NOTES FROM THE FIRST FORMAL COORDINATED ENERGY AND WATER-CYCLE OBSERVATIONS PROJECT (CEOP) TELECONFERENCE ON AMERICAS REGIONAL HYDROCLIMATE PROJECTS AND REFERENCE SITE ISSUES HELD ON 9 DECEMBER 2008
Final DRAFT, 26 March 2009

1. INTRODUCTION

The 1st Americas RHP and Reference Sites Teleconference related to the Coordinated Energy and Water-Cycle Observations Project (CEOP) took place on Tuesday 9 December 2008 at 20:00 UTC.

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

(i) CEOP Strategic Implementation Plan (SIP) and reference site data requirements related to the CEOP Science Strategy;
(ii) CEOP and CEOP Data element coordination strategy – conference call scheme;
(iii) Outcomes of the Second CEOP Annual Meeting in Geneva and the planning of the Third Annual Meeting in Melbourne, Australia, 19 – 21 August 2009;
(iv) Current status of the CEOP Reference Site Data Archive with focus on the sites located in the Americas region;
(v) Americas RHP status and issues;
(vi) Americas Reference Sites status and issues: Phase 1 missing data and current phase submission plans;

Participants
The participants were:

Toshio Koike	Tokyo, Japan, CEOP Co-Chair & representing JMA
Steve Williams	Boulder, Colorado, USA; Representing CEOP Data Management
Scot Loehrer	Boulder, Colorado, USA; CEOP Reference Site Data Archive manager)
Hugo Berbery	Maryland, USA; LPB RHP Co-Chair
Tilden Meyers	Oak Ridge, Tennessee, CPPA site manager
Alessandro Araujo	Manaus, Brazil; LBA representative
Luiz Horta	Cachoeira Paulista; LBA reference site data manager
Julio Tota	(Manaus, Brazil; Representing LBA Reference Sites)
Erin Thompson	Saskatoon, Canada; MAGS/BERMS site representative
Sam Benedict	San Diego, California, USA; CEOP International Coordination Function
Petra Koudelova	Tokyo, Japan; CEOP International Coordination Function

Drs Jin Huang (Silver Spring, Maryland, USA; Representing GAPP Reference Sites), Alan Barr (Saskatoon, Canada; Representing MAGS/BERMS), Antonio Manzi (LBA Executive Manager), Ron Stewart (Winnipeg, Canada; CEOP Co-Chair), Assuncao Silva Dias (Director of CPTEC and co-chair of LPB), Osvaldo Moraes (Cruz Alta (LPB) site manager), and Jair Maia (LBA RHP Chair) responded to the announcement but were not available for the call.

2. NEXT CONFERENCE CALL

The next, **2nd CEOP Americas RHP and Reference Sites Teleconference** is proposed to take place on **Tuesday 17 March 2009**. **Koudelova/Benedict** have the **action (A1)** to inform the group of the details of the next call nearer to the time of the call and to coordinate the origination of the call **(action A1a)**.

3. CEOP AND CEOP DATA GROUP GENERAL ISSUES

3.1 Opening

(3.1a) **Benedict** welcomed everyone on the call and introduced the agenda, reference material that was circulated prior to the call, and background comments meant to setup the framework for reinitializing this series of important calls. Most of those on the call had already known about the merger of the Coordinated Enhanced Observing Period with the GEWEX Hydrometeorology Panel (GHP) that resulted in the formation of the Coordinated Energy and Water-cycle Observations Project (CEOP). However, for those who still had questions about that matter it was noted that they could bring up any thoughts or issues related to the merger at any time during the call. In this context, **participants were asked in advance of the call, to**

reference the latest version of the CEOP Strategic Implementation Plan (SIP) available through the CEOP Home Page at:
http://monsoon.t.u-tokyo.ac.jp/ceop2/implementationplan.html. It was pointed out that the current version was an updated one dated on 1 December 2008 that reflected and responded to the comments from GEWEX SSG earlier this year.

