

The EU-funded IP ENSEMBLES



ENSEMBLES: General information

- Integrated Project funded by the VI FP of the EC
- Integrated probabilistic prediction system for time scales from seasons to decades and beyond
- 69 partners
- Seasonal-to-decadal hindcasts will be used to assess the reliability of model systems used for climate change experiments
- Great diversity of climate applications
- 2 consultants @ ECMWF
- Start date: 1 September 2004, Duration: 5 years
- <http://ensembles-eu.metoffice.com>



Organization

The project is organized in ten Research Themes (RT), ECMWF involvement in red:

- RT0: Management
- RT1: Development of the EPS
- RT2A: Global model engine
- RT2B: Production of regional climate scenarios
- RT3: High resolution regional ensembles
- RT4: Analysis of processes
- RT5: Evaluation
- RT6: Assessment of impacts
- RT7: Scenarios and policy implications
- RT8: Dissemination and training



RT1: Activities

- **RT1: Development of the EPS**

Model uncertainty estimates (first 18 months) using a recently developed stochastic physics scheme, a new multi-model and the perturbed parameters approach (Met Office).

Use of the coupled models IFS/HOPE and IFS/ORCA as part of the multi-model and the stochastic physics experiments.

Ocean initial conditions from ENACT and generation of new sets when possible.

Common output archived in MARS and ECFS.

Pre-production (initial 18 months) for 1991-2001 and reduced set of start dates.



Multi-model ensemble approach

Errors:

model formulation

initial conditions

Solution:

