



CEOP REFERENCE SITE DATA UPDATE

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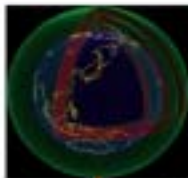


CEOP Model Output Development & Analysis Workshop
UCI, Irvine, California, USA
8-9 March 2004

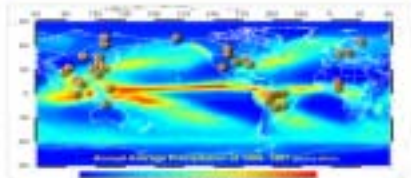


The First Global Integrated Data Sets of the Water Cycle

Model Outputs by Numerical Weather Prediction Centers



Surface Observational (in-situ) Data from the 33 CEOP Reference Sites



Satellite Remote Sensing Data



In-Situ Data Archiving Center at UCAR
(Center at University Corporation for Atmospheric Research) of USA
<http://www.ucar.edu/>

MODEL Output Data Archiving Center at Max-Planck Institute of Germany
<http://www.mpg.de/>

Data Integrating/Archiving Center at University of Tokyo and NASDA of Japan
<http://monsoon.t.u-tokyo.ac.jp/ceop/>

Input of Observed Data into Model



Global Land Data Assimilation System at NASA Goddard Space Flight Center of USA
<http://ldas.gsfc.nasa.gov/>



Data Archive Center



CEOP DATA MANAGEMENT WWW PAGE

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



In-Site Reference Site Data Sets and Information

Data Sets

- CEOP EOP-1 Reference Site Data Sets
- CEOP EOP-1 Reference Site Data Sets
- NASA/GISS/CEOP EOP-1 Reference Site Data Sets in OASIS FORGE
- Sample Reference Site Data Sets
- CEOP In-Situ Data Source Agency Links
- Equatorial Atmosphere Radiation Network (ERAN)
- GINEX Land Process Database Map Server

Information

- CEOP Reference Site Database Procedures Report (Approved by the GC2 in July 2003)
- CEOP Reference Site Station Checksheet
- CEOP Reference Site Map
- Reference Site Data Management 11 Update (public) 100 Meeting, 20-24 January 2003
- CEOP Reference Site In-situ Data Station Questionnaire
 - Response

Satellite Data and Information

Data Sets

- EOP-1 Satellite Data Sets
- NASA/GISS/ERAN/GISS/CEOP Database and Cloud Award for CEOP EOP

Information

- CEOP Satellite Data Source Agency Links

Model Output and Information

Data Policies

- New DRAFT CEOP Reference Site Data Release Guidelines

- SAITEP
- CAMP
- CATCH
- GAIT
- ISA
- MAGE

Data Standards Information

- Assistance for land surface modeling activities (AUMM)
- Atmospheric Model Intercomparison Project (AMIP)
- GDFC 2.1

Documents

- CEOP Implementation Plan
- Report from the 2nd CEOP Implementation Planning Meeting (DRAFT - 8 July 2003)
- WRF Major Activities Plan (1 June 2003)
- CEOP Reference Site Station Checksheet Questionnaire
- Establishment of a Global Hydrological Observation Network for Climate/GCMs/2003 WRF Meeting Report (June 2003)

Other Links

- CEOP Home Page
- WCFP Home Page
- GINEX Home Page
- CDVIR Home Page
- CSC Home Page
- ACOS Home Page
- Global Modeling and Assessment Office (NASA/GMAO)
- Land Information System (NASA/GISS)
- Model Facility for Evaluation Experiment (MFE)
- NASA/Goddard Institute for Space Studies (GISS) Data



Coordinated Enhanced Observing Period (CEOP) Model Output and Information



CEOP Model Data Sets and Information

Model Output Data Sets

- CEOP Model Data Gateway
- NASA/GISS Data Assimilation Office (DAO) Data
- NCEP GFS (AVN/MFR) MCOIS output
- GDAS/CEOP EOP-1 MCOIS output
- CEOP Model Output Source Agency Links

CEOP Model Output Teleconference Notes

- Tenth Formal Telecon (1 December 2003) (DRAFT)
- Ninth Formal Telecon (29 October 2003) (DRAFT)
- Eighth Formal Telecon (17 September 2003)
- Seventh Formal Telecon (30 July 2003)
- Sixth Formal Telecon (2 June 2003)
- Fifth Formal Telecon (28 April 2003)
- Second (17 Dec 2002), Third (3 Feb 2003), and Fourth (11 Mar 2003) Formal Telecons
- First Formal Telecon (15 November 2002)

