

**NOTES FROM THE SECOND FORMAL COORDINATED ENERGY AND WATER-CYCLE  
OBSERVATIONS PROJECT (CEOP) TELECONFERENCE ON EUROPE-NEESPI-AFRICA REGIONAL  
HYDROCLIMATE PROJECTS AND REFERENCE SITE ISSUES HELD ON  
16 JUNE 2009  
First DRAFT, 13 July 2009**

## 1. INTRODUCTION

The 2<sup>nd</sup> Europe-NEESPI-Africa RHP and Reference Sites Teleconference related to the Coordinated Energy and Water-Cycle Observations Project (CEOP) took place on Tuesday 16 June 2009 at 13:00 UTC.

The issues that were discussed on the subject conference call included:

- (i) Plans for the 3<sup>rd</sup> CEOP Annual Meeting at Melbourne, Australia from 19-21 August 2009;
- (ii) Current status of the CEOP Reference Site Data Archive with focus on the sites located in Europe and Africa;
- (iii) BALTEX RHP status and issues;
- (iv) Initiation of HyMeX as CEOP/GEWEX RHP, status and issues;
- (v) Europe Reference Sites status and issues.

### Participants

The participants were:

Toshio Koike	Tokyo, Japan, CEOP Co-Chair & representing JMA
Sam Benedict	San Diego, California, USA; CEOP International Coordination Function
Steve Williams	Boulder, Colorado, USA; Representing CEOP Data Management
Frank Beyrich	Lindenberg, Germany, BALTEX Lindenberg site representative. Will also report on Cabauw in place of Fred Bosveld and on BALTEX for Hans-Joerg Isemer.
Esko Kyrö	Finland; FMI/Sodankylä representative
Philippe Drobinski	(HyMeX, Representatives)
Pasha Groisman	(NEESPI RHP representative)

Drs Hans-Joerg Isemer (Representing BALTEX RHP and CEOP Data Management), Gaye (Representing AMMA RHP,) Bosveld BALTEX Cabauw site representative, Wrench UK, Chilbolton site representative all responded to the announcement but were not available for the call.

## 2. NEXT CONFERENCE CALL

The next, 3<sup>rd</sup> CEOP Europe-NEESPI-Africa RHP and Reference Sites Teleconference is proposed to take place on **Tuesday 22 September 2009, at 13:00 UTC, which is a change from the previously announced date of 29 September 2009 noted in the CEOP Calls Calendar Revision 3.** Please see the attached latest version (Rev-4) of the CEOP Calendar for the latest listing of dates for future CEOP Conference Calls. **Benedict** has the **action (A1)** to inform the group of the details of the next call nearer to the time of the call.

## 3. CEOP AND CEOP DATA GROUP GENERAL ISSUES

### 3.1 Opening

(3.1a) It was noted that CEOP overview and background material including plans for Third CEOP Annual meeting in Melbourne, Australia, 19 – 21 August 2009 is available for reference through the CEOP home page at: <http://monsoon.t.u-tokyo.ac.jp/ceop2/publications.html#calls>.

**Koike and Stewart** (CEOP Co-Chairs) have agreed that the Framework for the 3<sup>rd</sup> CEOP Annual Meeting (19-21 August 2009) would be based on the concept of the development of CEOP Synthesis Paper(s) for publication after the meeting. This concept is expected to enable participants to prepare/submit material in advance using a standardized format/outline suggested for such Publications. An initial outline provided earlier has been expanded on so that it now has the following form and topics:

**Coordinated Hydrometeorological Research: Progress and Plans of the Coordinated Energy and Water-Cycle Observations Project (CEOP)**  
(Rev 2: June 27 2009)

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(I) **General/Comprehensive**

1. Introduction (background, objectives, strategy) 2. Datasets and data integration (model, observations) 3. Science Progress (regional to particular themes and global perspectives) 4. Implications (models, remote sensing, monitoring, climate change) 5. Concluding Remarks (the problem, progress, plans)

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(II) **Special Topic: Regional Climate Foci**

1. Introduction of each science/ implementation strategy including target areas, durations, data, and models/ initial achievements 2. Contributions by RPHs/ Science Cross Cuts/ Data Management Group (Reference sites, satellites, model outputs)/ Modeling Group 3. Synthesis and Outstanding Issues 4. Concluding Remarks

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(III) **Special Topic 2: Science Cross Cuts**

1. Introduction of each science/ implementation strategy including target areas, durations, data, and models/ initial achievements 2. Contributions by RPHs/ Regional Climate Foci/ Data Management Group (Reference sites, satellites, model outputs)/ Modeling Group 3. Synthesis and Outstanding Issues 4. Concluding Remarks