multi-model

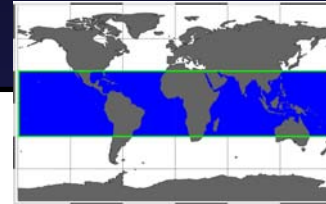
ensemble

multi-model ensemble forecast system

N models x M ensemble members



Multi-model: Impact of ensemble size



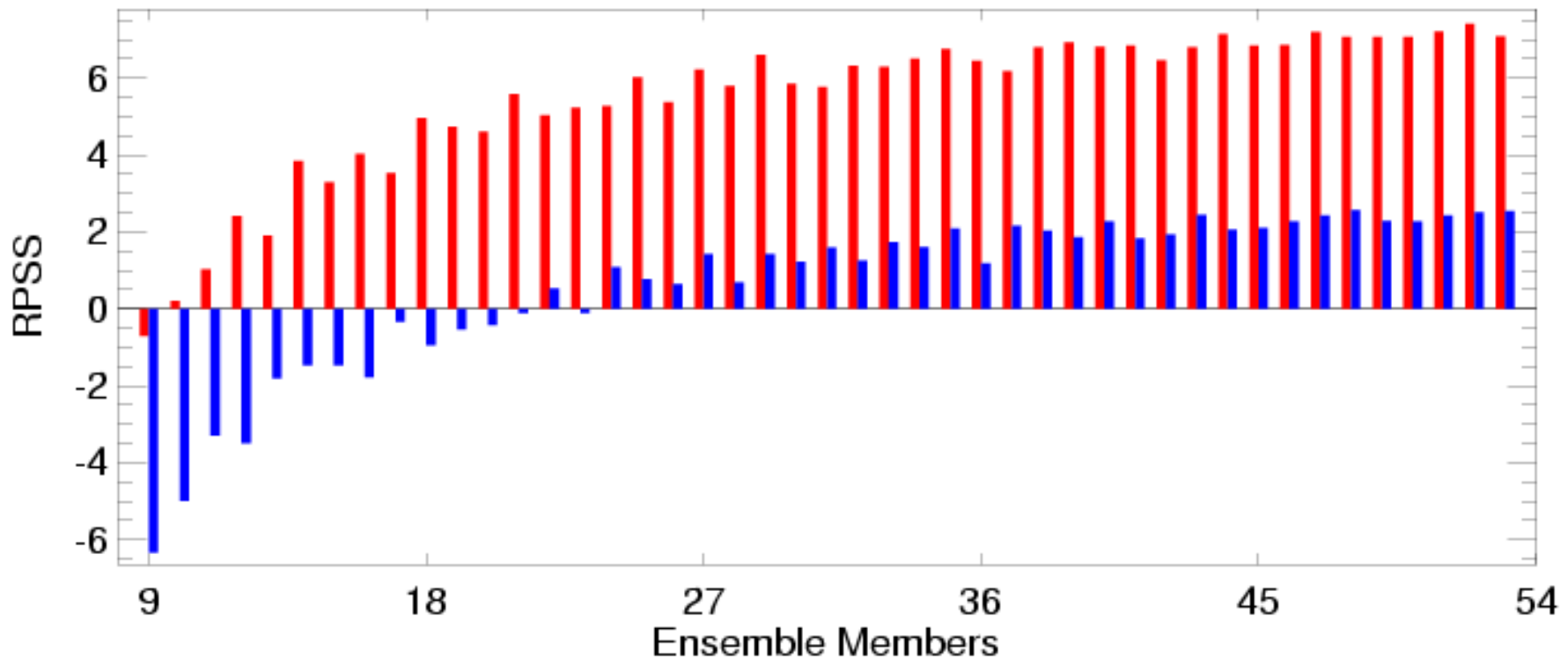
Precipitation, RPSS over Tropics

Forecast start month and years: May / 1987-1999

Average over 2-4 months FC (JJA)

Multi-Model

Single-Model



RT2A: Activities

- **RT2A: Global model engine**

Use of IFS/HOPE and/or IFS/ORCA as part of the multi-model.

Seasonal, annual and multi-annual integrations: 2 to 4 times the resources used in DEMETER.

Ocean initial conditions from ENACT and/or RT1 .

Common output (list of variables slightly larger than in DEMETER) similar archived in MARS and ECFS.

Dissemination based on public data and DODS servers.

Production period (after month 18) 1960-2001 (part of System 3 back-integrations).



RT2A: Multi-model ensemble system

- ENSEMBLES system: 7 coupled global circulation models

Partner	Atmosphere	Ocean
ECMWF	IFS	HOPE
ECMWF	IFS	ORCA
CNRM	ARPEGE	OPA 8
CERFACS	ARPEGE	ORCA
INGV	ECHAM-4	ORCA
MPI	ECHAM-5	MPI-OM1
UKMO	HadCM3	HadCM3

9-member ensembles

ERA-40 initial conditions

SST and wind perturbations

4 start dates per year (1 for annual and multi-annual)

6-, 12-month and longer hindcasts

realistic greenhouse gases, aerosols and boundary forcings

- Hindcast production period for: 1960-2001



Data storage

<http://cera-www.dkrz.de/CERA/>

Pressure levels

Date (4 values)	Time (1 value)
1958-02-01	00:00:00
1958-05-01	
1958-08-01	
1958-11-01	

Archive

- [Overview](#)
- [Catalogue](#)
- [Data Finder](#)
- [Last Update](#)
- [Server Activity](#)

Personal

- [Your Account](#)
- [Your Results](#)

Note about availability

Some of the fields may not be available for plotting data you may want to check the [links for availability](#) link.

Retrieving and plotting

In order to retrieve or plot data, you select more than one item in each

Other choices...

level, the pl, sfc
method 1, 20
year 1958, 1959, 1960, 1961, 1972, 1973, 1974, 1975, 1986, 1987, 1988, 1989, 2000, 2001
stream seas, sfinm
expver cnrm, crfc, lody, scnr, s
class od, at, ch, de, dk, es, fr,

Seasonal to decadal in MARS and ECES

Welcome to M&D's CERA2 WWW-Gateway V1.3.10

Go Search Extras Help

Back Home Process List Search by Name Search by Topic

Keyword

- aerosol
- aerosol: indirect effect
- aircraft measurement
- air-sea-fluxes
- AMIP
- AMIP2
- analysis
- atmospheric chemistry
- BMRC
- carbon dioxide
- carbon monoxid

