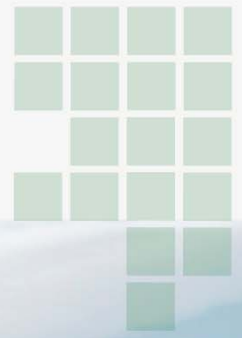




# CEOP PHASE-1 DATA MANAGEMENT ACCOMPLISHMENTS



**Steve Williams (NCAR/EOL)**

**Frank Toussaint (Max-Planck Institute)**

**Katsunori Tamagawa (University of Tokyo)**

**6<sup>th</sup> International Implementation Meeting for CEOP**

**NAS, Washington DC, USA**

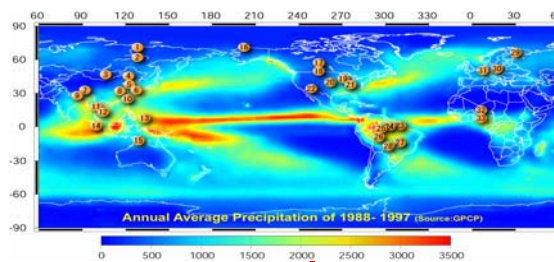
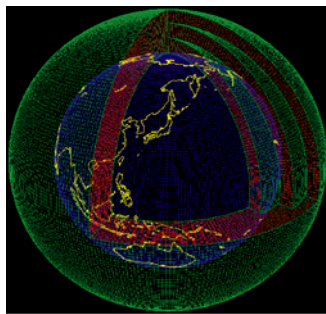
**12-14 March 2007**



GEWEX/CEOP EOL work supported by NOAA Climate Projects Office



## Coordinated Enhanced Observing Period




Model Output Data Archiving Center at the **World Data Center for Climate, Max-Planck Institute for Meteorology** of Germany

In-Situ Data Archiving Center at **NCAR (National Center for Atmospheric Research)** of USA





Data Integrating/Archiving Center at **University of Tokyo and JAXA** of Japan



<http://www.eol.ucar.edu/projects/ceop/dm/>



## Coordinated Enhanced Observing Period Data Management


CEOP Data Access	CEOP Documentation
<p style="text-align: center;"><b>Integrated Data Servers</b></p> <p>WTF-CEOP Distributed Data Integration Prototype System CEOP Centralized Data Integration System GCMD CEOP Portal</p>	<p style="text-align: center;"><b>Data Policies</b></p> <p>CEOP Reference Sites Data Release Guidelines BALTEx CAMP AMMA GAPP LBA MAGS</p>
<p style="text-align: center;"><b>In-Situ</b></p> <p style="text-align: center;"><b>Data Sets</b></p> <p>CEOP EOP-3/4 Data Sets CEOP EOP-1 Data Sets NASA/GMAO GrADS/DODS Server Baseline Surface Radiation Network (BSRN) GEWEX Land Processes Database Map Server IAEA Global Network of Isotopes in Precipitation</p> <p style="text-align: center;"><b>Information</b></p> <p>CEOP Reference Site Data Set Procedures Report CEOP Reference Site Station Characteristics Virtual Tour of Reference Sites Slideshow CEOP Reference Site Map CEOP Hydrology Reference Sites Reference Site Data Management Update (GEWEX SSG Meeting, 20-24 January 2003) CEOP In-Situ Data Source Agency Links</p>	<p style="text-align: center;"><b>Data Standards Information</b></p> <p>CEOP Metadata Design (Proposed) National Spatial Data Infrastructure (NSDI) Presentation (September 2004) Assistance for Land-surface Modelling activities (ALMA) Atmospheric Model Intercomparison Project (AMIP) ISO/TC 211</p> <p style="text-align: center;"><b>Documents</b></p> <p>CEOP Implementation Plan 3rd Implementation Planning Meeting Report (March 2004) Executive Summary Appendices 2nd Implementation Planning Meeting Report (July 2003) WESP Major Activities Plan (1 June 2003) Establishment of a Global Hydrological Observation Network for Climate* GCOS/GTOS/HWRP Meeting Report (June 2000)</p> <p style="text-align: center;"><b>Questionnaires</b></p> <p>CEOP Land Cover and Soils Questionnaire Responses CEOP Frozen Precipitation Questionnaire Responses CEOP Reference Site Rawinsonde Station Responses</p> <p style="text-align: center;"><b>Other Links</b></p> <p>CEOP Home Page WCRP Home Page GEWEX Home Page CLIVAR Home Page CLIC Home Page ACSYS Home Page Global Modeling and Assimilation Office (NASA/GSFC) Land Information System (NASA/GSFC) Model Parameter Estimation Experiment (MOPEX) NASA/Goddard Institute for Space Studies (GISS) Data International Atomic Energy Agency (IAEA) IAEA Isotope Hydrology Section</p>
<p style="text-align: center;"><b>Satellite</b></p> <p style="text-align: center;"><b>Data Sets</b></p> <p>EOP-1 Satellite Data Sets NASA/GMAO GrADS/DODS ISCCP Surface T and Cloud Amount for CEOP EOP1 NOAA CLASS Archive TRMM Online Visualization and Analysis System</p> <p style="text-align: center;"><b>Information</b></p> <p>CEOP Satellite Data Source Agency Links</p>	
<p style="text-align: center;"><b>Model</b></p> <p style="text-align: center;"><b>Data Sets and Information</b></p> <p>Model Output and Information</p>	