(3.1b) As part of the initial discussion item the Co-Chair of the new CEOP initiative **Koike** reiterated that agreement had been reached to designate **1 January 2007 as the start date for the resumption of the CEOP Reference Site Data generation process. The five-year period from 1 January 2007 to 31 January 2011 was 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.

(3.1c) 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.

3.2 CEOP and CEOP Data Element Coordination

(3.2a) The former GEWEX Continental Scale Experiments (CSEs) and associated reference site group was very active and well coordinated during CEOP Phase 1 but some momentum was lost during the transition period in 2007. In addition, number of CEOP elements and also reference sites increased and thus effective ways of coordination were sought. A new, expanded scheme of conference calls was proposed that reflects the wide range of CEOP activities. Currently, the scheme includes Model Output calls, Satellite Data Calls and RHP + reference site calls. Regarding the RHP and reference site groups, it was suggested that the calls be organized in a regional manner. This means that three parallel series of such calls will be implemented and each series would include representatives from certain region. The regions were proposed as follows:

1. Americas
2. Europe + Africa + NEESPI
3. Asia + Australia + Pacific region

The main reason for this distributed approach is that a number of CEOP Phase 2 reference sites are not associated with any of the GEWEX/CEOP RHP and thus individual reference site representatives need to participate in addition to the RHP representatives. This approach assures that issues related to the reference sites and data provision are communicated directly with respective reference site representatives, which will expedite the whole process. Accordingly, a too large group for these calls would be formed if all of the CEOP sites and RHPs were involved. The regional division makes the calls "smaller" and thus better manageable. In order to assure coordination on the "global" level, the outputs of the individual calls will be communicated through the call Notes within the broader CEOP group and possible ad hoc calls among all RHP representatives and other element leaders may be scheduled if necessary.

(3.2b) The RHP and reference site data calls will mainly discuss RHP activities progress, reference site data submission and issues, and will inform of the CEOP general issues including updates from other elements. The calls will be held on a regular 3-monthly basis.

3.3 2nd CEOP Annual Meeting in Geneva, 15 – 17 September 2008

(3.3a) **Benedict** reported on the outcomes of the 2nd CEOP Annual Meeting that took place in Geneva in September 2008. The meeting was planned and undertaken to move ahead with the implementation of CEOP in accordance with the strategy outlined in the Strategic Implementation Plan. All of the presentation material provided by the participants at the meeting, including abstracts of talks and posters is available on the Internet through the CEOP Home Page at: http://monsoon.t.u-tokyo.ac.jp/ceop2/meetings.html. A brief summary report on the meeting has been published in the November issue of the GEWEX News (http://gewex.org/Nov2008.pdf) and subsequently the **full meeting report** has also been completed and posted on the said CEOP Meetings page.

(3.3b) It was also pointed out that the next, **3rd CEOP Annual Meeting** would be held in Melbourne, Australia, 19 – 21 August 2009, i.e. the event will precede the GEWEX and iLEAPS science conferences. The venue for the CEOP meeting will be the Bureau of Meteorology (BoM). Further details and the meeting website will be released in due course. The participants on the call were asked to consider their

participation in this important event and also possible contribution to the ensuing GEWEX/iLEAPS conferences that will take place in Melbourne, Australia, 24 – 28 August 2009. The conference website is available at: http://www.gewex.org/2009gewex_ileaps_conf.html. Abstracts for all sessions are currently being accepted and can be submitted on-line through the meeting website. The deadline for abstract submission is **15 March 2009.**

3.4 GEWEX Legacy Document

The group was also informed that the GEWEX Legacy document was being prepared and all of the GEWEX projects including CEOP were requested to provide a contribution. The Legacy Document is also perceived as part of preparation for the transition of the WCRP projects in 2013 and thus should include (1) GEWEX accomplishments of Phase 2 and (2) the legacy for future based on what has been done and what is felt to be important to be continued. The CEOP **Co-Chairs**, T. Koike and R. Stewart, and the CEOP **International Coordination Function** have the **action (A2)** to compile a CEOP contribution to this Legacy Document by the beginning of December 2008. Subsequently, this action was undertaken and the CEOP contribution sent to the GEWEX Office.

