

# CEOP DATA MANAGEMENT UPDATE

**Steve Williams**

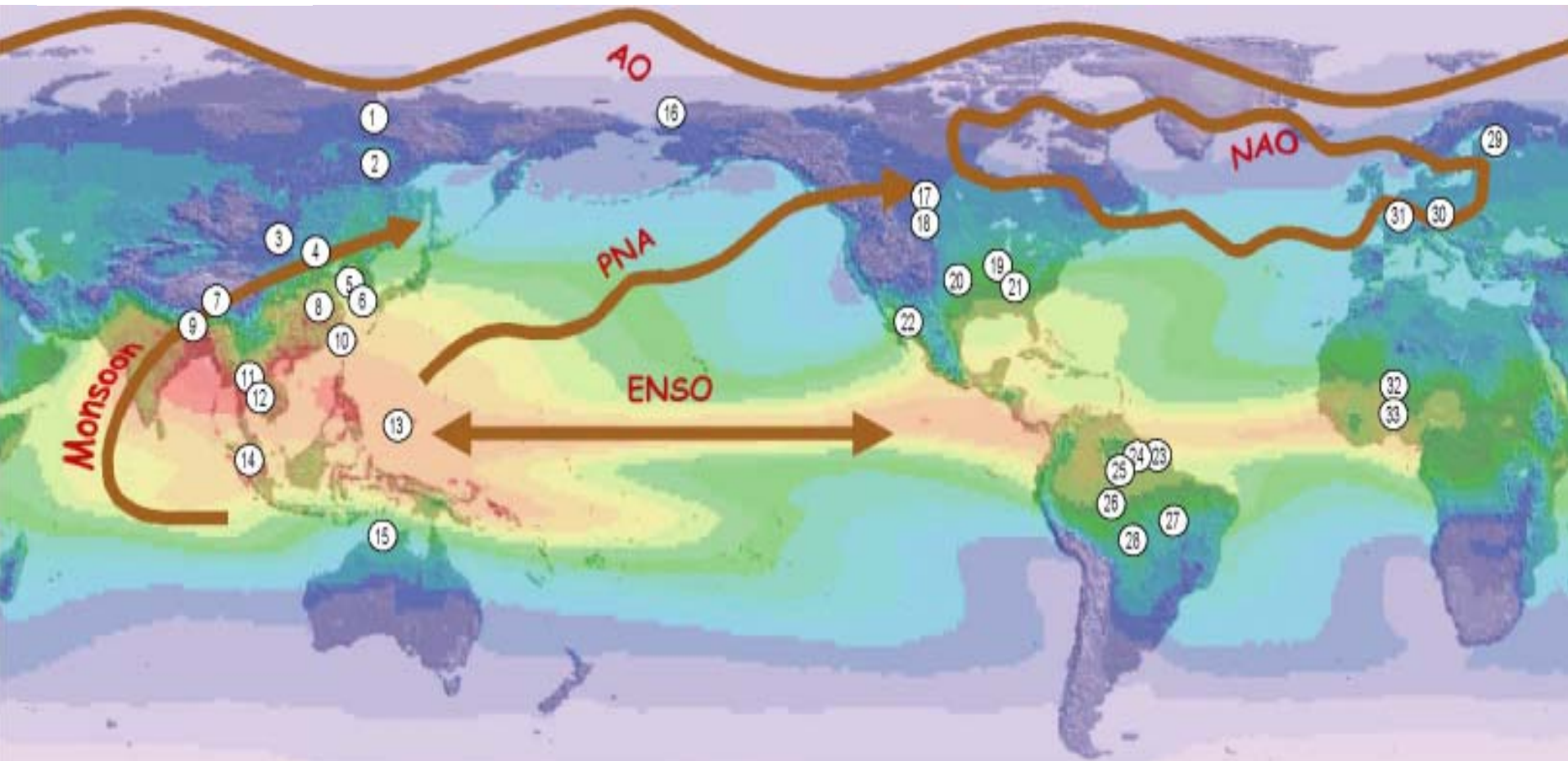
UCAR/Joint Office for Science Support (JOSS)  
Boulder, Colorado, USA

CEOP Satellite Data Integration Issues Meeting  
Tokyo, JAPAN  
9-10 October 2002