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(IV) **Special Topic 3: Model Integration**

1. Introduction of each science/ implementation strategy including target areas, durations, data, and models/ initial achievements 2. Contributions by RPHs/ Regional Climate Foci/ Science Cross Cuts/ Data Management Group (Reference sites, satellites, model outputs) 3. Synthesis and Outstanding Issues 4. Concluding Remarks

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This scheme will allow presentations/discussions and breakout groups at the meeting to be based on CEOP Synthesis Paper(s) Contributions per the topics noted in the outline for the Paper(s). At the end of the meeting the final synthesis of the material presented could be accomplished and the Paper(s) prepared for publication in an appropriate journal(s) or related technical periodical.

(3.1b) Participants were advised that information on the the GEWEX/iLEAPS conferences, which take place at Melbourne, Australia (24-29 August 2009) the week following the CEOP Third Annual meeting is available at the Conference website: [http://www.gewex.org/2009gewex\\_ileaps\\_conf.html](http://www.gewex.org/2009gewex_ileaps_conf.html).

#### **4. RHP and Reference Site Reports**

As part of the initial discussion during this part of the Call, **Koike** reiterated that per our earlier agreement **1 January 2007 had been designated as the start date for the resumption of the CEOP Reference Site Data generation process. The period from 1 January 2007 to at least the sunset dates for GEWEX and CEOP at the end of 2013 will represent the formal investigative element of the Project.** Backfilling for 2005-2006 data is desirable if technical, financial and manpower resources of respective providers allow executing of this extension of the formal commitment. In addition, it was pointed out that it was highly desirable to submit **missing data for Phase 1** (September 2002 – December 2004) and the site representatives were asked for their kind attention to this matter.

##### **4.1 BALTEX RHP report**

(4.1a) Isemer sent a written report in response to an action from the previous call, which required an update on the latest developments of the BALTEX RHP. In specific the written report relates to a 10-year precipitation BALTEX Radar Network (BALTRAD) dataset that is available at the BATEX Radar Data Center (BRDC) (<http://produkter.smhi.se/brdc/>). A particular question was raised about whether or not BALTRAD also provided solid precipitation observation. The paper, which clarifies this matter is enclosed as Attachment 1 (see item 4.2 for more discussion on the topic of solid precipitation data).

(4.1b) The Group was told that the BALTEX SSG had recently fixed the date and location of the forthcoming international BALTEX conference as follows:

6th Study Conference on BALTEX  
14 to 18 June 2010

Miedzyzdroje, Island of Wolin, Poland (<http://en.wikipedia.org/wiki/Wolin>)

The conference venue is the Hotel Amber Baltic: at <http://www.hotel-amber-baltic.pl/en/home/>

The 1st formal announcement for the Conference is planned to be issued before the end of June.

#### 4.2 CEOP/CliC Solid Precipitation Dataset Initiative

**Koike** reported on a special effort being undertaken in CEOP to produce a well calibrated solid precipitation dataset in cooperation with CliC. The work is progressing with good success and will continue using CEOP northern latitude reference site data with data from CliC sites. This effort incorporates the use of a unique scheme for adjusting biases and otherwise ensuring the quality of the data to produce a high quality database that has point and gridded data at regional to global scales for improved snow hydrology studies.

**Groisman** remarked that both the Canadians and Russians have been working in this field for a number of years and that, in addition, the WMO has undertaken an solid precipitation initiative with its members to intercompare solid precipitation datasets and work toward standardization of solid precipitation measurements. Data from NEESPI reference sites is being used in these studies. The concern was that the CEOP/CliC initiative did not duplicate any work already accomplished by these other studies. **Koike** noted that the CEOP/CliC effort is aware of the work by others in this area including the Canadians, Russians and WMO and is considering the work by these groups in their initiative. Koike further agreed to accept an **action (A2)** to keep the Participants informed of the progress in the CEOP/CliC initiative and to ensure that this effort does not duplicate work already accomplished by other past and on-going studies.

**Williams** also mentioned that a survey regarding CEOP sites and their collection of solid precipitation data had been sent out by the CEOP DM group in the past and the results had been compiled and were available at the CEOP DM web page. **Williams** also indicated that his DM group was ready to assist with any further requests to CEOP sites regarding the need for any additional solid precipitation data.