Select Clear Selection

Project

- Civil Aircraft for Regular Investigation of the Atmosphere Based on a
- Climate Model Simulations at DKRZ
- Climate Model Simulations at GKSS/Institute for Coastal Research
- Climate Model Simulations at MPI
- Climate Model Simulations at MPI/DKRZ
- Coordinated Enhanced Observing Period (CEOP)
- DLR EOWEB
- ECMWF Re-Analysis Project - Model Level Data
- ECMWF Re-Analysis Project 15
- ECMWF Re-Analysis Project 40

Select Clear Selection

Experiments

- AVHRR
- CCCma_SRES_A2
- CCCma_SRES_A2_R2
- CCCma_SRES_A2_R3
- CCCma_SRES_B2
- CCCma_SRES_B2_R2
- CCCma_SRES_B2_R3
- CCSRNIIES_SRES_A1
- CCSRNIIES_SRES_A1FI
- CCCma_SRES_A2

Information Contacts Datasets

CERA News

- 14-NOV-2003, Hannes Thiemann
Subject: ERA40
- 14-NOV-2003, not specified
Subject: New Usage Notes
- 06-AUG-2002, Hannes Thiemann
Subject: Regular maintenance

Show Details

Global change integrations in CERA and PCMDI



Archiving ENSEMBLES data

- Archiving at ECMWF (seasonal to decadal) and M&D (decadal to centennial in CERA).
- Use of a common list of variables (minimum requirement) for atmosphere and ocean variables (Table version as in operational multi-model seasonal forecast).
- Atmosphere (GRIB) in MARS and ocean (NetCDF) in ECFS. Need of an ENSEMBLES class for MARS.
- Make scripts available for archiving and retrieval.



Quality control

Need to check asap the quality (units, missing files, ...) of the hindcasts produced by all models

Verification suite running periodically with graphical output made available on the web

Use of existing verification suites, but also translation to MetPy, interaction with operational seasonal forecast verification, ...

The image displays two overlapping windows. The top window is a Mozilla browser showing the 'Indices' page of the European Centre for Medium-Range Weather Forecasts (ECMWF). The page title is 'Indices - Mozilla' and the URL is 'http://www.ecmwf.int/research/demeter/d/charts/verification/indices/'. The page content includes a navigation menu with links for 'About Us', 'Products', 'Services', 'Research', 'Publications', and 'News & Events'. The main content area is titled 'Indices' and contains two sections: 'Time series of anomaly indices for hindcast period 2-4 and 4-6 months' and 'Time series of anomaly indices for hindcast period 2-5 months'. Each section includes a small line graph and a text description. The bottom window is a task scheduler interface, likely cron or similar, showing a tree structure of tasks. The root task is 'demeter', which has sub-tasks 'automat', 'start', and 'work'. The 'work' task has a sub-task 'single', which in turn has many sub-tasks such as 'EXPVER...', 'getdata', 'bias', 'cross_com', 'scores', 'cal_acc', 'plot_acc', 'plot_accmap', 'cal_rmsss', 'plot_rmsss', 'plot_rmsssmap', 'cal_rmsss', 'plot_rmsss', 'plot_rmsssmap', 'cal_rova', 'plot_rel', 'plot_roc', 'plot_rocmap', 'plot_val', 'cal_rpss', 'cal_rpss_de', 'plot_rpssmap', 'cal_prob', 'plot_probmap', and 'clean_single'. Each task has a status indicator (e.g., a small square) and a completion message (e.g., 'cal_bias == complete').