# Reference Sites

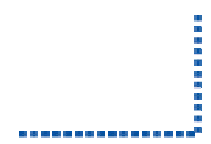
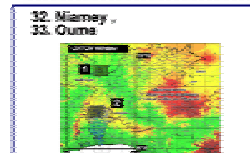
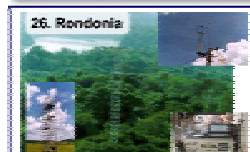
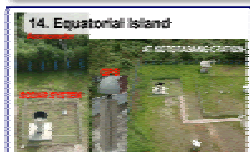
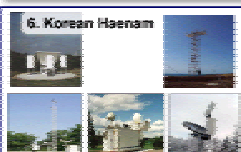
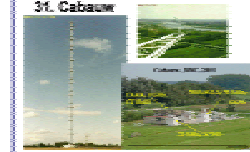
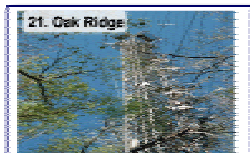
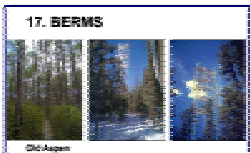
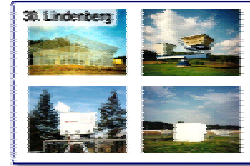
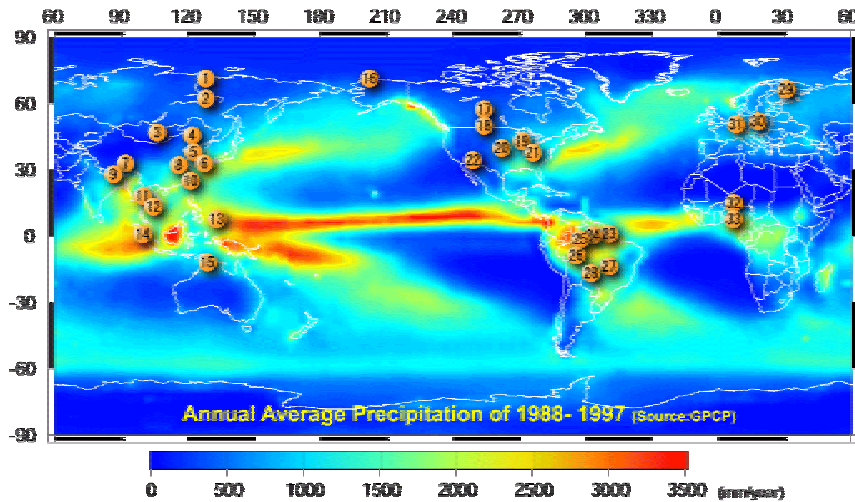
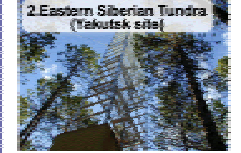
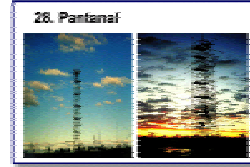
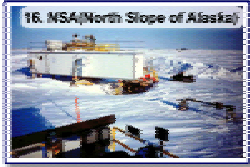
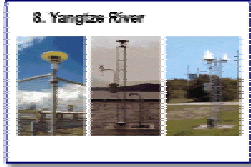
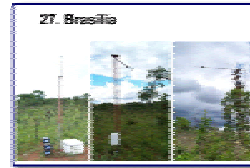
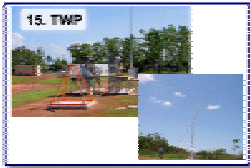
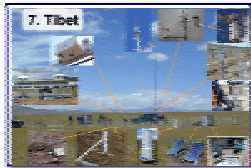


CEOP Reference Site Status: <http://www.joss.ucar.edu/ghp/ceopdm/rsite.html>

CEOP Data Management Site: <http://www.joss.ucar.edu/ghp/ceopdm/>

CEOP Web Site: <http://monsoon.t.u-tokyo.ac.jp/ceop/>

CEOP Reference Site Status: <http://www.joss.ucar.edu/ghp/ceopdm/rsite.html>





## **CEOP Reference Site Data Categories:**

### **Standard Data (*Category 1*):**

**Common or low exploitation value**, measurement technology common, generally well understood.

### **Enhanced or Experimental Data (*Category 2*):**

**High exploitation value**, measurement technology sophisticated and/or of experimental nature, contact to PIs highly recommended.

