPS IN PARALLEL SESSIONS**

Two sessions are planned:

10.1 CEOP Data Management and Satellite Data Integration Working Groups Session (Williams-Chair, Isemer/Fischer- Correspondents)

This session will address the main issues associated with the CEOP Implementation Working Groups on Satellite Data Integration and Data Management. Presentations will be made as necessary and the Chair and Correspondents will organize the group to respond to at least the following topics:

(i) Data Collection (CEOP Reference Site Table update process)
(ii) Data Quality Assurance/Control
(iii) Data Policy (including Data Availability, Data Archive/Flow, etc.)
(iv) Composite/Coordinated Dataset Definition (minimum parameter set)
(v) Possible additional Satellite Validation Sites
(vi) WGISS Test Facility (WTF) Definition/Applicability
(vii) Satellite data product requirements associated with reference sites

10.2 CEOP Water and Energy Simulation and Prediction (WESP) and Monsoon Systems Working Groups Session (Yasunari/Lau, Co-Chairs, Mechoso/Fortelius-Correspondents)

This session will address the main issues associated with the CEOP Implementation Working Groups on Water and Energy Simulation and Prediction and Monsoon Systems. Presentations will be made as necessary and the Chair and the Correspondents will organize the group to respond to at least the following topics:

(i) Temporal scale issues (diurnal through Interannual)
(ii) Spacial scale issues (local through Global)
(iii) Intercomparison of model products and their application to error analyses
(iv) Data (observational) Requirements

15.30 **BREAK**

15.45 **10.3** Plenary Session (All Participants)

The Chairs/Correspondents of each of the Groups will be given 60 minutes to report out on the results of the parallel sessions to all participants including time for open discussion on the outcomes of their deliberations.

18.00 **ADJOURN**

Friday, 8 March 2002:

9.30 **11. PLENARY SESSION TO ADDRESS SPECIAL REPORTS AS REQUIRED**

This session will provide time for further technical reports at least two reports are anticipated:

11.1 CEOP Model Data Strategy (J. Roads)

CEOP should provide a wealth of data to enable extensive testing of atmospheric model parametrizations, and have urged NWP and Climate modeling centers to consider how to take advantage of the opportunities provided. At the same time a request has been made by WCRP of these Centers for their help and participation in CEOP through the provision to the international research community of some of their global and regional analyses and model predictions (if possible) of water and energy cycle processes over the proposed CEOP period. In particular, CEOP has requested high temporal resolution time-series output referred to as Model Output Location Time Series or MOLTS at specified individual sites and gridded output in both three- and two-dimensional forms processed as synoptic snapshots at a minimum of six-hourly intervals.

11.2 A Possible CEOP Contribution to Improvement of Climate Model Parameterizations (M. Fiorino)

CEOP will contribute to improvement of climate model parameterizations. By contributing to work that looks at errors between model runs in a forecast mode and the observations this goal may be achieved. The Climate Change Prediction Program (CCPP)/ARM GCM Analysis of Tendency Errors (CAGATE) project is undertaking to extend comparison of climate models with the instantaneous state of the atmosphere to the global scale. This work depends on improvements that have been made in the assimilation of observations by the major NWP centers that could provide the community with an improved analysis that may be an excellent observational data source for most of the Earth. CEOP data products may be useful to evaluate model parameterizations on short time scales.

10.30 **12. CONVENING OF CEOP SCIENCE STEERING COMMITTEE (SSC)** (H. Grassl)

Dr H. Grassl will convene a breakout session of the CEOP SSC to address at least the following issues:

(i) Maximizing the Science and Technology Benefits from CEOP
(ii) Framework for Oversight of CEOP Science Implementation Plans/Results
(iii) Specific recommendations for efficient organization and management of CEOP to achieve the main science objectives
(iv) Objectives and Plans for possible CEOP Science Workshop in 2002.