**INTEGRATED** →

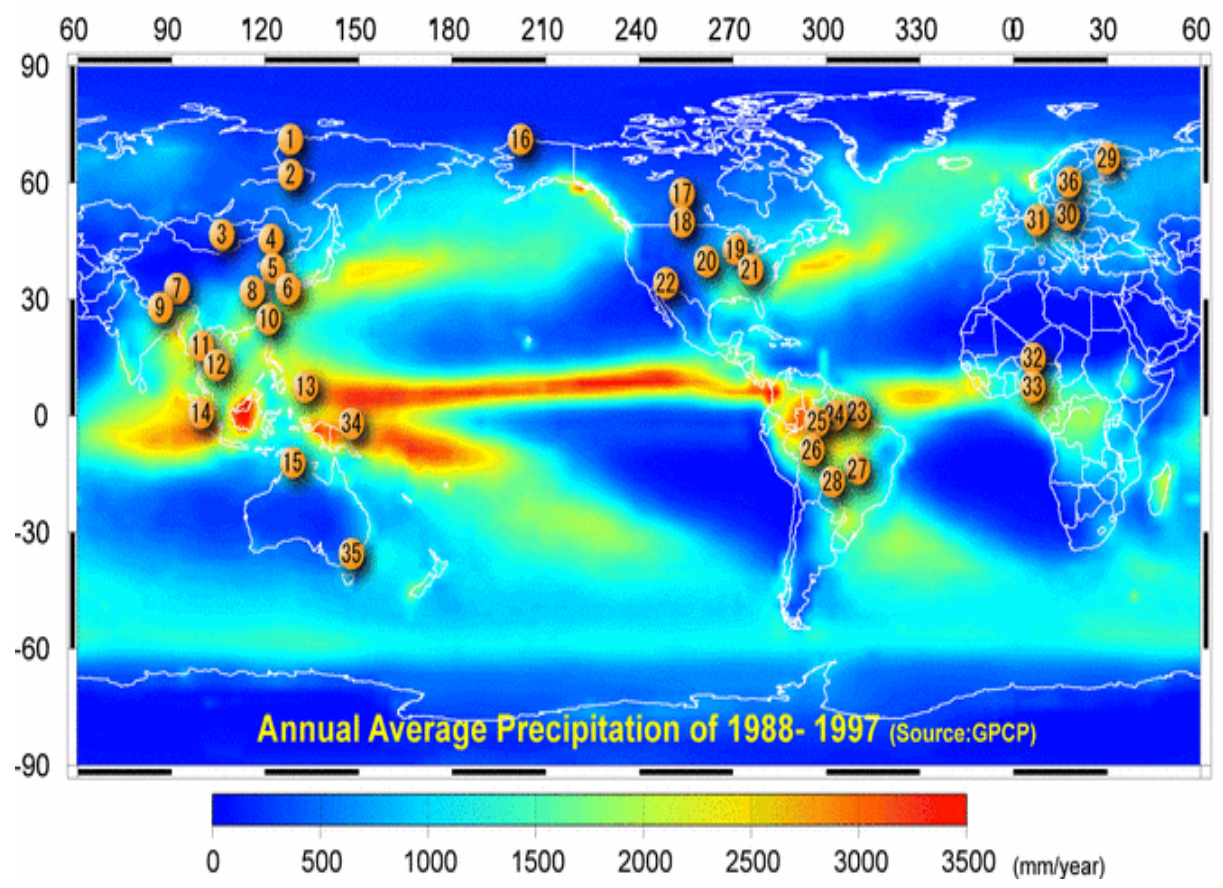
**IN-SITU** →

**SATELLITE** →

**MODEL** →

 EOL work supported by NOAA/CPO

## CEOP PHASE-1 REFERENCE SITE LOCATIONS





## CEOP REFERENCE SITE VIRTUAL TOUR CD

**“Reference Sites, their surroundings,  
and the cultural aspects of the  
region...”**

<http://www.eol.ucar.edu/projects/ceop/dm/insitu/tour>



### Reference Site Virtual Tour

For the full PowerPoint file (this file is large - 330 MB) click [here](#).