General Information

- Guidelines for CEOP Model Output Definition of HWF Center, Met Agencies and the DAO (10 Dec 2002)
- Model Output Variables Requested by CEOP (28 Mar 2003)
- MFI3 Statement (1 Nov 2002)
- Listing of CEOP proposed MCOIS locations
- Map of CEOP proposed MCOIS locations

CEOP Model Center Documentation

BoM

- + None

CPTEC

- + CPTEC Contribution to CEOP (10 Dec 2002)

ECMWF

- + ECMWF Contribution to CEOP (13 Dec 2002)
- + ECMWF CEOP MDT3 locations (13 Dec 2002)

ECPC

- + ECPC CEOP Contributors (20 May 2002)
- + ECPC Model Characteristics (30 May 2002)
- + ECPC Model Output Times (30 May 2002)
- + ECPC CEOP Variables and Processes (30 May 2002)
- + ECPC (MWR) MDT3 Characteristics (30 May 2002)

JMA

- + JMA Contribution to the CEOP Dataset (17 Dec 2002)
- + Additional JMA Comments and Questions on the CEOP Dataset (17 Dec 2002)
- + JMA CEOP MDT3 locations (18 Dec 2002)
- + Vertical levels of JMA CEOP Output Data (18 Dec 2002)
- + Elements of GCMs from JMA Operational 3-DVAR Global Analysis (18 Dec 2002)
- + Sample of JMA MDT3 Output (3 Feb 2003)

NASA Global Modeling and Assimilation Office (GMAO; formerly DAO)

- + File Specification for the GEOS DAS Gridded Output (Version 4.2) (4 June 2002)

NASA GLDAS

- + None

NCEP Operational

- + Output for CEOP from NCEP Global Data Assimilation and Forecast Model (14 Mar 2002)
- + NCEP Global Forecast System Implementation (29 Oct 2002)
- + NCEP GR3 Table 2 (14 Mar 2002)
- + NCEP Output of International CEOP MDT3 Sites (14 Mar 2002)
- + NCEP Global Model Characteristics of CEOP MDT3 Reference Sites (14 Mar 2002)
- + Vertical grid levels of NCEP Global Model MDT3 Output (14 Mar 2002)
- + NCEP data of MFI (28 Mar 2002)
- + NCEP CEOP Data ORA Storage (28 Mar 2002)
- + Map of proposed NCEP ETA MDT3 locations for NAME
- + Map of current NCEP ETA MDT3 locations around the AFM SOP site

NCMRWF

- + NCMRWF Notes on Gridded Data (19 Nov 2002)
- + NCMRWF CEOP Data Codes (19 Nov 2002)

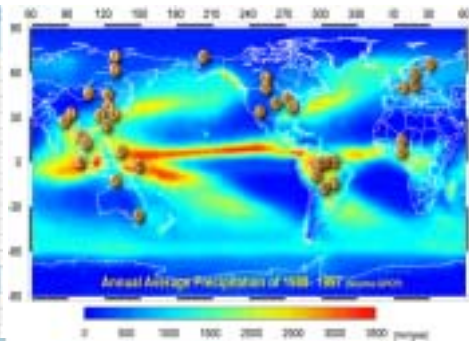
UKMO

- + Met Office Contribution to CEOP (12 Nov 2002)
- + IMAO GR3 Table 2 for CEOP Data (28 Mar 2002)
- + Model Locations of IMAO's Reference Sites (28 Mar 2002)
- + RAW for CEOP MDT3 and OASIS data from IMAO (12 Jun 2002)
- + Met Office Scientific Advisory Committee Presentations (28 Mar 2002)



REFERENCE SITE LOCATIONS

Number	Reference Site Name	Latitude	Longitude
CEOP			
1	Robert Mueller (India)	11.217°N	100.170°E
2	Robert Mueller (Irig)	22.999°N	101.647°E
3	Mangalia	42.254°N	101.270°E
4	Java Mangalia	66.677°N	103.817°E
5	Erzincan (Turkey)	37.965°N	107.930°E
6	Arad (Romania)	47.180°N	104.970°E
7	Ulaan	46.860°N	111.870°E
8	Trangcar (Indo)	22.200°N	112.300°E
9	Wrocław	51.101°N	16.613°E
10	South East (Ethiopia - Southern region)	69.747°N	101.719°E
11	Winnipeg (Canada)	49.895°N	99.130°E
12	North East (Ethiopia)	14.461°N	100.171°E
13	Western Pacific Ocean	1.000°N	154.270°E
14	Southwest (Ethiopia)	0.000°N	100.200°E
Other			
15	USA National Western Pacific (Alaska)	62.670°N	150.670°E
16	USA North Slope of Alaska (Barrow)	71.300°N	156.780°E
17	USA National Western Pacific (Alaska)	20.000°N	149.400°E
WAOIS			
17	WAOIS 20°N/160°W (Japan)	64.000°N	150.000°E
GANP			
18	Yi Peed	46.430°N	100.100°E
19	Shanghai	40.210°N	91.210°E
20	Asia Southern (South Korea)	35.270°N	127.100°E
21	Osaka (Japan)	35.680°N	139.760°E
22	San Francisco	37.820°N	122.470°E
USA			
23	Madison	43.070°N	91.630°E
24	Lawrence	38.000°N	94.770°E
25	Winnipeg	49.895°N	99.130°E
26	Albuquerque	35.080°N	106.650°E
27	San Jose	37.330°N	121.890°E
28	Portland	45.520°N	122.670°E