(NOTE: Sessions of the two other Working Groups may take place in parallel with the SSC breakout session as required)

11.15 **BREAK**

11.45 **13. CONTINUATION OF SSC BREAKOUT AND PARALLEL WORKING GROUP SESSIONS AS REQUIRED OR MEET IN PLENARY**

12.30 **LUNCH**

Friday, 8 March 2002-Continued

13.30 **14.** **FINAL PLENARY**

15.30 **BREAK**

16.00 **14.** **FINAL PLENARY (CONTINUED AS REQUIRED)**

ADJOURN

APPENDIX C

List of Acronyms

Acronym	Standard Name
AC	**A**dvisory **C**ommittee
ADEOS II	**Ad**vanced **E**arth **O**bserving **S**atellite-II
AMMA	**A**frica **M**onsoon **M**ultidisciplinary **A**nalyses
AQUA	NASA Earth Observing System (EOS) Platform
ARM	**A**tmospheric **R**adiation **M**easurement
BALTEX	**Balt**ic Sea **Ex**periment
CAC	**C**EOP **A**dvisory **C**ommittee
CAGATE	**C**CPP **A**RM **G**CM **A**nalysis of **T**endency **E**rrors
CALIPSO	**C**loud **A**erosol **L**idar and **I**nfrared **P**athfinder **S**atellite **O**bservations
CATCH	**C**ouplage de l'**A**tmosphere **T**ropical et du **C**ycle **H**ydrologique
CCPP	**C**limate **C**hanges **P**rediction **P**rogram
CDA	**C**entral **D**ata **A**rchive
CEOP	**C**oordinated **E**nhanced **O**bserving **P**eriod
CEOS	**C**ommittee on **E**arth **O**bservation **S**atellites
CIMVP	**C**EOP **I**nter-monsoon **M**odel **V**alidation **P**roject
CliC	**Cli**mate and **C**ryosphere
CLIVAR	**Cli**mate **Var**iability and Predictability
CSA	**C**ontinental **S**cale **A**ffiliate
CSE	**C**ontinental-**S**cale **E**xperiment
CSE's	**C**ontinental-**S**cale **E**xperiment**s**
CWG's	**C**EOP **W**orking **G**roup**s**
DMWG	**D**ata **M**anagement **W**orking **G**roup
ENVISAT	**ENVI**ronment **SAT**ellite
EOP-1	**E**nhanced **O**bserving **P**eriod-Phase **1**
EORC	**E**arth **O**bservation **R**esearch **C**enter
ESA	**E**uropean **S**pace **A**gency
FMI	**F**innish **M**eteorological **I**nstitute
GAME	**G**EWEX **A**sian **M**onsoon **E**xperiment
GAPP	**G**EWEX **A**mericas **P**rediction **P**roject
GCIP	**G**EWEX **C**ontinental-scale **I**nternational **P**roject
GEWEX	**G**lobal **E**nergy and **W**ater Cycle **Ex**periment
GHP	**G**EWEX **H**ydrometeorology **P**anel
GLDAS	**G**lobal **L**and **D**ata **A**ssimilation **S**cheme
GLDAS	Global Land Data Assimilation System
HIRLAM	**H**igh **R**esolution **L**imited **A**rea **M**odel
IGOS	**I**nternational **G**lobal **O**bserving **S**trategy
IGOS-P	**I**nternational **G**lobal **O**bserving **S**trategy **P**artnership
IGPO	**I**nternational **G**EWEX **P**roject **O**ffice
IGWCO	**I**ntegrated **G**lobal **W**ater **C**ycle **O**bservations
IPCC	**I**ntergovernmental **P**anel on **C**limate **C**hange
JMA	**J**apan **M**eteorological **A**gency
JSC	**J**oint **S**cientific **C**ommittee
LBA	**L**arge Scale **Bi**osphere-Atmosphere Experiment in **A**mazonia
LDAS	**L**and **D**ata **A**ssimilation **S**ystem