To view a slide show of the images from the presentation use the following set of links to view the show from the beginning or to view the images from a particular reference site.

[View from the beginning](#)

Jump to specific reference site:

[AMMA Niamey and Oueme](#)  
[BALTEX Cabauw](#)  
[BALTEX Lindenberg](#)  
[BALTEX Norunda](#)  
[BALTEX Sodankylä](#)  
[CAMP Chao-Phraya River and Northeast Thailand](#)  
[CAMP Eastern Siberia Taiga \(Yakutsk\)](#)  
[CAMP Eastern Siberia Tundra \(Tiksi\)](#)  
[CAMP Equatorial Island](#)  
[CAMP Himalayas](#)  
[CAMP Korean Haenam and Korean Peninsula](#)  
[CAMP Mongolia](#)  
[CAMP Northern South China Sea - Southern Japan](#)  
[CAMP Tibet](#)  
[CAMP Tongyu](#)  
[CAMP Western Pacific Ocean](#)  
[GAPP Bondville](#)  
[GAPP Ft. Peck](#)  
[GAPP Mt. Bigelow](#)  
[GAPP Oak Ridge](#)  
[GAPP ARM Southern Great Plains](#)  
[LBA Brasilia](#)  
[LBA Caxiuana](#)  
[LBA Manaus](#)  
[LBA Pantanal](#)  
[LBA Rondonia](#)  
[LBA Santarem](#)  
[MAGS BERMES](#)  
[MDB Tumbarumba and Murrumbidgee](#)  
[Other ARM North Slope of Alaska \(ARM\)](#)  
[Other ARM Tropical Western Pacific \(ARM\) - Darwin](#)  
[Other ARM Tropical Western Pacific - Manus](#)

[Back to CEOP DM web page](#)

### CEOP Reference Sites Data Release Guidelines



## Data exchange guidelines:

- (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**
- (5) Acknowledgement and citation
- (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 Phase I Reference Site Data Set Availability (as of 9 March)

CSE	Reference Site	EOP-3	EOP-4	CSE	Reference Site	EOP-3	EOP-4	
BALTEX	Cabauw			GAPP	Bondville			
	Lindenberg				Ft. Peck			
	Norunda				Mt. Bigelow			
	Sodankyla				Oak Ridge			
CAMP	Chao-Phraya River				ARM SGP			
	Equatorial Island				LBA	Brasilia		
	Himalayas			Caxiuana				
	Korean Haenam			Manaus				
	Korean Peninsula			Pantanal				
	Mongolia			Rondonia				
	Northeast Thailand			Santarem				
	Northern South China Sea			MAGS	BERMS			
	Siberia Taiga			MDB	Murrumbidgee			
	Siberia Tundra				Tumbarumba			
	Tibet			ARM	North Slope of Alaska			
	Tongyu				Tropical Western Pacific			
	AMMA	Niamey						
		Oueme						

Complete
  Partial

## Remaining Issues for CEOP Phase-I Reference Site Data Set

### CAMP

**Korean Haenam** - EOP-4 not submitted  
**Korean Peninsula** – EOP-3 second half and EOP-4 not submitted  
**Tibet** – EOP-4 sounding data?

### AMMA

**Niamey/Oueme** – Only precipitation (2001-2003) and streamflow (2001-2002) submitted.

### CPPA/GAPP

**Ft. Peck** – EOP-3 second half and EOP-4 not submitted.  
**Mt. Bigelow** – Awaiting reprocessed version of data for EOP-3 and EOP-4.  
**Oak Ridge** – EOP-3 second half and EOP-4 not submitted.

### LBA

**Brasilia** – SFC data still needed. Soundings?  
**Caxiuana** – FLX, SFC, STM, TWR data needed. Soundings?  
**Manaus** – STM, TWR data needed. Soundings?  
**Pantanal** – FLX, SFC, STM, TWR data needed. Soundings?  
**Rondonia** – FLX, SFC, STM, TWR data needed. Soundings?  
**Santarem** – FLX, SFC, STM, TWR data needed. Soundings?