***Data providers decide on category division of their data !***



## Data exchange guidelines (I) :

- (1) To comply with  
WMO Resolutions 40 (CG-XII) and 25 (CG-XIII)  
in particular: No financial implications.
- (2) CDA and *data users*: Commercial exploitation of CEOP data is prohibited.
- (3) *Data users*: No transfer to third parties.
- (4) Data release to *data users*: Turn-around period.  
*Category 1 data: 6 months*  
*Category 2 data: 15 months*



## Data exchange guidelines (II) :

### **(5) Acknowledgement and citation:**

**(5.1) *Data users'* publications: CEOP, CDA, *Data providers***

**(5.2) CDA: *Data providers* and their funding sources**

**(6) Co-Authorship for Reference Sites' PIs recommended, collaboration base required if PI requests co-authorship  
(in particular for *category 2* data)**

**(7) CEOP Publication Library at CDA**



# CEOP EOP-1 METEOROLOGICAL PARAMETERS

Reference Site	Air Temperature	Relative Humidity	Air Pressure	Precipitation	Wind Speed	Wind Direction
<b>LBA</b>						
<u>Brasilia</u>						
<u>Caxiuana</u>	30 min			30 min	30 min	30 min
<u>Manaus</u>	30 min	30 min	30 min	30 min	30 min	30 min
<u>Pantanal</u>	30 min	30 min	30 min	30 min	30 min	30 min
<u>Rondonia</u>	30 min	30 min	30 min	30 min	30 min	30 min
<b>CAMP</b>						
<u>Mongolia</u>	30 min	30 min	30 min	30 min	30 min	30 min
<u>NE Thai</u>	Hourly	Hourly	Hourly	10 min	10 min	Hourly
<u>Northern South China Sea</u>	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
<b>GAPP</b>						
<u>SGP</u>	1 min	1 min	1 min	1 min	1 min	1 min
<u>Ft. Peck</u>	30 min	30 min	30 min	30 min	30 min	30 min
<u>Bondville</u>	30 min	30 min	30 min	30 min	30 min	30 min
<b>BALTEX</b>						
<u>Cabauw</u>	10 min	10 min	10 min	10 min	10 min	10 min
<u>Lindenberg</u>	10 min	10 min	10 min	10 min	10 min	10 min
<u>Sodankyla</u>	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly

## NOTES:

- Caxiuana: Air Temperature measured at 16 and 32 m.  
Wind Speed and Wind Direction are resultant.  
Has additional parameters dry and wet bulb temperature at 53m, standard deviations of dry air temperature, wind speed, and wind direction.
- Mongolia: Four locations measure these parameters.
- SGP: 15 locations measure these parameters.
- Northern South China Sea: 25 locations measure these parameters.
- Cabauw: Pressure is Sea Level Pressure.





# CEOP EOP-1 FLUX PARAMETERS

Reference Site	Sensible Heat Flux	Latent Heat Flux	Water Flux	CO2 Flux	Soil Heat Flux	Friction Velocity	Monin Obukhov Stability Parameter	Momentum Flux	Mean Horizontal Wind Velocity
<b>LBA</b>									
<b>Brasilia</b>	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min
<b>Caxiuana</b>	Hourly	Hourly	Hourly	Hourly		Hourly	Hourly	Hourly	Hourly
<b>Manaus</b>	30 min	30 min		30 min		30 min	30 min		30 min
<b>Pantanal</b>	30 min	30 min		30 min	30 min	30 min	30 min		30 min
<b>Rondonia</b>	30 min	30 min		30 min		30 min	30 min		
<b>CAMP</b>									
<b>Mongolia</b>					30 min				
<b>NE Thai</b>									
<b>Northern South China Sea</b>									
<b>GAPP</b>									
<b>SGP</b>	30 min	30 min			30 min				30 min
<b>Ft. Peck</b>	30 min	30 min		30 min	30 min			30 min	30 min
<b>Bondville</b>	30 min	30 min		30 min	30 min			30 min	30 min
<b>BALTEX</b>									
<b>Cabauw</b>	10 min	10 min		10 min	10 min	10 min			
<b>Lindenberg</b>					10 min				
<b>Sodankyla</b>					10 min				30 min