Acronym	Standard Name
MAGS	**M**ackenzie **G**EWEX **S**tudy
MD	**M**urray **D**arling
MESA	**M**onsoon **E**xperiment **S**outh **A**merica
MOLTS	**M**odel **O**utput **L**ocation **T**ime **S**eries
NAME	**N**orth **A**merican **M**onsoon **E**xperiment
NASA	**N**ational **A**eronautics and **S**pace **A**dministration
NASDA	**Na**tional **S**pace **D**evelopment **A**gency
NCEP	**N**ational **C**enters for **E**nvironmental **P**rediction
NWP	**N**ational **N**umerical **W**eather **P**rediction
NWP	**N**umerical **W**eather **P**rediction
SDIC	**S**atellite **D**ata **I**ntegration **C**enter
SDIWG	**S**atellite **D**ata **I**ntegration **W**orking **G**roup
SSG	**S**cience **S**teering **C**ommittee
TERRA	Name Selected for EOS-AMI Spacecraft
TOR	**T**erms **o**f **R**eference
TRMM	**T**ropical **R**ainfall Measurement **M**ission
UCAR	**U**niversity **C**orporation for **A**tmospheric **R**esearch
UT	**U**niversity of **T**okyo
WCRP	**W**orld **C**limate **R**esearch **P**rogramme
WESP	**W**ater and **E**nergy **S**imulation and **P**rediction
WGCM	**W**orking **G**roup on **C**oupled **M**odeling
WGISS	**W**orking **G**roup on **I**nformation **S**ystems and **S**ervices
WGNE	**W**orking **G**roup on **N**umerical **E**xperimentation
WG's	**W**orking **G**roup**s**
WSSD	**W**orld **S**ummit on **S**ustainable **D**evelopment
WTF	**W**GISS **T**est **F**acility

APPENDIX D

SUMMARY OF ACTIONS/RECOMMENDATIONS
FROM THE COORDINATED ENHANCED OBSERVING PERIOD (CEOP)
IMPLEMENTATION PLANNING KICK-OFF MEETING
6-8 March 2002, Tokyo, Japan
Final Draft, 27 July 2002

Please see below a summary of actions from the subject meeting, excerpted from the main report, **referenced to the item numbers in the report** and identified by **action numbers A1-A18**.

Item No.

1.2 WCRP/GEWEX Strategy and Goals relevant to CEOP

It was reaffirmed that as a part of the transition from its Phase I to Phase II strategy GEWEX provided the most viable framework for the continued planning and execution of CEOP as a part of WCRP. The **GEWEX-SSG Chairman** accepted action (**A1**) to **ensure that CEOP will be integrated with the main GEWEX Phase II activities** including its global data activities designed to provide a more complete description of the processes driving the global energy budget and water cycle along with development of related model improvements necessary to enable better representations of these processes and their prediction. The focus will be more on wet processes, greater exploitation of satellite data, and expanded efforts related to water resource applications.

1.3 CEOP links to Agencies

It was recommended that **WCRP** in concert with the **CEOP Science Steering Committee (SSC)** and the **CEOP Advisory Committee (CAC)** take the action (**A2**) to again **emphasize in a letter the importance of the continuity of the measurements from the suite of operational geostationary and polar orbiting satellites.**

2.1 SSC Terms of Reference

Dr Grassl agreed to undertake **action A3** to formalize the work on the SSC into a set of Terms of Reference (TOR). The **CEOP Coordination Function** will provide support to Dr Grassl to develop the SSC TOR and distribute them for review by **30 April 2002**.

2.2 Composition and Role of the CEOP Advisory Committee (AC)

To initiate the activation of the CEOP AC **Dr Koike**, accepted **action A4,** to **send a letter** to Dr Carson, the Director of WCRP, by **30 April 2002**, asking him to invite Dr's Sumi and Kaye to become Co-Chairs of the CEOP AC. In due course, the Co-Chairs of the AC would be asked to develop the TOR for the AC and to nominate members to the AC. The nominees would be invited to participate through a separate letter from Dr Carson, to each of them, sent on behalf of the AC Co-Chairs. This process should be completed and the AC constituted by **1 July 2002**.

2.3 Revision of the CEOP Reference Site Data Policy

(i) Control of both the satellite data and model output products will have to be incorporated into or added as addenda to the CEOP Reference Site Data Policy to form a complete CEOP Data Policy Document. **Drs Williams and Isemer** accepted **action A6** to extend work on this issue to include incorporation of inputs on both Satellite and Model data products into a single CEOP Data Policy Document. A draft of such a document should be ready by **mid-2002**.

(ii) Dr **Goodison**, as MAGS Spokesperson at the meeting accepted **action A5** to clarify the data release criteria in the current version of the CEOP Reference Data Policy document and report his determination to Drs Isemer and Williams by **1 April 2002**.

2.4 Changes to the CEOP Brochure

Dr **Yang** accepted **action A7** to incorporate the changes and provide a final version for publication by **15 March 2002**. This action has been **closed**. The final version of the brochure is in publication and should be ready for distribution by the end of March 2002.