3.5 Japan Data Integration and Analysis System (DIAS)

Koike introduced Data Integration and Analysis System (DIAS) that was launched in 2006 as part of the Earth Observation and Ocean Exploration System, which is one of five National Key Technologies defined by the 3rd Basic Program for Science and Technology of Japan. This system has been build up based on experiences gained through the CEOP Phase 1 Data Management and is designed to enable archiving, disseminating, integration and analyzing multidisciplinary earth observation data. The system includes components supporting data and metadata provision and data quality control procedure. These components are being used by the CEOP Asian reference site providers, in particular for data quality control, but it is also opened to other interested data providers and the system administrators would welcome test cases from other parts of the world. Persons interested in these services should contact Mr. Katsunori Tamagawa (tamagawa@hydra.t.u-tokyo.ac.jp) at the University of Tokyo.

4. RHP and Reference Site Reports

4.1 Summary status of the reference site archive at NCAR/EOL

(4.1a) **Williams and Loehrer** introduced the current status of the CEOP reference site data archive referring to the document summarizing the status of the sites located in the Americas region that was distributed prior to the call (see Attachment 1). **Williams** pointed out three main issues that need to be considered including (i) missing data for the Phase 1 period (October 2002 – December 2004); (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. It was mentioned that it would be highly desirable to complete data submissions for all three periods in order to obtain a long data series that are critical for many CEOP and other energy and water cycle related studies and the site representatives were asked to consider such commitment. Nevertheless, extension of the formal commitment to provide data for the transition period 2005 – 2006 depend on technical, financial and manpower resources of respective providers as mentioned in Section 3.1 above.

(4.1b) It was also pointed out that in addition to the measurements collected during Phase 1, **data related to clouds, carbon, and other scientific issues** would be welcomed and appreciated if such observations exist at the sites. These items would not be included in the current common format files but additional files would be created. Based on the availability of such data, the Data Management group will propose an adequate format.

(4.1c) In addition, a question on a common format for radiosonde data was raised. **Williams** explained that most sites provide these data in the weather standard format and the Data Management group keep them in that form. This matter will be discussed further.

4.2 CliC/BERMS sites by Erin Thompson

Thompson reported that BERMS sites could continue to submit the data through 2009 including the period 2005 – 2006. The data for the transition period 2005 - 2006 have been prepared for submission and will be submitted in the near future. Regarding further submissions from 2007 onward, a request from the CEOP Data Management should be sent to the BERMS site representatives. **Williams** took the **action**

(A2) to send such request for further data submission to the BERMS site management that would specify the formal data provision period of the current phase of CEOP (2007 – 2011).

4.3 CPPA sites by Tilden Meyers and Steve Williams

(4.3a) **Meyers** reported that the data from the CPPA sites continued to be processed. The CPPA management will provide additional support to resolve remaining issues with the Fort Peck and Oak Ridge data for CEOP Phase 1 so that they can be included in the CEOP reference site archive. The Bondville data for the 2005 – 2006 period may be submitted in the near future.

(4.3b) **Williams** voiced that most probably the Mt. Bigelow site would not be able to continue to provide the data to CEOP and also completing the Phase 1 commitments might be difficult. **Williams** accepted the **action (A3)** to clarify the situation with Mt. Bigelow site.

(4.3c) **Meyers** further mentioned that another grassland site in the Walnut Gulch watershed was available and could provide data to CEOP. **Koike and Williams** took the **action (A3a)** to discuss with **Ron Stewart**, CEOP Co-Chair, about the preferences in case of this additional grassland site considering the scientific point of view.

4.4 LBA sites by Luiz Horta and Alessandro Araujo

(4.4a) **Horta and Araujo** reported that they were aware of the remaining issues with the Phase 1 data and were committed to address them. He pointed out that the data quality control had been made according to old, manual schemes that were too time consuming and thus the LBA data management group was now developing a new, sophisticated system. The LBA team is also opened to the idea of utilizing the quality check support system developed at the University of Tokyo but there is an issue with an insufficient capacity of the internet connection at Manaus, where data is being archived and thus transferring the data through the internet to the UT database will not be possible.