Other RTs: Activities

Data made available to scientists and users through:

- 1) MARS and ECFS (member state users)
- 2) public data (both GRIB and NetCDF) and DODS (NetCDF) servers

RTs concerned:

- RT2B and RT3: Downscaling
- RT4: Analysis of processes
- RT5: Model evaluation
- RT6: User applications
- RT8: Dissemination



RT5: Model evaluation

A prototype verification system will be based upon the KNMI Climate Explorer and the DEMETER verification system

The screenshot shows the DEMETER website interface. At the top, there is a navigation menu with links for Home, Your Room, Login, Contact, Feedback, Site Map, and Search. Below this, there are sections for 'Other charts' and 'Indices'. The 'Indices' section features two sub-sections: 'Time series of anomaly indices for hindcast period 2-4 and 4-6 months' and 'Time series of anomaly indices for hindcast period 2-5 months'. Each sub-section includes a small line graph and a descriptive paragraph. The bottom part of the screenshot shows a complex tree structure of data categories, including 'bias', 'cross_com', 'scores', 'cal_acc', 'cal_miss', 'cal_rps', 'cal_prob', and 'cal_grub', each with associated sub-items and checkboxes.

The screenshot shows the KNMI Climate Explorer website. The main heading is 'KNMI Climate Explorer: select a monthly time series'. Below the heading, there is a paragraph of text and a list of four instructions for selecting a time series. The instructions are: 1. Select station data from the GHCN historical climatological databases, 2. Select a climate index from your collection, 3. Average a region from a gridded dataset, and 4. Upload your own time series. Below the instructions, there is a section for finding stations with historical climate data, which includes a form with various input fields and radio buttons for selecting measurement types (precipitation, mean temperature, minimum temperature, maximum temperature, sea level pressure) and station types (GHCN adjusted, GHCN all, GCOS, other). The form also includes fields for latitude, longitude, and station number.



RT3 to RT8: Public data dissemination

For users with no access to ECMWF, storage of ~1 Tb of data on a Solo-like machine, conversion GRIB to NetCDF

<http://data.ecmwf.int/data>

DEMETER, Monthly fields

Select Experiment and Starting date

	CERFACS	ECMWF	INGV	LODYC	Météo France	Max Planck Institute	UK Met Office
2000-02	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2000-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2000-08	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2000-11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2001-02	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2001-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2001-08	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2001-11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Select All or Clear

Select parameters

Pressure levels:

850 500 200

Geopotential

Specific humidity

Temperature

U velocity

V velocity

850 500 200

Select All or Clear

Surface:

10 metre U wind component 10 metre V wind component 2 metre temperature

Mean sea level pressure Soil temperature level 1 Total precipitation

Select All or Clear

Select Forecast month

1 2 3 4 5 6

Select All or Clear

Select Ensemble member

0 1 2 3 4 5 6 7 8

Select All or Clear

Retrieve GRIB Retrieve NetCDF Plot data

DODS Dataset Query Form - Mozilla

http://data.ecmwf.int/dodsC/ENACT.html

DODS Dataset Access Form

Tested on Netscape 4.61 and Internet Explorer 5.00.

Action:

Data URL:

Global Attributes:

Title: "No description"
conventions: "CF-1.0"
source: "ENACT project"
references: ""
history: "version 1.00"
comments: "ORCA2"

Variables:

time: Array of 32 bit Reals [time = 0..23]
time:
data type: "float"
standard_name: "time"
long_name: "time"
units: "days since 1950-01-01 00:00:00 utc"
positive: "increment"
valid_min: "0"

lon: Array of 32 bit Reals [y = 0..178][x = 0..359]
y: x:
data type: "float"
standard_name: "lon"
long_name: "Longitude"
units: "degree east"
positive: "east"
valid_min: "0"

lat: Array of 32 bit Reals [y = 0..178][x = 0..359]
y: x:
data type: "float"
standard_name: "lat"
long_name: "latitude"
units: "degree north"
positive: "north"
valid_min: "-89"

depth: Array of 32 bit Reals [z = 0..32]
z:
data type: "float"
standard_name: "depth"
long_name: "detph"