2.5 Temporal Resolution of CEOP Reference Site Data, Possible Minimum CEOP Reference Site Criteria and Contributions to CEOP by the GEWEX CSE's in Australia and Africa

The SSC was asked to determine what minimum temporal resolution should be applied in sampling of CEOP Reference Site data. All **CSE Spokespersons and Reference Site managers** were asked to undertake **action A8** to make every attempt to meet the temporal limit of at least hourly samples of all of the parameters collected at their site for CEOP.

In the ensuing discussion, the issue was raised as to whether or not there was a need to establish criteria for the designation of a specific site to be a CEOP Reference site. The SSC asked **Drs Williams and Isemer**, Co-Chairs of the CEOP DMWG, to undertake **action A9,** to set a minimum standard definition for a CEOP Reference Site. The SSC will want to have such a minimum site policy established by at least **mid-2002**. **Benedict** will assist with this action by drafting for review, by the **end of April 2002**, a set of standards for sites, that are based on site contributions and noting that in all cases the SSC will reserve the right to review additions to the current list of 33 official CEOP sites.

In a related matter, the issue of contributions of CEOP Reference Sites from each of the GEWEX CSE's was opened. The **GEWEX SSG Chairman** was asked to contact **Dr M. Manton**, as the MD Basin CSE Spokesperson, to obtain a formal response regarding a CEOP contribution from the MD initiative and to contact **Drs J. Polcher, T. Lebel and J-L Redelsperger** for a similar formal response in regard to a reference site data contribution from CATCH/AMMA. These contacts are grouped under **action A10** and are to be completed by mid-July 2002.

2.6 Water Resources Issues at the World Summit on Sustainable Development (WSSD)

Material was provided that would be reviewed and negotiated for possible inclusion in documentation of the results of the World Summit on Sustainable Development (WSSD). An important element of this material, which is being considered a the PrepCom III meeting (25 March-5 April 2002, New York City, NY) is the statement on water resources and atmospheric and climate change including wording on assistance to developing countries to monitor and assess all aspects of water resources. The SSC asked all participants at the meeting to take action (**A11**) to support, through appropriate national channels, the inclusion of the statements on water resources and atmospheric and climate change as part of the results of the WSSD as they are negotiated at the PrepCom III meeting (25 March-5 April 2002, New York City, NY).

2.8 Endorsement of CEOP Seasonal Dataset

A discussion was had on whether or not to go forward with plans, as described in the CEOP Implementation Plan, to produce a 3-month dataset for the CEOP Initial Period (July through September 2001). The SSC concluded that the concept of such a dataset was valid as a pilot activity for the longer CEOP datasets planned later in the project. The **CEOP DMWG** accepted **action A12** to produce the CEOP seasonal dataset for the period 1 July to 1 October 2001 and to have it ready for release by **early 2003**.

3. CEOP DATA MANAGEMENT WORKING GROUP DELIBERATIONS

A great deal of additional information was made available concerning the characteristics of the CEOP reference sites at the meeting. Following the deliberations of the CEOP DMWG the following **action plan (A13)** was presented by Drs **Williams and Isemer** and endorsed by the SSC and the other participants at the meeting.

(i) **CSE Spokespersons and individual reference site managers** will provide reference sites documentation and sample data to the CEOP Central Data Archive (CDA) at UCAR, through **Dr Williams**, by **15 April 2002**.

(ii) The CDA at UCAR, (**Dr Williams**) will compile the reference site information and sample data, and update the CDA website table by 15 May 2002.

(iii) In accordance with the agreement on resolution (hourly) and the decision to attempt to formulate minimum data requirements for CEOP Reference Sites, the **CDA** at UCAR will build a composite CEOP reference site data set by 30 June 2002.

(iv) The **CEOP Data Management WG** will review and evaluate technical issues associated with development of composite reference site data set by **30 September 2002**.

(v) The **CSE CEOP Spokespersons with individual reference site managers** will submit final reference site data for CEOP EOP-1 Dataset (1 July-1 October 2001) to the CDA before **January 2003**.

(vi) The **CDA** will produce/distribute the CEOP, EOP-1 Dataset by **end of first quarter of 2003**.

4.2 CEOP Satellite Data Integration Center Development, Archiving and Distribution Scheme

The plan presented for the CEOP Satellite Data Integration Center (SDIC) emphasized a three-phased approach.