Number	Reference Site Name	Latitude	Longitude
SAFICS			
29	Saigon (Vietnam)	11.210°N	105.450°E
30	Guangzhou (China)	23.000°N	113.100°E
31	Wollongong (Australia)	34.000°S	150.900°E
32	Wellington (New Zealand)	41.280°S	174.800°E
CAFCO			
33	Alaska	64.000°N	149.000°E
34	Greenland	60.000°N	20.000°E
MD3			
35	South America	20.000°S	100.100°E

EVIDENCE	GATE					MADRID
	22E	22W, 23	Pt. Pico, 21T	Two Pige, 21T	St. Augustin, 22	
Site Location	541 - 304	48128	48128	33568	33428	53419 - 54128
Longitude	94.574 - 120.250	91.250	121.150	94.250	118.150	104.24 - 120.250
MOLTE Location	38.818	48128	48128	33568	33428	35.638 (33.988) (33.928)
	97.450	91.250	121.150	94.250	118.150	186.260 (105.120) (104.650)
MOLTE Elevation (m)	203	-280			203	600-63 (528-54) (578-21)
Site Maps	X	X	X	X	X	X
Site Context	X	X	X	X	X	X
Site Status	X	X	X	X	X	X
Site Type	X	X	X	X	X	X
Data Collection Period	2004 to Present	25 Aug 2006 to Present	1 Dec 1999 to Present	1 Jan 1981 to Present	17 Apr 2002 to Present	1 Jan 1997 to Present
Sample Data Set	X	X	X	X		X
Data Access	X					
ICP-1 Data Entered	X	X	X			
SEVER AIR OBSERVATIONS						
Redwood (X = on-site, XX = off-site operational)	X	XX	XX	XX	XX	XX
Radio	X					
Life	X					
Profile	X					
RAOS	X					
SURFACE OBSERVATIONS						
Air Temperature	X	X	X	X	X	X
Humidity	X	X	X	X	X	X
Wind	X	X	X	X	X	X
Pressure	X	X	X	X	X	X
Precipitation	X	X	X	X	X	X
Soil Temperature	X	X	X	X	X	X
Upward Shortwave Radiation	X	X	X	X	X	X
Downward Shortwave Radiation	X	X	X	X	X	X
Upward Longwave Radiation	X	X	X	X	X	X
Downward Longwave Radiation	X	X	X	X	X	X
Upward Photosynthetically Active Radiation	X	X	X	X	X	X
Downward Photosynthetically Active Radiation	X	X	X	X	X	X

ECP REFERENCE SITE INVENTORY

Public Sea Experiment (BAS-TRC)

Cuba

State: Dr. Fred Borell
Affiliation: Royal Swedish Academy
Address: P.O. Box 204
3700 AE De Dib
The Netherlands
Email: borell@bas.nl
Telephone: +31 38 2208 707 (t)
+31 38 2208 911 (f)
Fax: +31 30 2210 407

Lindenberg

State: Dr. Frank Dopick
Affiliation: Meteorologisches Observatorium Lindenberg
Address: Jan-Otto-Ring 12
D - 12564 Lindenberg
Germany
Email: Frank.Dopick@meteo.lindenberg.de
Telephone: +49 3032671 68220
Fax: +49 3032677 60208

