CEOP Elements Report : Model Output data

Basic information

Title: CEOP Model data archive
Starting date: 2002
Expected end date: 2012
URL: http://www.mad.zmaw.de/projects-at-md/ceop/
http://www.eol.ucar.edu/projects/ceop/dm/model/model_table.html
Chair: Dr. Michael Lautenschlager
Representative to CEOP: Dr. Frank Toussaint

Overview:

Overview

Understanding the Earths Energy Budget and the Hydrological Cycle is a fundamental precondition for investigating and predicting some key elements of men's environment including the behavior and development of the ecosystem as well as technical and economic challenges to men. One main focus of the CEOP project is to provide an extended data base for investigating these processes and for verifying the findings by comparison with the real world, i. e. by observations.
At the end weather forecasts, climate projections, and the associated impacts ,which is a focus of GEWEX, will be improved. CEOP is addressing this issue as well.

Objective

The aim of the model output archiving activity is to provide data sets to the research community for investigating and verifying the processes that are relevant for the energy and water cycle. In addition to the observations (in situ data) the model output yields a large scale description of the state of the atmosphere (the larger scale environment for local observations). The 'Model Output Local Time Series' (MOLTS) data sets which are derived directly form the model output allow a direct comparisong with the observation and thus can give hints for interpreting the observation but can also be used to check a model's quality and may help to improve the model.

Status

Most data sets for CEOP-Period1 (10/2001 to 12/2004) are stored in the CERA data base in the context of the World Data Center for Climate (WDCC). They sum up to about 5.6 TerraByte of data, most of them are gridded. The MOLTS data for 42 locations are much smaller in size.
Data for CEOP-2 become included into the data base since January 2007. Data from JMA and NCEP are included up to now.
Numerical Weather Production (NWP) Centres that contribute to the data archive are:

		Model	CEOP-1	CEOP-2[1]
NCEP	USA		G M	G -
UKMO	UK		G M	
NASA-GMAO	USA		G M	
NASA-GLDAS	USA		G M	
JMA	Japan		G M	G M
BMRC	Australia		G -	
ECMWF	USA		G -	

1 data provided up to 12-Dec-2008

		Model	CEOP-1	CEOP-2
ECPC	USA	SFM RII	G M G M	
MSC	Canada		G M	
CPTEC/INPE	Brazil		G M	
NCMRWF	India		G -	

An overview about the available data can be found at http://ceop.wdc-climate.de .
All data are available for download after registration. Download is possible through the data base (CERA[2]-) portal (GUI) by an internet browser or by use of a Java based command line tool. This CERA WWW-Gateway also permits to browse the metadata of the complete data base content and to search for specific quantities like variables, scenarios, keywords and more.
Data are stored in the structure and format as they are provided by the NWP-Centers.

New directions

Resulting from the experience ofr CEOP-1 data management some effort is undertaken to agree on an common structure for all data. It should improve the usability of the data sets especially for those scientists which are not familiar with such type of data and help to facilitate comparing model results with in situ data. It also allows for a finer granularity of the data and thus will reduce the amount of data that have to be transferred through the internet. This recommended data structure is given in http://www.mad.zmaw.de/fileadmin/extern/wdc/ceop/CEOP_II_Data_Structure.pdf .
In a joined activity of M&D/MPI-M and GKSS Research Center Gesthacht the MOLTS data for CEOP-Period 1 have been transformed into a homogeneous format (netCDF) but the data structures continue to be very different.
The data base also contains a large number of model data from climate scenario runs that may be used as well.

Future

Data from contributing NWP-Centres will be added to the Model output archive – based on the WDCC data base CERA. Two centers have started to provide data in Jan. 2007 - even if their data structures are different. Because there are not enough personal resources to do some postprocessing before storing – the data structure may differ from center to center as it is found for the CEOP-1 model data. Nevertheless an improvement of data structure homogeneity is aspired.
The hardware base of the Model Output Archive at DKRZ[3] will be improved early in 2009 providing more storage capacity and more powerful computers to manage the data base. However, this will not touch the user interface to the data. The same is true for some reorganization of the M&D group which will take place in 2009.
The CERA data base which keeps the CEOP model output data also includes a large number of data from climate model simulations that may be used for projections of the future climate conditions with focus on the CEOP perspectives.

Key results

- Providing access to the model output from 11 NWP Centers for CEOP-Periode 1 (1.10.2001 – 31.12.2004) and CEOP-2 (since 1.1.2007)
- Providing data and meta data on a database interface on the WWW.
- Continue to develop and maintain the web-based access of data

Issues and Recommendations

- NWP-Centres should be supported in postprocessing activities to fit the agreed data

2 **C**limate and **E**nvironmental **R**etrieval and **A**rchiving
3 Deutsches Klimarechenzentrum – German Climate Computing Centre (http://www.dkrz.de)

structure for gridded model output data and MOLTS-data as well
- A CEOP-wide definition of variables is required in order to support users in deciding what variables can be applied and can be compared with each other
- A user feedback is desired for getting informations on the usability of the data, data access and even data volume.

Issues for attention by CEOP and the GEWEX SSG

- The CEOP Data Policy must be formulated that covers all kinds of data provided by CEOP – including a recommended citation phrase.
- The CEOP data archives should be advertised to a broader community
- *Links from and to other GEWEX data archives are desirable*

Contribution to the CEOP objectives

- Providing online access to data and meta data for the CEOP user community
- Support data users in getting an ensemble of model based global or local data sets
- *Providing data from numerical climate simulations which are stored in the data base as well*

Contribution to the GEWEX Roadmap

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Summary :

The model output archive has successfully collected, archived and disseminated data from 11 numerical weather forecast centers. These data have been made accessible by internet. They represent a high volume data set that covers the state of the atmosphere globally and includes some model forecasts (up to 72 hours). For CEOP-2 some effort is undertaken to improve the usability of the data by defining a data structure that should be observed by the data providers. Data of CEOP-1 are included almost completely. Data set for CEOP-2 start at 1/1/2007 and will be included into the data base as they become available. However, for years 2005/2006 there remains a gap in the temporal coverage of data.

List of key publications

-Toussaint, F, M. Lautenschlager and H. Luthardt, 2007:
"World Data Center for Climate Data-Support for the CEOP Project in Terms of Model Output", JMSJ, Vol. 85A, 475-485

List of meetings, workshops

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Planned meetings, workshops

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List of members and their term dates where appropriate (incl. Changes)

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Dr. Frank Toussaint
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