A recommendation was made that the phased development process for the CEOP SDIC needed to be clarified. Dr **Koike** accepted **Action A14** to verify the schedule for the delivery of satellite data and if necessary to amend it to include requirements for receipt of regional datasets from other Space Agencies that would allow the provision to provide data for all reference sites simultaneously, or to allow for an internationally distributed set of reference sites as appropriate to ensure access to these data sets by the broadest possible community of CEOP researchers. In conjunction with this action the actual development and demonstration of capabilities of the system should be examined to determine if it could not benefit from broader exposure to the international development and user community. Dr Koike agreed to respond to these concerns by the **end of May 2002**.

4.2 WGISS Test Facility (WTF) for CEOP

NASDA has requested that the CEOS Working Group on Information Systems and Services (WGISS) consider a proposal for implementing a WGISS Test Facility (WTF) for CEOP. It was determined that this proposal is now being coordinated with a similar proposal for a Satellite Calibration and Validation (Cal/Val) WTF. Both proposals have similar requirements. The participants at the meeting agreed that this seemed to be a good opportunity to ensure close cooperation between CEOP and the satellite Cal/Val community and recommended that the NASDA representatives to the WGISS further develop the proposal as appropriate. Dr Koike agreed to keep the CEOP SSC informed of progress on this topic and its impact on the CEOP satellite data collection and archiving process.

4.3 Global Land Data Assimilation Scheme (GLDAS) Application to CEOP

Plans for the Global Land Data Assimilation Scheme (GLDAS), were presented by Drs Houser, Bosilovich and Peters-Lidard from the NASA/GSFC in the USA. A number of issues were raised in regard to the further development of GLDAS and its application in CEOP. Drs **Houser and Koike** as Co-Chairs of the Satellite Data Integration Working Group agreed to accept the action (**A15**) to continue to guide the GLDAS development process in a manner that gives priority consideration to the CEOP requirements for these products and to the issues raised by the participants at the meeting. The CEOP SSC asked to be kept informed of **progress on this action** at regular quarterly intervals with the first update on the matter due by the **end of May 2002**.

4.5 Satellite Data Integration Working Group Action Plan

A number of items and related milestones were address by the Satellite Data Integration Working Group during parallel WG sessions at the meeting. Dr Jürgen Fischer summarized these items, on behalf of Drs Koike and Houser, for consideration by the SSC and other participants at the meeting. Following the deliberations of the CEOP SDIWG a number of issues were raised that will require a more detailed action plan to be developed for their completion. Dr **Fischer** agreed to assist the **SDIWG Co-Chairs** in the action (**A16**) to further develop the plans for: Finalizing the definition of the satellite derived properties and defining of “CEOP” data format(s) in addition, to defining the related priority research areas to be undertaken as part of the application of the CEOP integrated satellite data products. These two efforts could possibly be completed by **30 September 2002.** Description of the algorithms which are applied to the CEOP integrated satellite data products is necessary with a definition of priority parameters that must be considered in the initial analyses of the CEOP integrated satellite data products. The SDIWG felt that those issues could be settled by **31 July 2003**. It was estimated that the first results of analyses with the CEOP integrated satellite data products for specific regions could possibly be available by **31 July 2003** and in conjunction with the initial analyses, clarification of access (Password protected, high speed link available for external users?,

etc.,) to the data could be settled and implemented by **30 September 2003**. These items require further discussion in the context with the CEOP reference data management scheme so that a single unified approach could be implemented for both data types. The SSC asked to be kept informed of progress on completion of the tasks outlined during the meeting.

5. MONSOON SYSTEMS WORKING GROUP DELIBERATIONS

A CEOP Monsoon Systems Working Group has been organized to address the accomplishment of one of the main CEOP aims associated with the documenting of the seasonal march of the monsoon systems. The result of discussions included the initial definition of a CEOP Inter-monsoon Model Validation Project (CIMVP). The project was conceived to respond to the Sections 7.3.1 and 7.4 in the CEOP Implementation Plan. The SSC asked Drs **Lau** and **Yasunari**, as Co-Chairs of the CEOP Monsoon Systems Working Group, with assistance from Dr **Matsumoto**, to take action (**A17**) to move forward with the development of a specific action plan for accomplishing CIMVP including identification of participants, funding considerations, archival/distribution facilities and a detailed timeline. It was the desire of the SSC to have this activity plan completed by the **end of May 2002** and to have CIMVP underway by the **end of 2002**.