Saskatoon

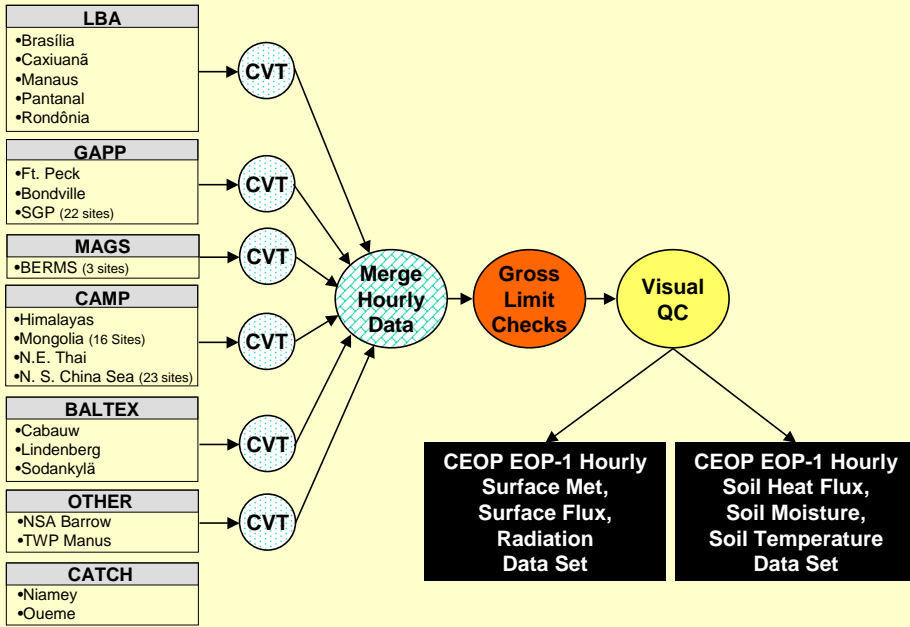
State: Doug Tunnicliffe
Affiliation: Research manager
Solar- and wind-energy, renewable energy
Address: Paradise 15 A
P.O. BOX 305
S7N 0S1 S1 Saskatoon
Canada
Email: doug.tunnicliffe@ec.gc.ca
Telephone: +158 9 1829 4360
Mobile: +158 30 9804 210



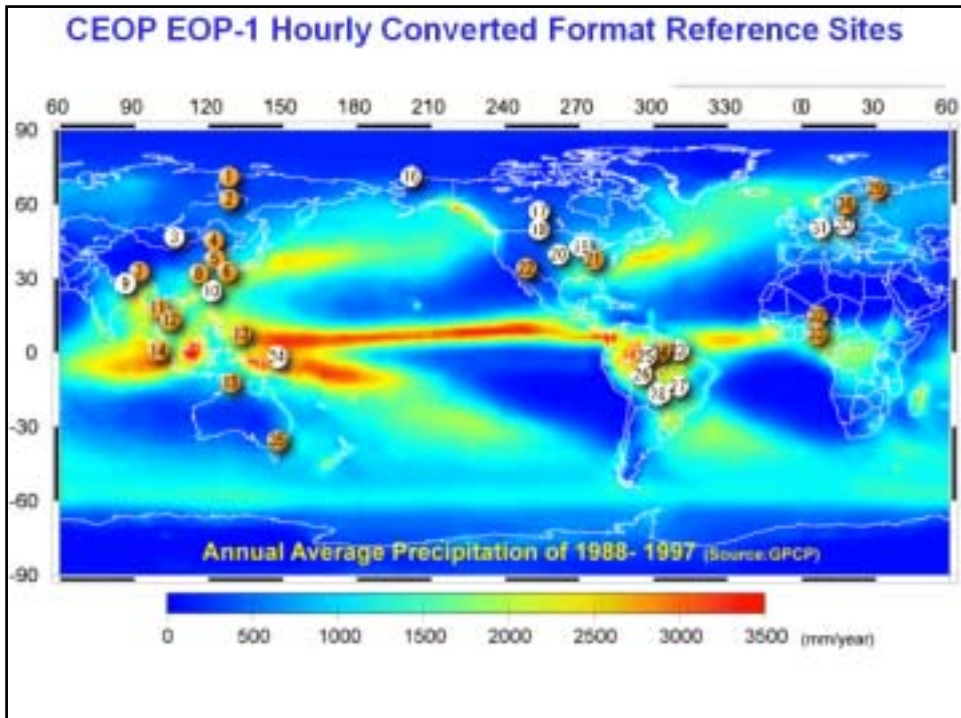





CEP EOP-1 "Composite" Data Set Development



CEOP EOP-1 Hourly Converted Format Reference Sites





“Composite” Reference Site Dataset Issues from Berlin Meeting (April, 2003)

- Prepare cold weather precipitation questionnaire to document measurement/collection techniques, instrumentation, and data processing
- Update Reference Site documentation and metadata
- Finalize data parameters and file organization
- Finalize temporal resolution, averaging interval, and data formats
- Document data quality assurance/control procedures
- Document data collection and submission for CEOP Annual Cycle Datasets (schedule)



