Aims (what is this talk about?)

- **CEOP**
  - What is it?
  - What was it?
  - What is in it for the MDB?
  - What opportunities does it present?

- **MOLTS**
  - What are they?
  - What is available?
  - What use are they?

- **ACCESS**
  - What is the ACCESS model going to do for you?
  - What fields could be useful?
PHASE 1

Coordinated Enhanced Observing Period

LONG-TERM GUIDING GOAL
To understand and model the influence of continental hydroclimate processes on the predictability of global atmospheric circulation and changes in water resources, with a particular focus on the heat source and sink regions that drive and modify the climate system and anomalies.
CEOP Phase 1 – CSE's

Continental Scale Experiments

35 CSE's

http://www.eol.ucar.edu/projects/ceop/dm/
Ceop Phase 1 – DA/NWP centres

• Ten operational Numerical Weather Prediction (NWP) and two data assimilation centers contribute analysis/assimilation and forecast model products from global and regional NWP suites, including both operational and reanalysis systems.
• BoM: Bureau of Meteorology
• CPTEC: Centro de Previsao de Tempo e Estudos Climaticos
• ECMWF: European Centre for Medium-Range Weather Forecasts
• ECPC: Experimental Climate Prediction Center
• EMC: EPSON Meteo Center (Centro EPSON Meteo)
• GLDAS: Global Land Data Assimilation System
• GMAO: NASA Global Modeling and Assimilation Office
• JMA: Japan Meteorological Agency
• MSC: Meteorological Service Canada
• NCEP: National Centers for Environmental Prediction
• NCMRWF: National Center for Medium Range Weather Forecasting
• UKMO: UK Met Office
• MAC: Multi-model ensemble
http://gmao.gsfc.nasa.gov/research/modeling/validation/ceop.php

http://www.eol.ucar.edu/projects/ceop/dm/model/
Interoperability Arrangement

A well organized collecting, processing, storing, and disseminating shared data, metadata and products.

Three Unique Capabilities

- Model Output Data Archiving Center at 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
Coordinated Enhanced Observing Period
Three Unique Capabilities

Data Management

and Centralized- Data Integration Functions

Distributed- and Centralized- Data Integration Functions

NCAR

GrADS/ DDDS for Subsets

Distributed Integration Services

http://jaxa.ceos.org/wtf_ceop/

http://monsoon.t.u-tokyo.ac.jp/ceop-dc/ceop-dc_top.htm

Computing Power

MPI

UT/JAXA

GrADS/ DODS for Subsets

Centralized Integration Services

GrADS/ DODS for Subsets

In-situ

Satellite

Computing Power

model

model

model
CEOP Phase 1 – Scientific Activities

MODEL OUTPUT
- Global
- Regional
- Local

REFERENCE SITES
- Data Integration & Dissemination

SATELLITES
- Diurnal
- Intra-seasonal
- Seasonal

WATER & ENERGY SIMULATION & PREDICTION (WESP)
- Water and Energy Budget Studies
- Global Land Data Assimilation Systems
- Inter-CSE Transferability Study

CEOP INTER-MONSOON STUDY (CIMS)
- Coordinated Model Integration Process
- Monsoon System Inter Comparison
CEOP Phase 1 – MOLTS

- **Model Output Location Time Series**
- Subset of NWP/Reanalysis centres
- Higher time frequency
- Non-standard fields
- Smaller file sizes
- 41 defined MOLTS points covering CSE's

**Caveats:**
- Nearest grid point to MOLTS point
- Model topography
- Model surface properties
- Model resolution/topography resolution dependent
MOLTS for MDB
MOLTS for MDB

The Centre for Australian Weather and Climate Research
A partnership between CSIRO and the Bureau of Meteorology
CEOP – Phase 2

- CEOP was a sub-program of the GHP
- Phase 1 very successful but 'over' after 2004
- CEOP combined hydrology, NWP, satellite, data, data access

Solution:
- CEOP took over GHP

Problem:
- Great logo – bad name

Solution:
Coordinated Energy and Water Cycle Observations Project (CEOP)

New Observing period: 2007-2011
35 CSE's => 51 RHP's
43 => 174 MOLTS points
CEOP Phase 2 - Elements

- Regional Hydroclimate Projects
  - AMMA: African Monsoon Multidisciplinary Analyses
  - BALTEX: Baltic Sea Experiment
  - CPPA: Climate Prediction Program for the Americas
  - LBA: Large-Scale Biosphere-Atmosphere Experiment in Amazonia
  - LPB: La Plata Basin Project
  - MAHASRI: Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative
  - MDB: Murray-Darling Basin Water Budget
  - NEESPI: Northern Eurasia Earth Science Partnership Initiative

- Regional Studies
  - Cold Region Studies (CRS)
  - High Elevations (HE)
  - Monsoon (MONS)
  - Semi-Arid Studies (SAS)

- Cross Cutting Studies
  - Water and Energy Budget Studies
  - Extremes
  - Aerosols
  - Isotope Cross Cut Study (ICCS)

- Model Studies
  - Global Models
  - Regional Climate Models
    - Inter-Continental Transferability Study (ICTS)
    - Scale Interaction Evaluation Experiment (SIEVE)
    - Land Surface Models (LSM)
    - Hydrologic Applications Project
ACCESS and NWP data

- 4DVAR is very powerful data integrator
- Analysis incorporates millions of individual data 'bits'
  - Standard meteorological measurements
  - Satellite radiances
- Physical model 'ties' data together implicitly
- Generates 'missing' data consistently

Caveats:
- Missing physics is not reproduced
- Occasional 'variations from exact reality'

However:
- 4DVAR/Model under continuous improvement
An example: Surface insolation

**GMS Based**

NB: Old model – ACCESS will be better

4DVAR => better moisture fields

Prognostic Cloud

**MALAPS**

Other fields of interest?
Summary - CEOP

• **CEOP**
  • **Data**
    • CSE/RHP data
    • NWP/RA gridded data
    • NWP/RA MOLTS data
    • Satellite data tailored for RHP areas.
  • **Web accessible!**
  • **Science Projects**
    • e.g. semi-arid or extremes
  • **People**
    • Meeting place for meteorologists/hydrologists/information geeks
4DVAR + millions of data bits per day + good model

→

very powerful data generator

→

Viable alternative to 'stand alone' remote sensing data retrieval?

(with caveats)
Thank you

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