6. WATER AND ENERGY SIMULATION AND PREDICTION (WESP) WORKING GROUP DELIBERATIONS

A CEOP Water and Energy Simulation and Prediction (WESP) Working Group has been organized to address the accomplishment of one of the main CEOP aims. Following the deliberations of the CEOP WESP-WG a number of issues were raised that will be undertaken or extended as contributions to CEOP in response to specific elements of the CEOP Implementation Plan. All of the proposed activities require more detailed action plans to be developed that focus on specific deliverables and timelines. The WG must also bridge the technical/scientific gap that was evident between the model based and process study oriented elements of the proposed initiatives. Drs **Roads and Marengo** as Co-Chairs of the WESP-WG, with assistance from Dr **Stewart**, Chair of the GEWEX Hydrometeorology Panel (GHP), were asked to take action (**A18**) to clarify these matters by the **end of May 2002**. The specific items noted at the meeting for consideration in this action are:

(i) Comparisons between NCEP reanalysis and the ARM reference sites using MOLTS Data from various NWP Centers applying the Climate Change Prediction Program (CCPP) -ARM GCM Analysis of Tendency Errors (CAGATE) Concept. (IP Sect. 6.1.1; Roads/Fiorino; Start mid-2002).

(ii) Diagnosis of HIRLAM weather prediction system, including comparison to Cabauw, Lindenberg and Sodankyla reference sites in the framework of BALTEX. (IP Section 6.1.3.1; Fortelius at FMI, Start as CEOP Project by mid-2002)

(iii) Intercomparisons of different reference (vegetation/land use) sites in GAME-CEOP. (IP Section: 6.1.3.2 C. Cho/S. Korea, W. Dong and H. Liu/IAP-China, K. Yang/Tokyo). Start by mid-2002 as a GAME Phase II contribution to CEOP)

(iv) Intercomparisons of different reference (vegetation/land use) sites in LBA. (IP Sect: 6.1.3.4; J. Marengo, mid '02.)

(v) USA LDAS, GLDAS, Proposal to add ocean surface and atmosphere to be submitted as CEOP contribution by mid-2002: (IP Sect: 6.2.1; Houser)

(vi) Current activities focusing on analyses and comparisons between reanalyses and observations to be further expanded to encompass predictions of Water and Energy Budget variables to improve model physics including both regional and global climate models in the intercomparisons. (IP Section: 6.1; Stewart/Roads/Marengo to document/implement).

(vii) Plan and implement a WESP Workshop at time and venue to be determined. (Roads/Stewart/Marengo to organize by the end of 2002).

APPENDIX E

EXECUTIVE SUMMARY OF CEOP IMPLEMENTATION PLANNING MEETING (6-8 MARCH 2002, TOKYO JAPAN) FINAL DRAFT, 27 JULY 2002

The Coordinated Enhanced Observing Period (CEOP) was initially motivated by the World Climate Research Programme (WCRP) Global Energy and Water Cycle Experiment (GEWEX) international efforts focusing on the measurement, understanding and modeling of water and energy cycles within the climate system. The requirements of GEWEX, the Climate Variability and Predictability (CLIVAR) initiative, the Climate and Cryosphere (CliC) Project and the other WCRP core projects as well as the climate research community at large have been taken fully into account in planning the assembly of a co-ordinated data set that will serve numerical modeling and analyses needs. Plans are for CEOP to assist research into the global atmospheric circulation and changes in water resources. CEOP has gained the interest of other international organizations outside of the WCRP community, as evidenced by the proposal for an Integrated Global Water Cycle Observations (IGWCO) theme within the framework of the International Global Observing Strategy Partnership (IGOS-P), which has re-affirmed CEOP as 'the first element of the IGWCO'. IGOS is a partnership between international bodies concerned with global environmental issues, including, among others, space agencies belonging to the Committee on Earth Observation Satellites (CEOS).