In this context, **Koike** pointed out that the UT group was very interested in assisting the LBA team to try to utilize the UT quality check system. The transfer of data could be arranged by other means, e.g. by via sending a harddisc that would be provided by UT. It was proposed and agreed that a very simple test would be made with the Manaus data that would include a sample dataset of the one-week period. Such small dataset should be possible to transfer through the internet. **Araujo and Tamagawa** took **action (A4)** to communicate undertake the necessary steps to set up such a test case and report on its results at the time of the next call. Further steps including possible focused conference call will be discussed at the time of the next call.

(4.4b) **Araujo** further reported that most probably three of the LBA sites would continue to provide the data including Manaus and two Rondonia sites (pasture and forest). Other sites may not be available any more.

4.5 LPB by Hugo Berbery

Berbery reported that the LPB tower site was working and a website on this observatory was being prepared. In addition, a second tower site is planned in Argentina that could contribute its data to CEOP in future. **Berbery** voiced that the LPB site representatives and managers, namely Drs. Maria Assuncao Silva Dias and Osvaldo Moraes could not attend this call due to a schedule conflict but would participate in the next call and provide more detailed report on the sites and data.

5. OTHER ISSUES

5.1 Meetings

(5.1a) The next **3rd CEOP Annual Meeting** will be held in **Melbourne, Australia, from 19 through 21 August 2009** in conjunction with the GEWEX/iLEAPS science conferences that will take place in Melbourne, 24 – 28 August 2009 (http://www.gewex.org/2009gewex_ileaps_conf.html). Participants were asked to consider their participation in this important event. Further details of the CEOP meeting will be provided in due course.

(5.1b) The 2nd Lund Regional-scale Climate Modeling Workshop will be held in **Lund, Sweden** from **4 – 8 May 2009** (see the GEWEX calendar page: http://www.gewex.org/gewex_meetings.html for more information).

5.2 CEOP special issue of the GEWEX Newsletter

Koudelova advised the group that the CEOP special issue of GEWEX News had been published and its PDF version was available through the CEOP Home Page at: http://monsoon.t.u-tokyo.ac.jp/ceop2/publications.html.

The contents of the Newsletter include:

- Leading article by Director WCRP, Ghassem Asrar
- In Memoriam note of John Roads
- Multimodel Analysis for CEOP, Mike Bosilovich and David Mocko
- ICTS progress, Burkhardt Rockel and Beate Geyer
- African Drought Monitor, Eric Wood et al.
- Report on the High-Elevation Study Kick Off Meeting in Padua, April 2008, Gianni Tartari
- Report on the Extremes Workshop in Vancouver, May 2008, Ron Stewart
- Announcements of the GEWEX science conference in 2009 and the GLASS meeting, IGPO
- JAXA statement on major update of the Distributed Data Integration System, Satoko Miura
- Satellite Data Gateway, Toshio Koike

5.3 CEOP Home Page and Satellite Data Gateway

(5.3a) 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/.

(5.3b) 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. The call was adjourned at 22:00 UTC.

ATTACHMENT 1 CEOP Americas Region Reference Site Data Status Report

(updated through 1 December 2008)

CliC

CliC BERMS – All data sets complete through 2004. No data submitted for 2005 on.

CPPA

CPPA Bondville – All data sets complete through 2004. No data submitted for 2005 on. NWS radiosonde data set complete through 2007.

CPPA Ft. Peck – All data sets complete through March 2003, however, these data were not gap-filled like the Bondville data. A complete resubmission using the same methods as those used for Bondville would be useful. No data submitted for April 2003 on. NWS radiosonde data set complete through 2007.

CPPA Mt. Bigelow – Data submitted for 2003-4 back in late 2005. Issues reported back. No change in status.

CPPA Oak Ridge - All data sets complete through March 2003, however, these data were not gap-filled like the Bondville data. A complete resubmission using the same methods as those used for Bondville would be useful. No data submitted for April 2003 on. NWS radiosonde data set complete through 2007.