### CIIC/MAGS

**BERMS** – Snowfall issue in SFC data set to be resolved.

### MDB

**Tumbarumba** – SFC, STM, TWR data needed. Soundings?



# CEOP REFERENCE SITE OpenDAP SERVER STATUS

(9 March 2007)

- Operating version running at EOL
- Complete data sets from available Reference Sites being loaded
- Solved firewall issue
- Working on interface to CODIAC System
- Working to establish metrics interface
- Plans to convert archive to NetCDF



## Reference Site Metadata



Lindenberg  
Reference Site



### STATION NAME:

Falkenberg

### CONTACT:

**Name:** Dr. Frank Beyrich

**Affiliation:**

Meteorologisches Observatorium Lindenberg  
Deutscher Wetterdienst (DWD)

**Address:**

Am Observatorium 12  
D - 15848 Tauche - OT Lindenberg  
Germany

**E-mail:** frank.beyrich AT dwd DOT de

**Telephone:** +49 33677 60228

**Fax:** +49 33677 60280

### WEB PAGES:

- [Lindenberg Meteorological Observatory Web Page](#)
- [BALTEX Home Page](#)

### STATION LOCATION:

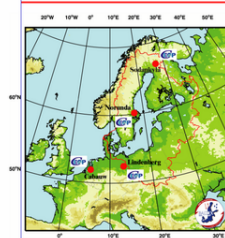
All meteorological, radiation, soil, tower and flux measurements have been performed at the Falkenberg Boundary Layer Field Site of the Meteorological Observatory Lindenberg (MOL).

The coordinates of the GM Falkenberg are given by: 52° 10' 01" N (52.17°N) and 14° 07' 27" E (14.12°E) at 73 m elevation.

The radiosondes are released at the site of the Meteorological Observatory Lindenberg (MOL) which is about 5 km to the North of the Falkenberg site.

The co-ordinates of the MOL are given by: 52° 12' 36" N (52.21°N) and 14° 07' 12" E (14.12°E) at 112 m elevation.

### BALTEX Reference Sites for CEOP



**Sodankylä (FMI)**  
67.4N/26.7E  
B. Tamminen

**Norunda (Lund University)**  
60.1N/17.5E  
A. Lindroth

**Lindenberg (DWD)**  
52.2N/14.1E  
F. Beyrich

**Cabauw (KNMI)**  
52.1N/5.2E  
F. Bosveld

## Individual Site Metadata includes:

- Station (s)
- Contact (s)
- Links to relevant web pages
- Station location (e.g. maps, photos)
- Station description (e.g. vegetation characteristics, soil types, climate)
- Parameters and Instrumentation descriptions (SFC, TWR, STM, FLX, UA)
- Links to presentations
- Links to data sets and additional documentation

### STATION DESCRIPTION:

# CEOP LAND COVER AND SOILS QUESTIONNAIRE

**Minimum Requirements - All Reference Sites are requested to fill out this portion**

Which CEOP Continental Scale Experiment (CSE) and Reference Site are these responses related to?:

Which Station at the Reference Site are these responses related to?:

**Soils Minimum Requirement**

Surface sand, silt and clay percentages; or texture class

Surface porosity (%)

**Land Cover Minimum Requirement**

Dominant land cover at the ground measurement location (detailed description or USGS class preferred; other classification optional, but specify)

Has there been a major change in land cover at the ground measurement site during the period from 1 October 2002 to 31 December 2004 (e.g. deforestation, crop rotation, fires, etc)? If yes, please provide details.

**Elevation Minimum Requirement**

Elevation (m) at the ground measurement location

**Enhanced Information - All Reference Sites may fill out this section, but BALTEX, Lindenberg, CAMP Tongyu, GAPP Bonville and MOJ are specifically requested to fill out this section.**

**Soils Enhanced Information**

Textures in deeper soil layers  
Layer sand, silt and clay percentages; or texture class

Porosity (%) in deeper soil layers

Soil infiltration rate (mm/hr)

Bulk dry density (g/cm<sup>3</sup>)

Saturated hydraulic conductivity (cm/s)

## Reference Site (Station)

### Minimum Soils Information

Texture Class, Porosity

### Minimum Land Cover

USGS Class, Site Changes

### Enhanced Soils Information

Profile (texture, porosity, infiltration, bulk dry density, saturated hydraulic conductivity, reference groups)

### Enhanced Land Cover Information

Land cover (50m, 500m, 12km, seasonal changes)

Elevation information (slope)