Professor T. Koike, the Lead Scientist for CEOP, on behalf of Dr David Carson, Director of WCRP and Dr Soroosh Sorooshian, Chairman of the GEWEX Scientific Steering Committee (SSG), arranged for the initial launching meeting of the formal CEOP implementation process to be held at the Earth Observation Research Center (EORC) of the National Space Development Agency (NASDA), in Tokyo, Japan, from 6-8 March 2002. More specifics about CEOP and the Kick-off meeting can be found through the CEOP Internet site: http://monsoon.t.u-tokyo.ac.jp/ceop/. Each of the main items associated with the action plans developed at the meeting is referenced to the CEOP Implementation Plan. The Plan, which was finalized following recommendations formulated at a CEOP Implementation Workshop held at the Goddard Space Flight Center (GSFC) in March 2001, was published in May 2001 and can be found at: http://www.gewex.com/ceop/ceop_ip.pdf.

The CEOP Schedule has an observation and data collection phase from 1 July 2001 to 31 December 2004, which overlaps with an analysis phase. The implementation of the observational phase will be divided into four Enhanced Observing Periods (EOPs). The four periods are designed to start at a relatively low level for EOP-1 as an enhanced seasonal observing period focusing on a selected set of reference sites 1 July to 30 September 2001. EOP-2 from 1 October 2001 to 30 September 2002 will entail a coordinated "Buildup Period" in which CEOP participants begin to make contributions as their capability for model output and satellite data is implemented. The primary focus will be on the collective 2-year data set beginning with EOP-3 (1 October 2002-30 September 2003), which will cover the first of two annual cycles with emphasis on a data set suitable for a synoptic climatology case study. EOP-4 will cover the second annual cycle and beyond (1 October 2003-31 December 2004) with provisions for some intensive water and energy-cycle experiments using coordinated Intensive Observing Periods (IOPs) as part of the major activities. It was decided to extend the second annual cycle observing period to the end of 2004 to allow for analyses within water year as well as prediction/forecasting (e.g. calendar) year frameworks.

Dr H. Grassl, SSC Chairman, convened a working session of the CEOP SSC to address a number of issues including establishing its own terms of reference; discussing the make-up and role of the CEOP Advisory Committee (CAC); finalizing the CEOP Data Policy statement; setting minimum standards for temporal sampling of CEOP Reference Site parameters, maximizing the science and technology benefits from CEOP, especially associated with setting a goal for delivery of a CEOP seasonal data product; providing inputs on the CEOP publications including the CEOP Brochure and other matters related to the efficient organization and management of CEOP to achieve the main science objectives.

A great deal of additional information was made available concerning the characteristics of the CEOP reference sites at the meeting. This information is being placed in the CEOP Reference Site Table at: http://www.joss.ucar.edu/ghp/ceopdm/rsite.html. Drs Isemer and Williams, Co-Chairs of the CEOP Data Management Working Group (DMWG), with the support and input of all the CEOP Reference Site Spokespersons, had drafted The CEOP Reference Site Data Policy. The policy, based to a large degree on the framework of the Data Policy established by the contributors to the Baseline Surface Radiation Network (BSRN) activity within WCRP and suggested for CEOP use by the BALTEX CSE participants, was reviewed and modified by the SSC. The revised version of the Policy was accepted by the participants at the meeting, with the exception of the MAGS Spokesperson, and has now been posted in final draft form on the CEOP Data Management Internet page http://www.joss.ucar.edu/ghp/ceopdm/.

The following action plan for the Data Management Working Group was endorsed by the SSC and the other participants at the meeting.

(i) CSE Spokespersons and individual reference site managers will provide reference sites documentation and sample data to the CEOP Central Data Archive (CDA) at UCAR, through Dr Williams, by 15 April 2002.
(ii) The CDA at UCAR, (Dr Williams) will compile the reference site information and sample data, and update the CDA website table by 15 May 2002.
(iii) In accordance with the agreement on resolution (hourly) and the decision to attempt to formulate minimum data requirements for CEOP Reference Sites, the CDA at UCAR will build a composite CEOP reference site data set by 30 June 2002.
(iv) The CEOP Data Management WG will review and evaluate technical issues associated with development of composite reference site data set by 30 September 2002.
(v) The CSE CEOP Spokespersons with individual reference site managers will submit final reference site data for CEOP EOP-1 Dataset (1 July-1 October 2001) to the CDA before January 2003.
(vi) The CDA will produce/distribute the CEOP, EOP-1 Dataset by end of first quarter of 2003.