CPPA ARM SGP – All data sets complete through 2004. Data for 2005-2007 are in-house and in the queue for processing. Radiosonde data set complete through 2007.

Other

Other ARM NSA – All data sets complete through 2004. Data for 2005-2007 are in-house and currently being processed.

Other ARM TWP - All data sets complete through 2004. Data for 2005-2007 are in-house and currently being processed.

LBA

LBA Brasilia – STM and FLX complete through 2004. No radiosonde data have been submitted. Complete EOP-3 and EOP-4 SFC submitted 6 July 2005; issues described below.

1) For the 2003 portion of the data the 0000 UTC records are out of order. e.g. the 0000 UTC record on 26 June 2003 is placed between the 2330 observation on 26 June 2003 and the 0030 UTC observation on 27 June 2003. Are these 0000 UTC records actually for the following day? If so, then they would be in order.
2) The radiation parameters have a large number of very bad values from 1 May 2004 to 30 September 2004.
3) The wind direction has 72 values above 360 from 1 May 2004 to 30 September 2004.
4) The relative humidity never reaches above 97.00%.
5) The U and V wind components do not match the wind speed and wind direction.
6) The incoming longwave changes drastically on 1 January 2004. Prior to that time the incoming longwave values range from about 300 to 450 W/m2 (this is similar to values at other stations). Then starting 1 January 2004 the values range from about 200 to 325 W/m2.
7) The outgoing longwave changes drastically on 1 January 2004. Prior to that time the outgoing longwave values range from about 400 to 550 W/m2 (this is similar to values at other stations). Then starting 1 January 2004 the values range from about 300 to 325 W/m2.

LBA Caxiuana - Complete EOP-3 SFC last submitted January 2005. The first half EOP-3 STM last submitted March 2005. The first half EOP-3 TWR last submitted April 2004. The first half EOP-3 FLX last submitted November 2004. No radiosonde data have been submitted.

SFC issues:

1) The station location in the data files does not match that in the documentation.
2) The first half EOP-3 data set contained in/out longwave and net radiation while the second half EOP-3 data set did not.
3) The second half EOP-3 data set contained dew point and relative humidity while the first half EOP-3 data set did not.
4) One wind direction value is flagged U, while the value is the missing value (0400 UTC on 3 April 2003).
5) Data for EOP-4 has not been submitted.

STM issues:

1) The station location in the data file does not match that in the documentation.
2) There are several spikes in the soil temperature at all depths in late December and early January. And a few other spikes in late January at all depths. None of these are flagged as D or B.
3) Data has not been submitted for the second half of EOP-3 or EOP-4.

TWR issues:

1) The submitted TWR data file contained only one level (that already in the SFC data set). It is not clear if there is a tower with measurements at multiple heights.

FLX issues:

1) The submitted data set contains -0.10 m height records, but they are always entirely missing. Are there supposed to be soil heat flux observations at the -0.10 m height?
2) Data has not been submitted for the second half EOP-3 or EOP-4.

LBA Manaus – Complete EOP-3 and EOP-4 SFC and FLX data sets on-line. First half EOP-3 TWR data set last submitted April 2004. No STM or radiosonde data have been submitted.

TWR Issue:

1) The submitted TWR data file contained only one level (that already in the SFC data set). It is not clear if there is a tower with measurements at multiple heights.

LBA Pantanal – The first half EOP-3 SFC data set is on-line. No second have EOP-3 or EOP-4 SFC data have been submitted. First half EOP-3 TWR last submitted April 2004. No FLX or radiosonde data have been submitted. Are there STM data for 2004 and beyond?

TWR Issues:

1) The submitted TWR data file contained only one level (that already in the SFC data set). It is not clear if there is a tower with measurements at multiple heights.
2) The U and V wind components do not match the wind speed and direction.

3) It looks like LBA incorrectly corrected the 2400 time problem. It looks like they just changed the 2400 times to 0000 without moving the date forward one day (e.g. 2400 on 1 October should be 0000 on 2 October not 0000 on 1 October).