## Metadata design for integrating CEOP satellite imagery, reference site data and simulation result data

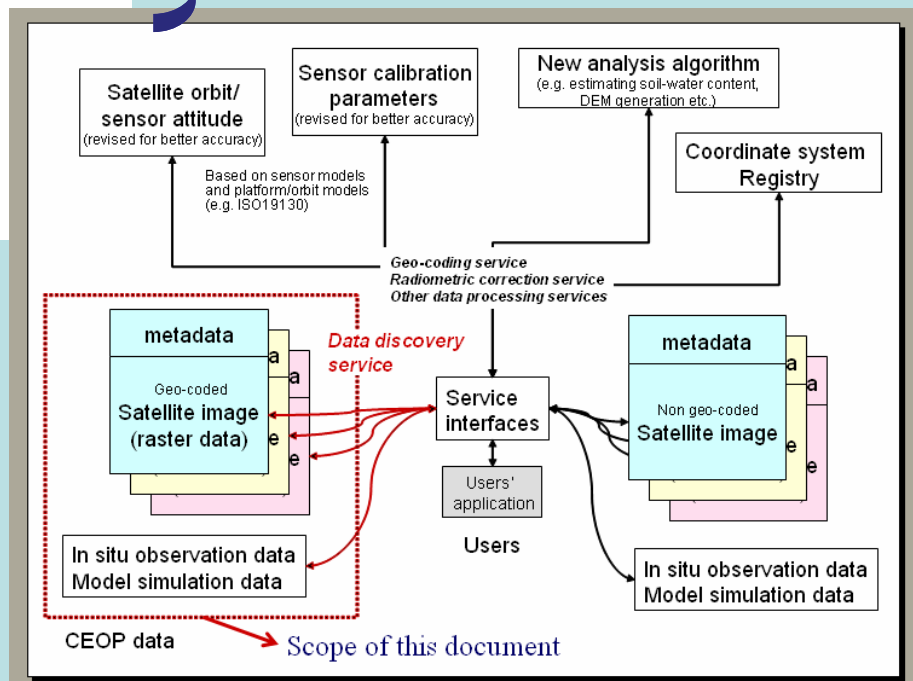
Version 1.0  
Shibasaki Group  
For "Koike global water informatics" project  
October 30, 2004

Center for Spatial Information Science  
The University of Tokyo  
4-6-1 Komaba, Mitaka-ku, Tokyo 153-8505, Japan  
Tel: +81-3-5452-6412  
Fax: +81-3-5452-6414  
<http://lab4.us.u-tokyo.ac.jp>

## CEOP Metadata Design Meeting

University of Tokyo, 1-2 November 2004

- Based on ISO 19115 Metadata Standards
- Design for Finding and Integrating data



Coordinated Enhanced Observing Period (CEOP) Hydrology Reference Site Data Management - Mozilla Firefox

http://www.eol.ucar.edu/projects/ceop/dm/hydro/

**CEOP Hydrology Reference Sites**

Data Access

Candidate Site Information

- Kyeamba Creek (Australia)
- Naqu River (China)
- Walnut Gulch (USA)
- Southern Great Plains (USA)
- Zwalm River (Belgium)
- Sleeven Polder (Ireland)
- Igarape Asu (Brazil)
- Volta River (Ghana)
- Wolf Creek (Canada)

Project Information

CEOP, the GEWEX Coordinated Enhanced Observing Period, has as its overarching goal and model the influence of continental hydroclimate processes on the predictability of circulation and changes in water resources ... The first of two CEOP objectives is "To observe to better document and simulate water and energy fluxes and reservoirs

Done

- Contacting Data Sources
- Subsetting Data Sets
- **Need to reformat into CEOP format**

### CEOP Hydrology Reference Site Data Sets

Southern Great Plains (USA)		
<a href="#">Surface Meteorology and Radiation Data Set</a>	Oct 2002 - Dec 2004	CEOP Format
<a href="#">Meteorological Tower Data Set</a>	Oct 2002 - Dec 2004	CEOP Format
<a href="#">Soil Temperature and Moisture Data Set</a>	Oct 2002 - Dec 2004	CEOP Format
<a href="#">Flux Data Set</a>	Oct 2002 - Dec 2004	CEOP Format
<a href="#">Streamflow Data Set</a>		
Walnut Gulch (USA)		
<a href="#">Daily/Monthly/Annual Precipitation Data</a>	1954 - Current	Source Format
<a href="#">Daily/Monthly/Annual Runoff Data</a>	1954 - Current	Source Format
Naqu River (China; CAMP Tibet)		
<a href="#">Surface Meteorology and Radiation Data Set</a>	Oct 2002 - Mar 2003	CEOP Format
<a href="#">Meteorological Tower Data Set</a>	Oct 2002 - Sep 2003	CEOP Format
<a href="#">Soil Temperature and Moisture Data Set</a>	Oct 2002 - Mar 2003	CEOP Format
<a href="#">Flux Data Set</a>	Oct 2002 - Mar 2003	CEOP Format
Zwalm River (Belgium)		
No data yet.		
Kyeamba Creek (Australia)		
No data yet.		
Sleeven Polder (Ireland)		
No data yet.		
Igarape Asu (Brazil)		