The CEOP Satellite Data Integration Working Group has been organized and making progress on the satellite data integration issues for CEOP. An activity under development by NASDA and the University of Tokyo (UT) was presented. It has been reconfirmed that a 500 tera-byte data archival system at UT will be available for the CEOP satellite data integration work. A scheme that utilizes the NASDA/UT capability for production and archiving of satellite data products for CEOP reference sites was presented as a three phased process. It was also noted that NASDA has proposed that a CEOP CEOS Working Group on Information Systems and Services (WGISS) Test Facility (CEOP-WTF) be developed to assist with the derivation of CEOP special products from each satellite sensor. Presentations were also made that demonstrated work being undertaking in relation to Land Data Assimilation System (LDAS) projects that are developing at both Continental and global (GLDAS) scales. These projects are expected to lead to more accurate reanalysis and forecast simulations by NWP models. Finally, an action plan for moving forward with the main milestones to be undertaken by the CEOP Satellite Data Integration Working Group was developed at the meeting.

A CEOP Monsoon Systems Working Group has been organized to address the accomplishment of one of the main CEOP aims associated with the documenting of the seasonal march of the monsoon systems, assessing the monsoon systems driving mechanisms, and investigating the possible physical connections between such systems. The specific issues related to these objectives, which are being defined and incorporated into the CEOP scientific strategy were addressed at the meeting. The result of discussions included the initial definition of a CEOP Inter-monsoon Model Validation Project (CIMVP). The project was conceived to respond to the Sections 7.3.1 and 7.4 in the CEOP Implementation Plan. CIMVP will be an international research project to validate and assess the capabilities of climate models in simulating physical processes in monsoon regions around the world. The objectives are to provide better understanding of fundamental physical processes underpinning the diurnal to annual cycles in monsoon land and adjacent oceanic regions of Asia, Australia, North America, South America and Africa and to demonstrate the synergy and utility of CEOP integrated satellite data, in situ observations and assimilated data in providing a pathway for model physics evaluation and improvement. Drs Lau and Yasunari, as Co-Chairs of the CEOP Monsoon Systems Working Group will take action to move forward with the development of a specific action plan for accomplishing CIMVP including identification of participants, funding considerations, archival/distribution facilities and a detailed timeline.

A CEOP Water and Energy Simulation and Prediction (WESP) Working Group has been organized to address the accomplishment of one of the main CEOP aims associated with the use of enhanced observations to better document and simulate water and energy fluxes and reservoirs over land on diurnal to annual temporal scales and to better predict these on temporal scales up to seasonal for water resource applications. Drs Roads and Marengo as Co-Chairs of the WESP-WG will take action to clarify these matters by the end of May 2002. The specific items noted at the meeting for consideration in this action are:

(i) Comparisons between NCEP reanalyzes and the ARM reference sites using MOLTS Data from various NWP Centers applying the Climate Change Prediction Program (CCPP) -ARM GCM Analysis of Tendency Errors (CAGATE) Concept.
(ii) Diagnosis of HIRLAM weather prediction system, including comparison to Cabauw and Lindenberg Sodankyla reference sites in the framework of BALTEX.
(iii) Intercomparisons of different reference (vegetation/land use) sites in GAME-CEOP.
(iv) Intercomparisons of different reference (vegetation/land use) sites in LBA.

(v) USA LDAS, GLDAS, Proposal to add ocean surface and atmosphere to be submitted as CEOP contribution by mid-2002:
(vi) Current activities focusing on analyses and comparisons between reanalyses and observations to be further expanded to encompass predictions of Water and Energy Budget variables to improve model physics including both regional and global climate models in the intercomparisons.
(vii) Plan and implement a WESP Workshop

The Second Formal CEOP Implementation Planning meeting will be held from 2-4 April 2003, in Berlin, Germany. The meeting is being planned by Drs Fischer and Grassl. Support of the meeting in various forms is expected from ESA, NASA, NASDA and WMO/WCRP and others.

Through the assistance of the CEOP Coordination Office in Tokyo, all of the presentations at the meeting, as referenced in the body of the full meeting report be accessed on the Internet at: http://monsoon.t.u-tokyo.ac.jp/ceop/meeting/kickoff/presentation/index.htm by clicking on the presenters name.