#### 4.3 Summary status of the reference site archive at NCAR/EOL

**Benedict** pointed out that **all the participants** have the **action (A3)** to consider three main issues that need to be complete relative to their submittal of CEOP in-situ reference site data for archiving at NCAR/EOL. These items are (i) submission of missing data for the Phase 1 period (October 2002 – December 2004) – this applies for sites that participated in Phase 1; (ii) submissions for the transition period January 2005 – December 2006; and (iii) submissions for the current phase of CEOP, i.e. January 2007 – December 2011. The action is to, as much as possible, complete data submissions for all three periods in order to obtain a long data series that is critical for many CEOP and other energy and water cycle related studies. **The site representatives** were asked to undertake to meet such a commitment especially to provide the technical, financial and manpower resources needed to submit the data for the transition period 2005 – 2006.

#### 4.4 BALTEX: Lindenberg by Frank Beyrich

BALTEX Lindenberg has submitted revised SFC and TWR data for 2004-2006 and new data for all of 2007. The revisions dealt with minor corrections of the old data. The new data had included wind profiler data with a new calibration scheme applied. FLX and STM data have also been submitted for 2007 except for soil profile data from both the grassland and the forest station data. In each case the 2008 data are expected to be completed by the start of the third quarter of 2009. There will be a field project at Lindenberg during this summer that will be undertaken for research purposes. At this time it is believe that the data from this project will be of value to CEOP. This issue may be revisited at the Melbourne Meeting or at the next conference call with this group.

#### 4.5 BALTEX: Cabauw by Frank Beyrich for Frank Bosveld

**Beyrich** has submitted revised SFC and TWR data for 2005 and 2006. These data are going through a Q&A check before being put on line. The 2007 data will be submitted soon.

#### 4.6 BALTEX: Sodankylä by Esko Kyro

(4.6a) **Kyro** gave a brief summary of the situation at Sodankyla. It was reiterated that in terms of points of contact for Sodankylä **Bengt, Tarja and Reijo** are now engaged in other activities and should be removed from the CEOP mailing list as far as the work on CEOP data sets at the site goes. Instead Kyro, Ryyppo and Kivi should be noted as the Sodankyla CEOP data Team.

(4.6b) In response to an earlier request the data after Dec 31 2004 has essentially all been identified. However, since the Mast at Sodankylä is not a single project but an infrastructure used by several projects there are still some remaining issues. For example, there seems to be some gaps in the data due to instrument updates, server crashes and related incidents. Additional work is required to find these problems and correct them. That work is now underway but will continue to take time to resolve. **Kyro** was asked to undertake **action A4** to follow-up on this work and report its progress to the group by the time of the August meeting. In this context, **Kyro** also accepted action A4a to review and modify or augment as necessary all the meta data from Sodankylä that is currently at the CEOP DM Web Page.

(4.6c) Data formatting methods have been rechecked and in the process it has been determined that the old data was essentially manually formatted and flagged using just excel spreadsheets. For this reason the old data from Sodankylä is quite scant with only one altitude of meteorological data (48 m) and with some flux and soil parameters missing as well as other shortcomings. In order to meet the need for several years of continuous data starting at the beginning of 2005 it will be necessary to automate the process in order to be able to submit even the most basic dataset. The goal has been set to develop an automated scheme at Sodankylä as a means of not only handling the data currently identified but to provide the possibility to provide an even more complete data output.

(4.6d) **Ryyppo**, working as a Graduate Student, has been identified to assist with the development of the automated data scheme noted in item (4.6c) above. This work should start in earnest in August 2009. The group felt that this was an important development and expressed their thanks to Kyro and the other members of the Sodankylä Team working on CEOP data matters. The new plan provides the basis for an optimistic outlook on obtaining a fully complete FMI CEOP dataset. This would be a noteworthy milestone to be achieved in CEOP efforts to make available the most complete and consistent dataset to the climate research community.

#### 4.7 HyMeX (HYdrological cycle in the Mediterranean Experiment) by Philippe Drobinski

**Drobinski** advised the group that this proposed GEWEX/CEOP Regional Hydroclimate Project (RHP) is described in detail in the HyMeX White Book at the HyMeX Web Page <http://www.cnrm.meteo.fr/hymex/>. The effort is a major experimental program aiming at a better quantification and understanding of the hydrological cycle and related processes in the Mediterranean, with emphases put on high-impact weather events and regional impacts of the global change including those on ecosystems and the human activities.

A letter formally applying to GEWEX/WCRP to have HyMeX become a GEWEX/CEOP RHP was received by GEWEX and a copy of the letter was sent to everyone in this CEOP working group. The letter was provided earlier for review and comment. The Participants including the CEOP Co-Chairs have seen the letter and the HyMeX White book and have unanimously concurred with concept of having HyMeX join the GEWEX/CEOP RHP infrastructure.