## CEOP and CliC COORDINATION ACTIVITIES

Data and Information Service for CliC - DISC

WCRP CliC

Climate and Cryosphere

...a core project of the World Climate Research Programme

Project Office ACSYS CliC Data & Info Contact Us

**D I S C**

Data and Information Service for CliC

Cryosphere

Datasets Image of the Month Links

Media Meetings Newsletters

Publications Reference Materials Reports

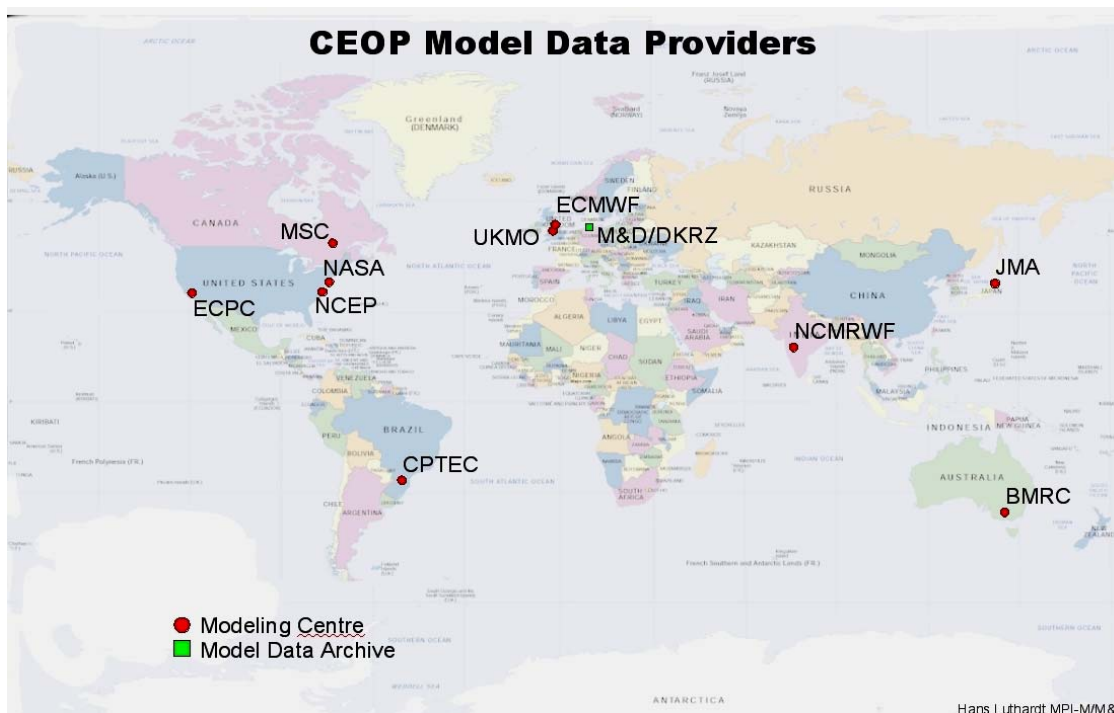
© CIPO

### COLLABORATION FOR IPY

- Cold Weather Precip Questionnaire
- Link CEOP Data to DISC
- Common metadata (ISO19115)
- Shared Archives (Interoperability)
  - AON, Buoys, field project data
  - Satellite data/products
- Additional Reference Sites
- Entrain Cryospheric Community
- CEOP/CliC Joint Session (Paris, 2006)







## Model Data Content (as of 6 February 2007)

CEOP data	2001												2002												2003												2004												Included	Size	
	Prelim												Building phase												1. Annual Cycle												2. Annual Cycle														
06-FEB-2007																																																			
NCEP	GRID																																																		674.2 GB
	MOLTS																																																		5.4 GB
	CDAS_GRID																																																		7.4 GB
	CDAS_MOLTS																																																		
UKMO	GRID																																																		568.6 GB
	MOLTS																																																		9.7 GB
JMA	GRID																																																		465.7 GB
	MOLTS																																																		15 GB
ECMWF	GRID																																																		42.9 GB
	MOLTS																																																		
ECPC	SFM_GRID																																																		1282 GB
	SFM_MOLTS																																																		12.2 GB
	RII_GRID																																																		1282 GB
	RII_MOLTS																																																		12.2 GB
	RSMICTS																																																		8.9 GB
BMRC	GRID																																																		1.5 GB
	MOLTS																																																		14.3 GB
NASA/GMAO	GRID																																																		0.1 GB
	MOLTS																																																		215.3 GB
NASA/GLDAS	GRID																																																		0.2 GB
	MOLTS																																																		20.5 GB
NCMRWF	GRID																																																		180.2 GB
	MOLTS																																																		0.05 GB
CPTEC/INPE	GRID																																																		948.5 GB
	MOLTS																																																		0.6 GB
MSC	GRID																																																		
	MOLTS																																																		
EMC	GRID																																																		
	MOLTS																																																		

■ Gridded data      ■ MOLTS data      ■ WTF – tables  
■ Data arrived in the Hamburg file archive but not yet included into the data base  
■ Data will shortly be replaced by an updated version