Reference Site Data Set Procedures Report (Approved by the SSC on 29 July 2003)

- Introduction
- Data Set Description, submission schedule, formats
- Metadata
- Gap filling
- Quality Control/Quality Assurance
- File naming convention
- Submission instructions to CDA
- CDA Composite formation
- CDA Quality Assurance
- Rawinsonde Data Sets
- Ancillary Data Sets

Data Set	File Extension	Submission Date Interval (UTC-2)	Submission Time Interval (UTC-2)	Submission Rate (per day)	Submission Rate (per hour)	Submission Format
Surface Meteorological and Radiation Data Set	CSVgen	1 October 2002	1 April 2004	1500000	1 per 2000	NetCDF Hierarchical and Database Format
Flux Data Set	CSVgen	1 July 2004	1 January 2005	1 per 2000	1 per 2000	Flat Format
30m Temperature and Surface Wind Data Set	CSVgen	1 October 2002	1 April 2004	1000000	1 per 2000	Self-Describing Flat Database Format
Radiosonde Time Series Data Set	CSVgen	1 October 2002	1 April 2004	1000000	1 per 2000	Self-Describing Flat Database Format



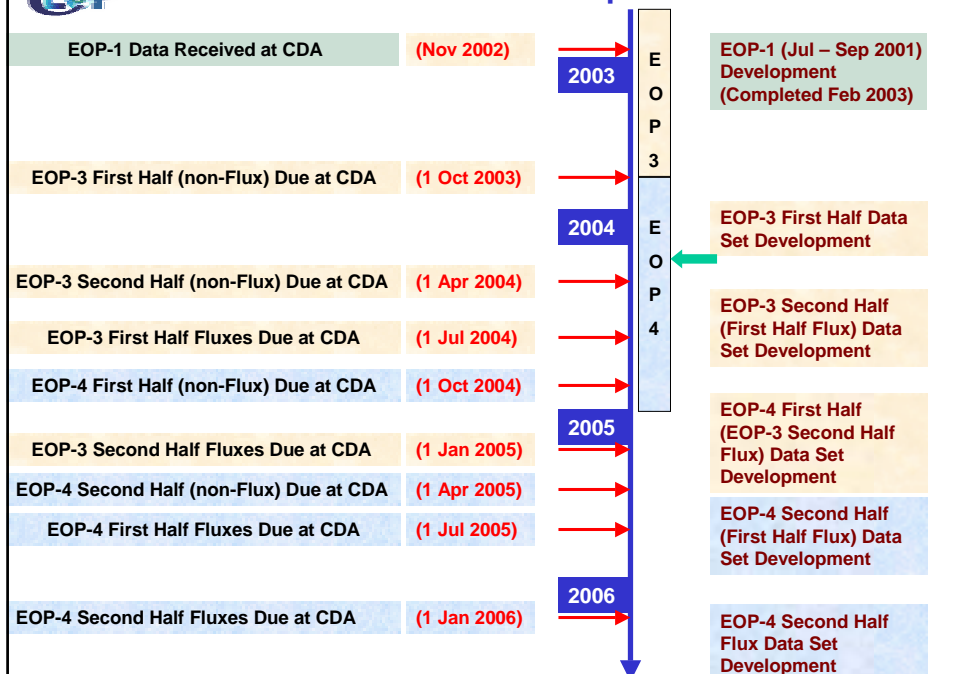


REFERENCE SITE FLUX DATA SET FORMAT

Parameter	C Format	Missing Value	Final Units/Equations/Notes
UTC Nominal Date/Time	16 chars	N/A	yyyy/mm/dd HH:MM, where MM is 00 or 30, only
UTC Actual Date/Time	16 chars	N/A	yyyy/mm/dd HH:MM
CSE Identifier	10 chars	N/A	Fill name with underscores, not spaces.
Reference Site Identifier	15 chars	N/A	Fill name with underscores, not spaces.
Station Identifier	15 chars	N/A	Fill name with underscores, not spaces.
Latitude	f10.5	-99.99999	decimal degrees. South is negative.
Longitude	f11.5	-999.99999	decimal degrees. West is negative.
Elevation	f7.2	-999.99	meters
Sensor Height	f7.2	-999.99	meters; Height of sensor. Positive above ground level. Negative below ground.
Sensible Heat Flux	B.2	-999.99	W/m ²
Sensible Heat Flux Flag	1 char	M	See Flag values .
Latent Heat Flux	B.2	-999.99	W/m ²
Latent Heat Flux Flag	1 char	M	See Flag values .
CO2 Flux	B.2	-999.99	μmol/m ² /s
CO2 Flux Flag	1 char	M	See Flag values .
Soil Heat Flux	B.2	-999.99	W/m ²
Soil Heat Flux Flag	1 char	M	See Flag values .