(4.7a) The **CEOP Co-Chairs and the International Coordination Function have the action (A7)** to work with the HyMeX Representatives to ensure all the GEWEX/CEOP RHP criteria are met for HyMeX to meet its obligations to become a fully functioning part of the CEOP RHP International Framework. This action is to be completed in time for **an appropriate recommendation to be made to the GEWEX SSG**, on the question of the HyMeX application for involvement in CEOP as an RHP, prior to the SSG's 2010 meeting.

(4.7b) **Drobinski** explained that the HyMeX strategy includes the set-up of hydrometeorological sites for long term observation, that can fulfil the requested criteria to become GEWEX CEOP in-situ reference site or basin. This emphasis will be coupled with a series of coordinated observation periods expected to take place during the 2010-2020 time-window. They will be based on measurement campaigns, the deployment of dedicated instrumentation, and the enhancement of existing operational systems. A comprehensive description of the HyMeX underlying science is provided by the project white-book which is available from their web page referenced above. The first version of the HyMeX International Science and implementation Plan is expected by the end of 2009.

(4.7c) One issue of concern to the HyMeX representative was the CEOP data collection period. The overall concept was reiterated by **Koike** as noted in item 4. The main points are that:

(i) **1 January 2007 had been designated as the start date for the resumption of the CEOP Reference Site Data generation process. Therefore, the period from 1 January 2007 to at least the sunset dates for GEWEX and CEOP at the end of 2013 will represent the formal investigative element of the Project.**

(ii) because Phase 1 of the Coordinated Enhanced Observing Period had initiated Enhanced Observing Periods (EOPs) beginning in 2002 up to 1 January 2005 it would be highly desirable to submit **missing data for Phase 1** (September 2002 – December 2004).

(iii) to make the longest consistent dataset possible for research purposes, backfilling for 2005-2006 data is encouraged.

(4.7d) Another matter that was discussed at the time of the call was associated with the HyMeX reference sites that would contribute to CEOP. The items discussed included that CEOP needs:

(i) a list of reference sites with data collected at each site,

(ii) the exact Latitude and longitude of each site,

(iii) Model Output Location Time Series (MOLTS) output at each of the reference observing sites in the list requested in (ii) above Working with the NWP Center(s) associated with the HyMeX sites (per the GEWEX criteria for becoming an RHP), this output should be augmented in each case with MOLTS output at several (4 or more) model grid points surrounding each given reference site (250km sq). The purpose of the surrounding sites is to allow: a) averaging to reduce sampling noise; b) some assessment of the uncertainty; and c) a posteriori computation of advective terms.

**Williams, Benedict and Koike took action A7a, to work with Drobinski** on details related to data policy, site locations, data categories, data formats, MOLTS output, and other CEOP Data Management details. Specific's associated with these details are expected to be reported by the time of the CEOP 3<sup>rd</sup> Annual meeting in Melbourne, Australia (19-21 August, 2009).

#### 4.8 Chilbolton by Charles Wrench

A written input was received from **Wrench**, who could not participate in the call. **Wrench** has agreed to focus on preparing a Chilbolton site documentation file (**action A8**). **Williams** has provided **Wrench** with a link to the Lindenberg site description to provide a template for the Chilbolton documentation file. An initial file is expected to be completed by the **end of July** with other details to be filled out in due course.

Data continues to be collected at the Chilbolton Facility for Atmospheric and Radio Research (CFARR); that data is quality assured and archived at the British Atmospheric Data Centre (BADC). An overview of the CFARR data that we currently archive on the BADC is provided on the following web page: <http://badc.nerc.ac.uk/data/chilbolton/?source=dbrowser>

To add to that, Wrench reported that, Chilbolton has recently installed a number of other 24/7 instruments from which data will soon be made available to the BADC.

These include:

- Sonic anemometer & CO<sub>2</sub>/ H<sub>2</sub>O probe
- 1.5 micron Co/Cx polarisation Doppler Lidar
- 355nm polarisation lidar
- Soil heat flux plates
- Net Flux radiometer

In addition, Chilbolton also has:

- a CIMEL Sun Photometer providing aerosol optical depth and particle size directly to AERONET.

- a 5m tower that is not instrumented at present. (Our meteorological measurements are collected near to the ground.)
- multiple rain rate and rain drop measuring instruments.

#### 4.9 AMMA: discussion

**Koike** informed the group that the 3<sup>rd</sup> International **AMMA Conference** will be held in **Ouagadougou, Burkina Faso**, from **20 – 24 July 2009** (conference webpage: [http://www.amma-international.org/rubrique.php3?id\\_rubrique=1](http://www.amma-international.org/rubrique.php3?id_rubrique=1)). **Koike** will attend the AMMA Conference in Ouagadougou, Burkina Faso. Cooperation between AMMA and CEOP will be discussed with the AMMA representatives there and especially CEOP access to AMMA reference site data for uploading to the CEOP reference site data archive.