5635.75 GB

Hans Luthardt M&D/MPI-M

The most recent version of the data status (time line) can be found from:  
<http://www.mad.zmaw.de/wdc-for-climate/ceop/>



## Web Access to CEOP model data



Access by internet (web browser) to the CERA Gateway

<http://ceop.wdc-climate.de>

<http://www.mad.zmaw.de/wdc-for-climate/ceop/>

or

by java command line tool ('jblob')

CERA Gateway page for CEOP also provides summary information (e. g. time line representation of available data) on the data base content and data descriptions

Coordinated Enhanced Observing Period (CEOP) Data Management - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.joss.ucar.edu/ghp/ceopdm/model/model.html

Getting Started Colorado Weather Forecast Models Scot's Weather Text... Scot's Weather Ima... AT&T: Directory Assi... CNN.com JOSS Project Pages Nedcam

### CEOP Model Center Documentation

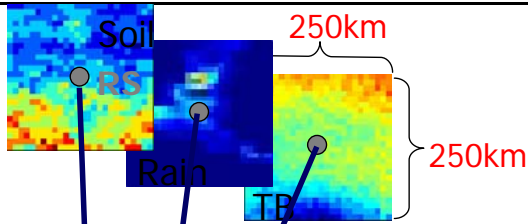
This table summarizes some basic characteristics of models providing MOLTS output for CEOP. **DRAFT** (as of 1 November 2004, to be completed by all Centre representatives. Further columns may have to be added, if required.)

Center (Linked to further documentation)	Model Name and Type (operational, re-analysis, forecast, ...)	Model Horizontal Resolution (Both spectral and long/lat or km information)	Time Resolution	Number of Vertical Levels	Vegetation Description Scheme Used (name and number of types, details in a separate table)	Soil Description Scheme Used (name and number of types, details in a separate table)	MOLTS Location Characteristics Table	MOLTS Format
BMRC	Operational Global Medium Range Prediction Model	T239L29	1 hour	29	bucket hydrology	3 layers		netCDF
CPTEC	CPTEC/COLA	T126 gaussian grid ~1.125 degrees on pressure surfaces	6 hours	28	SSIB scheme 13 vegetation types	13 types related to the vegetation		IEEE binary read from GRADS
ECMWF	ERA-40 (and continuation)	T159 Reduced gaussian grid (125 km)	1 hour	60	TESSEL BATS classification	1 soil type	Table ERA-40	ASCII
	Operations	T511 Reduced gaussian grid	1 hour	60	TESSEL BATS classification	1 soil type	Table Operations	ASCII