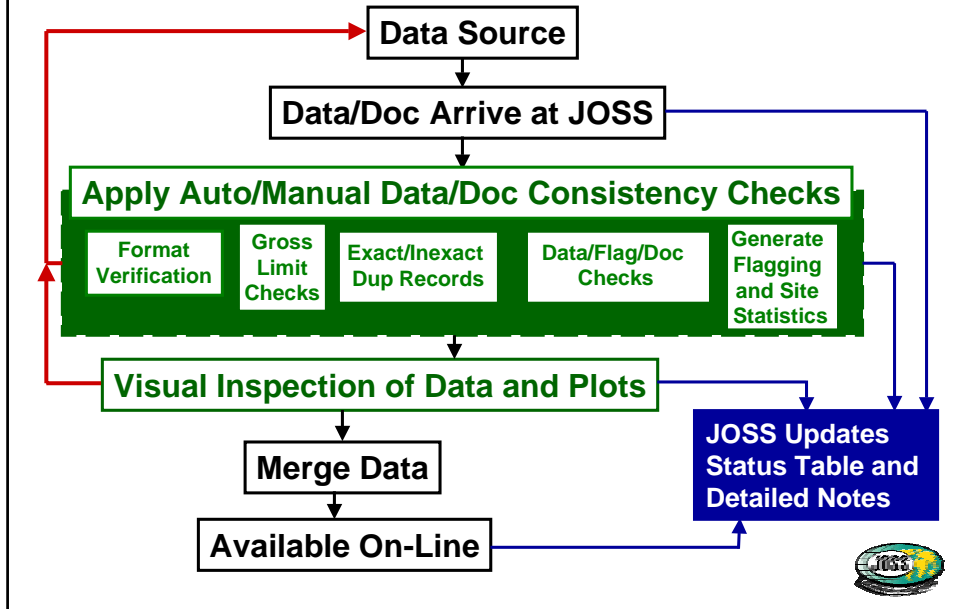


Reference Site Data Set Development Timeline





Reference Site EOP-3 Data Flow



UCAR/JOSS Manual Data and Documentation Consistency Checks

- Examine documentation and data files for completeness.
- Examine in-depth results from UCAR/JOSS automated checking software.
- Consistent CSE, Reference Site, and Station between data file name, data file metadata, and documentation file.
- Consistent station location information between doc and data.
- Consistent sensor heights between doc and data.
- Examine data flag usage.
- Verify data flags properly applied.
- Verify proper units used.
- Examine time series plots of every parameter at every station.





UCAR/JOSS Automated Data Consistency Checks and Statistics for CEOP

Consistency Checks Applied per the 29 July 2003 CEOP SSC Approved Formats:

- File Name in Proper Form (i.e., CSE_RefSite_StatID_BegnDate_EndDate.suffix)
- File is Sorted Correctly.
- File does Not Contain Exact Duplicate Records
- File does Not Contain In-Exact Duplicate Records (i.e., dates/times/names/stations match but not data)
- Every Record is Correct Length
- No Control Chars in Any Record
- Verify Meta Data and Data Field Location and Justification (i.e., locations of slashes, colons, decimal points, spaces, etc.)
- Consistency between File Name and Meta Data and Data in File
- Consistency between Nominal and Actual Data/Times within Each Record
- Gross Limit Check each Meta Data and Data Value
- Check for Data Values of -0.00
- Sensor Height are Valid (Soils ≤ 0.00 ; Tower ≥ 0.00)
- Flag Values are Valid (U,G,D,B,C,M, or I only)
- Missing Data Value Has Missing Flag (i.e., C or M only)
- Identify Completely Missing Records
- Constant Station Location (lat/lon/elev)

The following statistics are Produced:

- Extreme Values for Each Parameter
- Count & Percent of Each Flag Type for Each Parameter
- List of All Stations/Lat/Lon Sets Found
- List of All Sensor Heights Found
- Tracks/Prints Station Information for Every Station
- Summarizes Total Error Counts for Data and Meta Data