#### 4.10 NEESPI: by Pasha Groisman

No data has been received from any NEESPI reference site. Groisman reported that there is a large borehole initiative being undertaken at cold region (perma-frost) NEESPI sites. Over 130 such sites were sampled in Russia in 2007, 50 more in Mongolia and over 190 in Alaska.

Groisman agreed to help in the identification of CEOP suitable reference sites in NEESPI and to assist with getting them to submit data in the CEOP format in a timely manner (**action A9**). Some result from this action is expected by the time of the CEOP 3<sup>rd</sup> annual meeting at Melbourne Australia 19-21 August 2009.

## 5. OTHER ISSUES

### CEOP Home Page and Satellite Data Gateway

It was reiterated that the CEOP Home Page had been released and was available at: <http://www.ceop.net> or directly at <http://monsoon.t.u-tokyo.ac.jp/ceop2/>.

It was also mentioned that the CEOP Satellite Data Gateway had been opened for public. It is available at: <http://monsoon.t.u-tokyo.ac.jp/ceop2/satellite/>. **Williams** voiced that the link to the Gateway was posted on the Data Management website.

## 6. CLOSING

**Koike** acknowledged the participants for attending the call and providing their valuable contributions, comments and suggestions.

### ATTACHMENT 1:

#### **Information on the Baltrad Network in the Baltic Sea Basin By Jarmo Koistinen (FMI) and Daniel Michelson (SMHI)**

C-band (~5.5 GHz) weather radars detect snowfall (and at short ranges ice clouds) very well. The practical problem is that with a conventional single polarization radar we are not aware of the water phase of hydrometeors in each radar measurement "point" or bin (actually a small volume called contribution volume). Thus in the signal processors of weather radars the conversion from the measured quantity, effective radar reflectivity factor ( $Z_e$ ), to precipitation intensity ( $R$ ) is performed assuming that the scatterers are everywhere either liquid (rain) or solid (snow).

For example in the BALTEX radar data center (BRDC) products rain is assumed during the entire year. We are presently unable to distinguish among different precipitation phases in the network products. Individual radars can do this but we don't have access to the data. The RR products are gauge-adjusted anyway which minimizes the bias against gauge observations (see below).

As you can imagine such a crude assumption can occasionally introduce a bias of +/- 6.5 dB in the measured  $Z_e$  (less in  $R$ ). However, BRDC products have been adjusted on daily basis with rain gauge amounts and thus we expect that systematic biases have been mostly removed. Still one might expect 1-3 dB errors varying randomly in time and space. Occasionally also Swedish radars suffer of severe ground clutter in some regions. BRDC products are rather good if you are interested in the semi-quantitative

momentarily occurrence of precipitation in time and space or in quantitative amounts integrated over larger spatial areas during periods of 6-24 h.

The new generation of weather radars, just emerging into operational networks, is equipped with polarization diversity. With this capability it is rather easy to distinguish between rain, melting snow and dry snow. Unfortunately even this is not a final solution for accurate measurements in time and space as the measurement geometry of radars on the surface of the spherical Earth is such that at long ranges (~ 100-250 km from radar) the measurement bin is typically located at altitudes 1-3 km above ground level. Therefore e.g. in Northern Europe it is quite common during spring and autumn that the measurement location is in snow whereas rain is prevailing at ground level.

To overcome the vertical sampling problem (to get ground estimates of  $Z_e$ ) you should apply a correction due to the vertical profile of reflectivity (VPR) or a distance-dependant gauge adjustment. In order to obtain the correct water phase at ground level we have applied at FMI an independent surface analysis of temperature and relative humidity at the height of 2 m. Applying a statistical dependence between the water phase and those two quantities we use here a variable  $R(Z_e)$  conversion which depends on the actual time-space distribution of water phase at ground level.

One way to overcome the phase problem related to snow is to select cases which are definitely snow (temperature below 0 deg C) everywhere. Even in those cases it is recommendable to integrate in time (3-24 hours) to get better surface estimates as at longer ranges snow flakes easily drift horizontally 10-100 km between the radar measurement bin and the ground.

In a national project we will calculate radar based daily precipitation accumulation maps (1 Jan 2006 - 31 May 2009) in a limited area (perhaps 150 x 150 km<sup>2</sup>) at the CEOP site Sodankylä. In these products it will be also analyzed which was the fraction of dry snow, wet snow and rain of the total daily accumulation at each grid point, respectively.

The data from BRDC (link from the BALTEX website) is available after you register there.