**NOTES:**

- Brasilia:** Soil heat flux at unknown depth. Probably 5cm. Latent heat, CO2, and water fluxes also have a value "corrected for system frequency response". Has additional parameters: First, second, and third rotations, lags for CO2 and H2O, Monin-Obukhov length, distance of peak of footprint function, distance of 50 and 90% fetch, variance of u and v components after rotation, Bowen Ratio, and variances of horizontal wind and direction.
- Pantanal:** Latent heat flux and H2O concentration have 2 values one with Krypton sensor and one with Licor IRGA. Soil heat flux at 2 and 5 cm.
- Manaus, Rondonia and Pantanal:** All have other parameters: virtual air temperature, CO2 concentration, and H2O concentration.
- Brasilia and Caxiuana:** Have additional parameters: Variances and averages of u, v, w, t, CO2 and H2O concentrations, and mean wind direction.
- Mongolia:** Soil heat flux at 5 cm.
- Sodankyla:** Soil heat flux at 7 cm. Has other parameters: X, Y, Z wind components, sin and cos of wind direction, wind direction, uw, ww, and wT all at 3, 8, 32, and 47 m.
- Bondville and Ft. Peck:** Have additional parameters: u'2, v'2, w'2
- Cabauw:** Soil heat flux at 5 and 10 cm.







# CEOP EOP-1 RADIATION PARAMETERS

Reference Site	Incoming Shortwave	Outgoing Shortwave	Incoming Longwave	Outgoing Longwave	Incoming PAR	Outgoing PAR	Net Radiation	Skin Temperature
<b>LBA</b>								
<u>Brasilia</u>	30 min	30 min			30 min	30 min	30 min	
<u>Caxiuana</u>	30 min	30 min	30 min	30 min	30 min	30 min		
<u>Manaus</u>	30 min	30 min	30 min	30 min	30 min		30 min	30 min
<u>Pantanal</u>	30 min	30 min			30 min	30 min	30 min	
<u>Rondonia</u>	30 min	30 min	30 min	30 min	30 min		30 min	30 min
<b>CAMP</b>								
<u>Mongolia</u>							30 min	30 min
<u>NE Thai</u>								Hourly
<u>Northern South China Sea</u>								
<b>GAPP</b>								
<u>SGP</u>	1 min	1 min	1 min	1 min				20 sec
<u>Ft. Peck</u>	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min
<u>Bondville</u>	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min
<b>BALTEX</b>								
<u>Cabauw</u>	10 min	10 min	10 min	10 min				
<u>Lindenberg</u>	10 min	10 min	10 min	10 min	10 min	10 min		
<u>Sodankyla</u>	10 min	10 min		10 min			10 min	10 min

## NOTES:

Caxiuana: Has additional parameters: net radiometer temperature, standard deviations of incoming shortwave, incoming PAR, and outgoing PAR.

Pantanal: All radiation measurements have values at both 4 and 21 m.

SGP: Skin temperature changes from 20 sec to 1 min data on 26 September 2001.

Sodankyla: Net radiation at 2 m, other radiation parameters at 45 m.





# CEOP EOP-1 SOIL PARAMETERS

Reference Site	Soil Temperature	Soil Moisture	Wetness
<b>LBA</b>			
<u>Brasilia</u>	30 min		
<u>Caxiuana</u>	30 min		
<u>Manaus</u>			
<u>Pantanal</u>			
<u>Rondonia</u>			
<b>CAMP</b>			
<u>Mongolia</u>	30 min (4 sites) Hourly (12 sites)	30 min (4 sites) Hourly (12 sites)	
<u>NE Thailand</u>	Hourly	Hourly	
<u>Northern South China Sea</u>	8 Hourly		
<b>GAPP</b>			
<u>SGP</u>	Hourly	Hourly	
<u>Ft. Peck</u>	30 min	30 min	30 min
<u>Bondville</u>	30 min	30 min	30 min
<b>BALTEX</b>			
<u>Cabauw</u>			
<u>Lindenberg</u>	10 min	10 min	
<u>Sodankyla</u>	10 min		10 min