Done

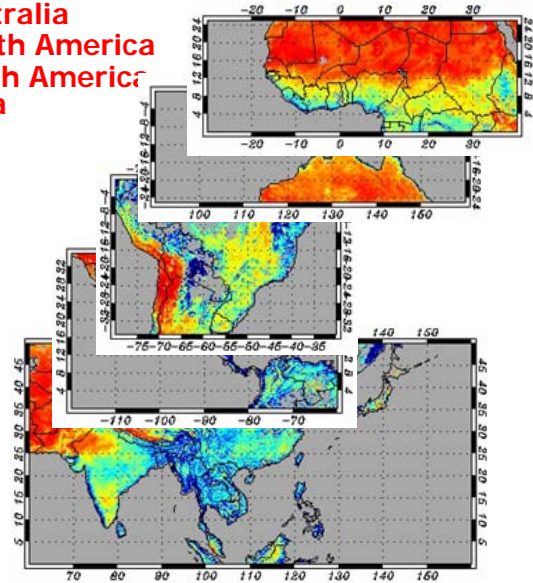
# 3 Types scale of Satellite datasets

## 1. Reference site: 35 Points

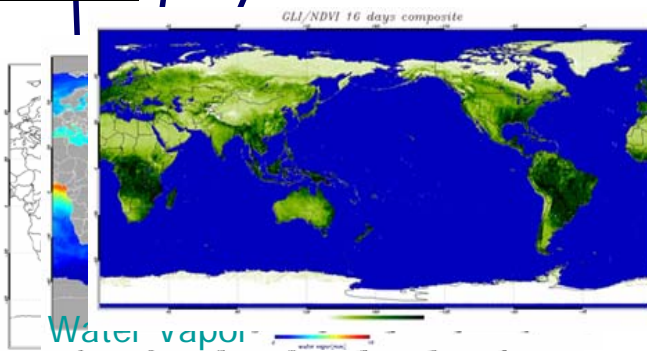


## 2. Monsoon Region

- > North Africa
- > Australia
- > South America
- > North America
- > Asia

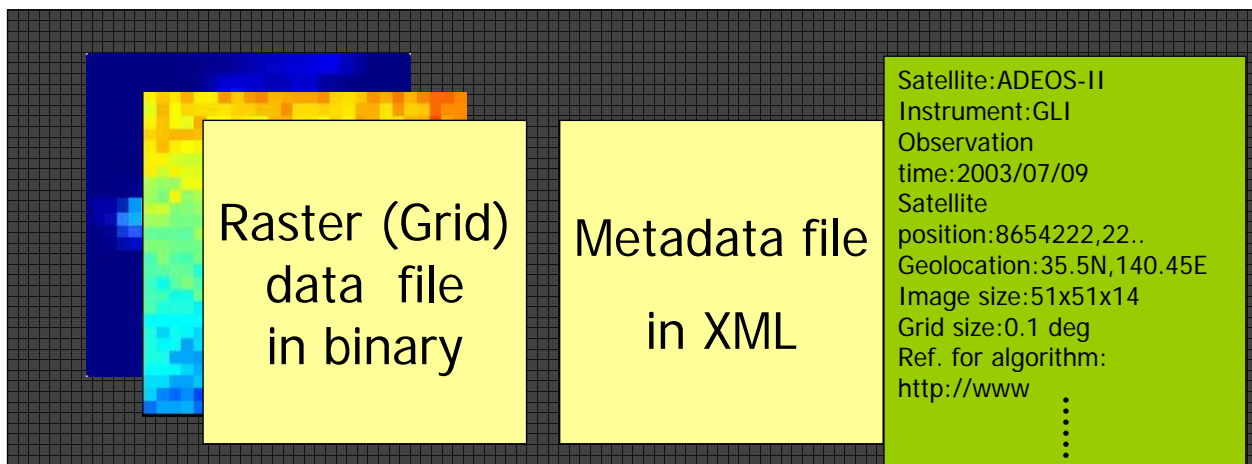


## 3. Global



# CEOP Dataset Format

A dataset consist of raster(Grid) data file in band sequential format (BSQ) and metadata file in XML.



# Currently Available Datasets from JAXA and UT

## (Reference Site Scale)

Platform	Sensor	Level	Description	EOP-1	EOP-3	EOP-4	Subsetting
AQUA	AMSR-E	L1B	Brightness Temperature	/			
		L2, L3	Soil Moisture				
			Snow Water Equivalent				
			Rain Rate				
			Water Vapor				
			Cloud Liquid Water				
			Sea Surface Temperature				
			Sea Surface Wind Speed				
ADEOS-II	AMSR	L1B	Brightness Temperature	/			
		L2, L3	Soil Moisture				
			Snow Water Equivalent				
			Rain Rate				
			Water Vapor				
			Cloud Liquid Water				
			Sea Surface Temperature				
			Sea Surface Wind Speed				
	GLI	L1B	Radiance				
		L2, L3	Precipitable water				
			Sea Surface Temperature				
			Snow Grain Size				
			Aerosol Optical Thickness				
			Cloud Parameter				
Cloud Liquid Water							
TRMM	TMI	L1B	Brightness Temperature				
		L2, L3	Rain Rate Profile				
	PR		L2, L3				
DMSP F13,14,15	SSM/I	L1B	Brightness Temperature				
GMS, GOES	SVISSR	L1B	Radiance				
NOAA	AVHRR	L1B	Radiance				
TERRA/AQUA	MODIS	L1B	Radiance				

Global area
  Asian region only
  Not provided

# Currently Available Datasets from JAXA and UT

## (Monsoon and Global Region)

Platform	Sensor	Level	Description	EOP-1	EOP-3	EOP-4	Subsetting
AQUA	AMSR-E	L1B	Brightness Temperature	/			
		L2, L3	Soil Moisture				
			Snow Water Equivalent				
			Rain Rate				
			Water Vapor				
			Cloud Liquid Water				
			Sea Surface Temperature				
			Sea Surface Wind Speed				
ADEOS-II	AMSR	L1B	Brightness Temperature	/			
		L2, L3	Soil Moisture				
			Snow Water Equivalent				
			Rain Rate				
			Water Vapor				
			Cloud Liquid Water				
			Sea Surface Temperature				
			Sea Surface Wind Speed				
	GLI	L1B	Radiance				
		L2, L3	Precipitable water				
			Sea Surface Temperature				
			Snow Grain Size				
			Aerosol Optical Thickness				
			Cloud Parameter				
Cloud Liquid Water							
TRMM	TMI	L1B	Brightness Temperature				
		L2, L3	Rain Rate Profile				
	PR		L2, L3				
DMSP F13,14,15	SSM/I	L1B	Brightness Temperature				
GMS, GOES	SVISSR	L1B	Radiance				
NOAA	AVHRR	L1B	Radiance				
TERRA/AQUA	MODIS	L1B	Radiance				

Global area
  Not Requested
  Not provided