LBA Rondonia – First half EOP-3 SFC last submitted November 2004. The second half EOP-3/-4 (through 29 September 2004) SFC, STM and FLX last submitted 14 March 2006. No sounding data has been submitted.

Documentation issues:

1) The documentation file was corrupted in some fashion. I get error messages when trying to print it. Figure 1 does not show up. The first Figure 5 and Figures 6 and 7 are visible but corrupted.
2) The documentation file does not contain information on instrumentation, data collection, data processing, or QC/QA.

SFC Issues:

1) The submitted data file ends on 29 October 2004. Are there no data for 30 October to 31 December 2004?
2) The station location changes on 1 April 2003. Prior to that date it was: -10.77402 -62.33741 293.00 after that date it was: -10.76210 -62.35730 274.00 Is this correct? If so, this needs to be mentioned in the documentation file. Any differences between the sites also should be included (e.g. instrumentation, land cover, etc).
3) Neither of those locations matches the one provided in the documentation file, which is: -10.079722 -61.930000 and 274.00 m
4) The seasonal cycle of temperature and outgoing longwave is very different in the late 2002/early 2003 period versus the same period in 2003/2004. Is this correct?
5) An incorrect missing value is used for outgoing PAR. The value used is -999.90, but the missing value should be -999.99.
6) The gap filling portion of the document says the following: "Flag for dew point temperature and relative humidity set to I (when not M) to indicate that these variables were derived using a constant value for the air pressure (1000 mb)." However, the dew point and RH are always flagged "G", "M" or "U". So is what the document says about their derivation correct?
7) The data remarks section of the document says the following: "In the 2002 DRY-TO-WET LBA Campaign two other automatic weather stations (AWS) at the site confirmed that the pressure measured by the INPE AWS was in average 12.6 mb lower. So, the same correction was applied to the pressure in this data set and the flag set to 'I'." Again, the station pressure is never given the "I" flag (only "G", "M" or "U" are used). The station pressure changes dramatically on 1 April 2003. The station pressure up to that point is much lower (~12 mb), but is flagged "G". The station pressure after that point is flagged "U".
8) The parameters are all flagged "G" for the first half of EOP-3 but are unchecked thereafter.
9) The data remarks section of the document says the following: "The relative humidity at the site never reaches 100 %, as would be expected frequently. So, the entire serie was multiplied by a factor so that the maximum value in the period reaches 100 % and consequently the whole serie is lifted a little bit. All the serie is flagged as 'I'." As with the other items, the RH is never given the "I" flag (only "G", "M" or "U" are used). If a correction factor is used it needs to be specified in the document. Only during the first half EOP-3 period does the RH reach 100%. After the change in station (or whatever happens on 1 April 2003) the RH only reaches a maximum value of ~95%. So, was this factor applied? Was the same factor used the entire period? Were the other moisture parameters impacted by this? If so, their flags should be adjusted as well.

FLX Issues:

1. The submitted data file ends on 29 October 2004. Are there no data for 30 October to 31 December 2004?
2. The station location changes on 1 April 2003. Prior to that date it was: -10.77402 -62.33741 293.00 after that date it was: -10.76210 -62.35730 274.00 Is this correct? If so, this needs to be mentioned in the documentation file. Any differences between the sites also should be included (e.g. instrumentation, land cover, etc).
3. Neither of those locations matches the one provided in the documentation file, which is: -10.079722 -61.930000 and 274.00 m
4. The parameters completely change on 1 April 2003. Prior to that date the data set includes soil heat flux at the -0.10 m height and sensible, latent and C2 flux at the 4.04 m height. After that date the data set only includes soil heat flux at the -0.05 m height.
5. There are several times when the soil heat flux at the -0.05 m height has a value of -999.99 (the missing value), but is flagged U, e.g. 1130 UTC on 12 November 2003.
6. The soil heat flux at the -0.10 m height is completely missing. The document mentions something about the soil heat flux not being measured at the site in the first half of EOP-3, but the soil heat flux in later periods is at the -0.05 m height. So why is this -0.10 m height included in the data set?