**NOTES:**

- Brasilia:** Soil temperature at 5 cm (two locations separated by ~45cm).
- Caxiuana:** Soil temperature at 5 cm.
- Mongolia:** Soil temperature and moisture at 3, 10, 40, and 100cm at four sites. Soil temperature and moisture at 3 and 10cm at 12 sites.
- Sodankyla:** Soil temperature at 2, 5, 10, 20, 50, and 100 cm. Also has snow temperatures at 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, and 110 cm.
- Bondville:** Soil temperature at 2, 4, 8, 16, 32, and 64 cm. Soil moisture at 10, 30, and 60 cm.
- Ft. Peck:** Same as Bondville except soil moisture also at 5 cm.
- SGP:** Soil temperature and moisture at 5, 15, 25, 35, 60, 85, 125, and 175 cm.
- NE Thai:** Depths unknown.
- Northern South China Sea:** Soil temperature at 0, 5, 10, 20, and 30 cm.
- Lindenberg:** Soil temperature at 5, 10, 20, 50, 100, and 150 cm. Soil moisture at 8, 15, 30, 45, and 60 cm.





# CEOP EOP-1 RAWINSONDE DATA

Reference Site	Located On-Site?	Distance to site	Temporal Resolution	Vertical Resolution	Typical Number of Data Points
<b>LBA</b>					
<u>Pantanal</u>	No (Campo Grande)	~300 km	12 Hourly	Mandatory Levels	10-20
<u>Rondonia</u>	No (Vilhena)	Close	12 Hourly	Mandatory and Significant Levels	80-100
<u>Santarem</u>	Yes	0	12 Hourly (and specials)	Varies, typically 20-50 m	600-900
<b>GAPP</b>					
<u>SGP</u>	Yes	0	6 Hourly	2 sec (~10 m)	2800-3100
<u>Ft. Peck</u>	No (Glasgow MT)	~100 km	12 Hourly	6 sec (~30 m)	900-1100
<u>Bondville</u>	No (Lincoln IL)	~80 km	12 Hourly	6 sec (~30 m)	900-1100
<b>BALTEX</b>					
<u>Lindenberg</u>	Yes	5km to ABL site	6 Hourly	Mandatory and Significant Levels	80-100
<u>Sodankyla</u>	Yes	0	12 Hourly	Mandatory and Significant Levels	80-100
<b>CAMP</b>					
<u>Northern South China Sea</u>	No (Hualien and Taipei)	At same locations as surface stations.	12 Hourly	Mandatory and Significant Levels	50-70

**NOTES:**

Santarem: On-site only during special experiment (18 July to 15 August). No data received for remainder of EOP-1 period.

SGP: A second on-site location released radiosondes every 6 hours from 1 July to 20 August.

Lindenberg: Has high vertical resolution data as well, but awaiting resolution to QC issue.





# Other EOP-1 Data Received

## Cabauw

**Tower** – 10 min air temperature, dew point, wind speed, and wind direction at 10, 20, 40, 80, 140, and 200 m.

## Lindenberg

**Wind Profiler** – 30 min low mode vertical profiles of wind speed and direction

**RASS** – 30 min vertical profiles of virtual temperature

**Ceilometer** – 10 min cloud layer height

**Tower** – 10 min air temperature, relative humidity, wind speed, and wind direction at 40 and 98 m.

## Sodankylä

**Tower** – 10 min air temperature and relative humidity at 3, 8, 18, 32, and 48 m and wind speed and wind direction at 18, 25, 38, 47 m





# CEOP EOP-1 DATA ISSUES SUMMARY

## (7 October 2002)

### BALTEX

**Cabauw** – In sample, received several types of data not provided for EOP-1: Radiosonde, wind profiler, RASS, radiometer, ceilometer, and 35 GHz radar.

**Lindenberg** - Still need high-resolution radiosonde data and surface fluxes.

**Sodankyla** - No documentation for radiation data files in either sample or EOP-1. Still need high resolution radiosonde data.

### CAMP

**NE Thailand** - Still need SMTMS (soils) and sounding data. Radiation and ground heat flux parameters in voltage units.

**Mongolia** - Data only through mid-September. They said they would provide rest. It would be best if they could provide whole time period again rather than separate files of last few days.

Any other CAMP sites still going to be providing data (e.g. Tibet)?





# CEOP EOP-1 DATA ISSUES SUMMARY (cont'd.) (7 October 2002)

## CATCH

Data/Information received 9 September 2002 – being reviewed

## GAPP

No data provided from Oak Ridge site.