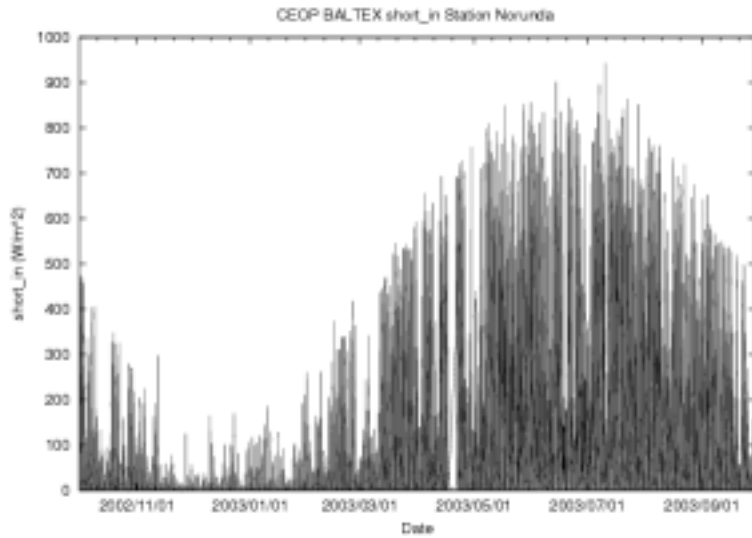


CEOP First Half EOP-3 Data and Documentation Issues

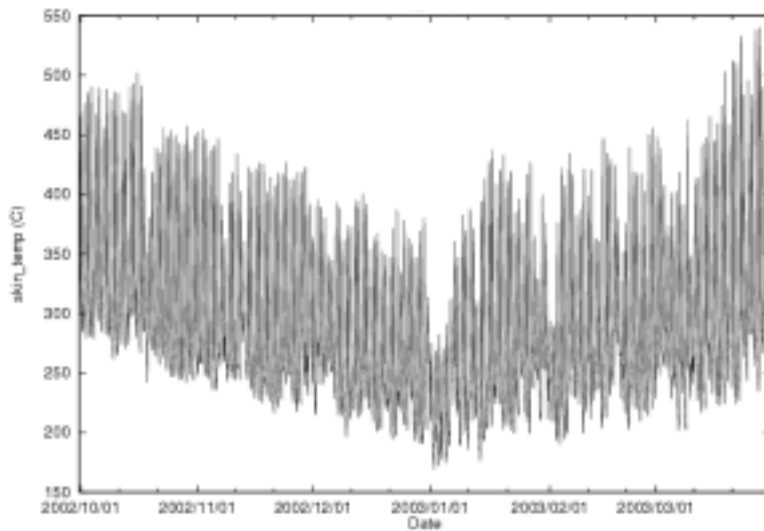
- **Incomplete documentation and/or data files.**
- Information in documentation file does not match data file (e.g. station locations, heights and depths of measurements).
- Incorrect data file format. Incorrect date format.
- Reporting 00:00 UTC observation as 24:00 UTC.
- Incorrect flag applied to missing data. Incorrect missing value used.
- **Inexact duplicates present in the data (e.g. two records of data at the same reporting time but with different parameter values).**
- Using missing values when deriving parameters.
- Large amounts of data flagged as Bad or Dubious without explanation in documentation.
- **Incorrect units used. Incorrect parameters included in data.**
- Sensor heights reported with incorrect sign.
- Reporting the surface pressure at all heights of the tower data.
- **Having multiple measurements of the same parameter at the same height or depth without a way to differentiate.**