STM Issues:

1. During the first half of EOP-3 the date format keeps changing between dd/mm/yyyy and yyyy/dd/mm. After the first half of EOP-3 the date format stays as mm/dd/yyyy. None of these is correct, it should be yyyy/mm/dd.
2. The day changeover times are given as 24:00:00 in the first half of EOP-3. The format of the time is supposed to be hh:mm, so are these times 24:00 or 00:00? No times of 24:00 should be in the data set.
3. There are no data in the first half of EOP-3 and even the measurement heights are missing. Is there a reason for the inclusion of these records?
4. The submitted data file ends on 29 October 2004. Are there no data for 30 October to 31 December 2004?
5. The station location changes on 1 April 2003. Prior to that date it was: -10.77402 -62.33741 293.00 after that date it was: -10.76210 -62.35730 274.00 Is this correct? If so, this needs to be mentioned in the documentation file. Any differences between the sites also should be included (e.g. instrumentation, land cover, etc).
6. Neither of those locations matches the one provided in the documentation file, which is: -10.079722 -61.930000 and 274.00 m
7. The data values appear to be in the wrong columns. The order is supposed to be soil temperature and then soil moisture, but it looks like it is actually soil moisture and them soil temperature.
8. The soil moisture values are all between 0 and 1 and probably need to be multiplied by 100.
9. The format of the data beyond the first half of EOP-3 is incorrect. There needs to be another space before the final data column.

LBA Santarem – The complete EOP-3 SFC, STM and FLX data sets are on-line. No EOP-4 data have been submitted for these data sets. The first half EOP-3 TWR data set is on-line. No second half EOP-3 or EOP-4 data have been submitted for the TWR data set. No radiosonde data have been submitted.

Documentation Issues:

1. The documentation mentions additional heights of temperature data that are not included as part of the TWR data set. In the data set the temperature is provided at 2, 10 and 40 m, the documentation mentions additional heights, 20, 30 and 64 m.
2. The documentation mentions additional heights of wind speed data that are not included as part of the TWR data set. In the data set the wind speed is provided at 40 and 50 m, the documentation mentions the additional height of 64m. Figure 13 mentions winds at 6 heights but only 3 heights are mentioned in Section 3.1 ("Profile") and only 2 are provided in the data set..
3. The soil temperature depths in the STM data do not match what is mentioned in the documentation. The data contains soil temperature at 10, 20 and 50 cm depths. The documentation mentions soil temperature at 2, 5, 10, 20, 50, 150 and 200 cm depths.
4. The soil moisture depths in the STM data do not match what is mentioned in the documentation. The data contains soil moisture at 10, 20 and 40 cm depths. The documentation mentions soil moisture at 5, 10, 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 225 and 250 cm depths.
5. The wind speed in the SFC data set seems to be a bit different between the first half and the second half (i.e. second half wind speeds are about 0.5 m/s lower than first half, and first half had a minimum value of 0.45 m/s while in the second half values got below 0.45). This was probably due to either a change in processing methods or the use of different instrumentation. Either way, this could be handled by adding some text into the documentation explaining the difference.
6. The document still has references to this being an hourly data set when it is actually 30 min. Some examples are in section 2.1: "This data set was formed by extracting the top of the hour observations from the 30 minute native format data." "The precipitation data set was formed by summing the previous bottom of the hour and current top of the hour 30 minute values."
7. The document contradicts itself in section 2.1 and section 6 in reference to the moisture parameters. In section 2.1 it says that the specific humidity was derived from the dew point and station pressure. In section 6 it says that the dew point and RH were derived from the specific humidity and station pressure. Based on the data set, it looks like section 6 is the correct version.
8. The documentation does not specify the heights of the measurements included in the SFC data set. It would be useful to separate out the information for each data set as was done in the Lindenberg documentation. It would also be helpful if the instrumentation information were put into a table form as was done in the Lindenberg documentation (see their Table 2).
9. The landscape section includes some rainfall information that would be better placed in the climate section.