Data was provided from Black Hills site which is not now a reference site.

## LBA

Still need radiosonde data for Brasilia, Caxiuana, and Manaus.

Still need radiosonde data for Santarem for 1-17 July and 16 Aug–30 Sept. Presumably this would be lower resolution off site data. And it would actually be best if they would provide this off-site data for the entire period so that there would be one consistent radiosonde site during EOP-1.

For Santarem we have only received the one month of radiosonde data, is there going to be AWS or flux data?

The Brasilia data we received did not have surface meteorological data (i.e. air temp, precip, etc). Are there any surface meteorological data at this site?

## MAGS

BERMS Data/Information received 8 September 2002 – being reviewed





# PROPOSED EOP-1 REFERENCE SITE “COMPOSITE” DATA SET

- **Common Parameters**

**Meteorology [T, RH, P, Precip, WS, WD]**

**Radiation [In/out (LW, SW, PAR), Net, SkinT]**

**Flux [SH, LH, CO<sub>2</sub>, Soil H]**

**Soil [T, Moisture]**

**Upper Air [P, T, RH, H, WS, WD]**





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Upper Air [P, T, RH, H, WS, WD]

- **Common Format**

UTC [YYYYDDMMhh], Units

Comma delimited ASCII

Documentation







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Meteorology [T, RH, P, Precip, WS, WD]

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Flux [SH, LH, CO<sub>2</sub>, Soil H]

Soil [T, Moisture]

Upper Air [P, T, RH, H, WS, WD]

- **Common Format**

UTC [YYYYDDMMhh], Units

Comma delimited ASCII

Documentation

- **Common Temporal Resolution**

1-hour surface data [Meteorology, Radiation, Flux, Soil]

12-hour Upper Air Profiles





# FUTURE DATA TASKS

- Prepare EOP-1 Reference Site “composite” (common parameters, format, temporal resolution)





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- Build Satellite Data Archive (U of Tokyo, NASDA, NASA)





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- Prepare re-analysis MOLTS EOP-1 data set (DAO, NCEP, JMA, ECMWF?.....)
- Build Satellite Data Archive (U of Tokyo, NASDA, NASA)
- Develop Model Output Archive (MPI?, others?)





<http://www.joss.ucar.edu/ghp/ceopdm/>

## Coordinated Enhanced Observing Period (CEOP)

### Data Management

#### Data Policies

- [Final DRAFT CEOP Reference Sites Data Release Guidelines](#)
- [BALTEX](#)
- [CAMP](#)
- [CATCH](#)
- [GAPP](#)
- [LBA](#)
- [MAGS](#)

#### Model Location Time Series (MOLTS)

- Global Models
  - [Listing of CEOP proposed MOLTS locations](#)
  - [Map of CEOP proposed MOLTS locations](#)
- Regional Models
  - [Map of proposed NCEP ETA MOLTS locations for NAME](#)
  - [Map of current NCEP ETA MOLTS locations around the ARM SGP site](#)

#### Documents

- [CEOP Implementation Plan](#)
- [CEOP Reference Site Station Characteristics Questionnaire](#)
- [Establishment of a Global Hydrological Observation Network for Climate" GCOS/GTOS/HWRP Meeting Report \(June 2000\)](#)

#### CEOP Data Sets and Links

- [GAPP-ARM SGP Reference Site Data Sets](#)
- [CEOP In-Situ Data Sets and Source Agency Links](#)
- [CEOP Satellite Data Sets and Source Agency Links](#)
- [CEOP Model Output Sets and Source Agency Links](#)
- [GEWEX Land Processes Database Map Server](#)
- [Sample GEWEX Continental Scale Experiment \(CSE\) Reference Site Data Sets](#)

#### Reference Sites Information

- [CEOP Reference Site Station Characteristics](#)
- [CEOP Reference Site Map](#)
- [Reference Site Energy and Water Budget Variables](#)
- [CEOP Reference Site Rawinsonde Station Questionnaire](#)
  - [Responses](#)

#### Satellite Data Archives

- [BALTEX](#)
- [CATCH](#)
- [GAME](#)
- [GCIP/GAPP](#)
  - [GOES-8 Data](#)
  - [NOAA-AVHRR/TOVS Data](#)
  - [LANDSAT Data](#)
- [LBA](#)
- [MAGS](#)