INCOMING SHORTWAVE

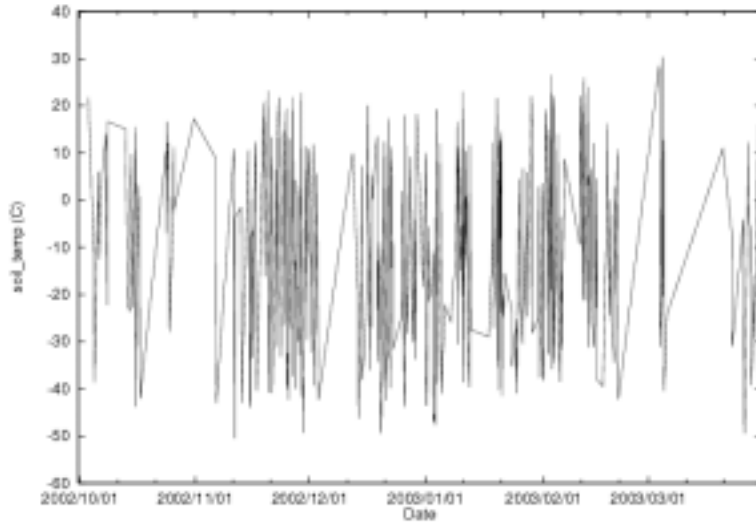


SKIN TEMPERATURE

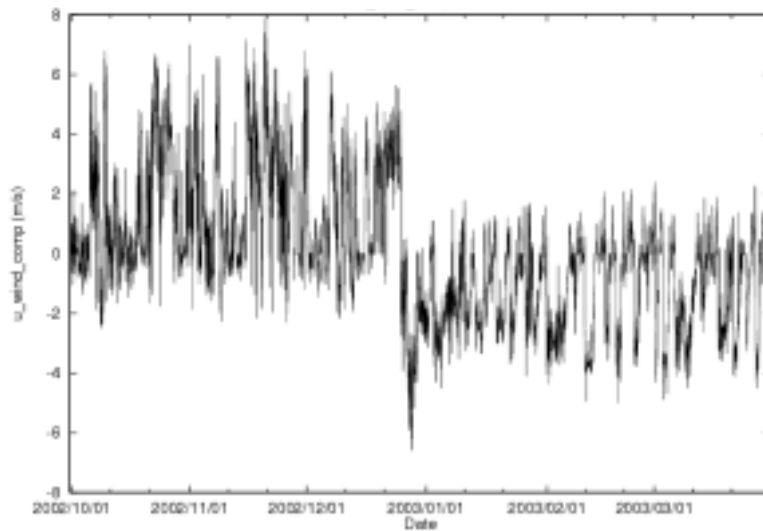




SOIL TEMPERATURE

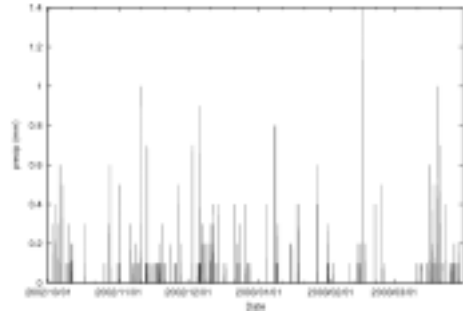
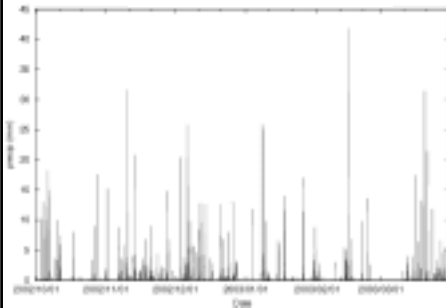



U-WIND COMPONENT






PRECIPITATION DATA CHANGES

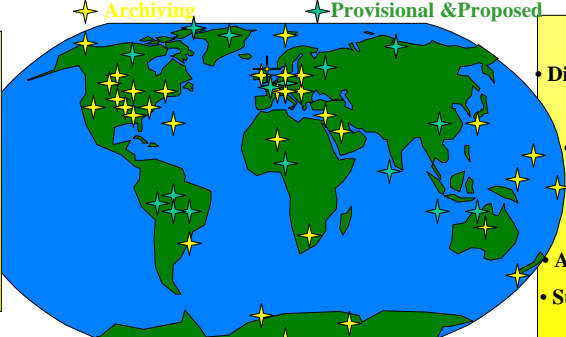




Baseline Surface Radiation Network



Goal:
To acquire the highest possible quality, globally-diverse, surface-based radiation measurements for climate research.



Measurements

- Direct & diffuse solar²
- Downward IR *
- Upwelling irradi.
- PAR & UV
- Upper air met.
- Aerosol optical depth
- Surface meteorology*

*all sites

Network Status

- 2561 station-months of data
- 34 archiving sites + 15 potential
- Zurich/ETHZ archive extended
- New Brazilian network
- New site – SIRTA - France
- 2 new Canadian sites proposed
- Progress on a China site(s)
- Potential eventual Siberian site
- GCOS invitation
- July 2004 Mtg. in Exeter U.K.

<http://BSRN.ETHZ.CH>

BSRN Data

Parameters vary by station.

Base data includes:

metadata (location, PI, station characteristics,
Instrumentation details)

Radiation data at 1-minute resolution (global, direct, diffuse,
downward longwave, air temperature, RH, pressure)

Other data might include:

spectral shortwave, upward shortwave, upward longwave

net radiation

UV

SYNOP

radiosonde

ozone

cloud amount and/or heights

tower measurements

CEOP First Half EOP-3 Reference Site Data Set Status (as of 5 March 2004)

CAMP								
Reference Site	SFC		TWR		STM		FLX	
	Doc	Data	Doc	Data	Doc	Data	Doc	Data
Chao-Phraya								
Equatorial Island								
Himalayas								
Inner Mongolia								
Korean Haenam								
Korea Peninsula								
Mongolia								
NE Thailand								
NSCS-SJ								
Siberia Taiga								
Siberia Tundra								
Tibet								
W. Pacific Ocean								
Yangtze River								

