

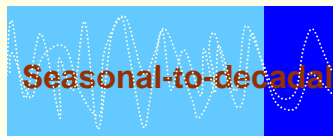
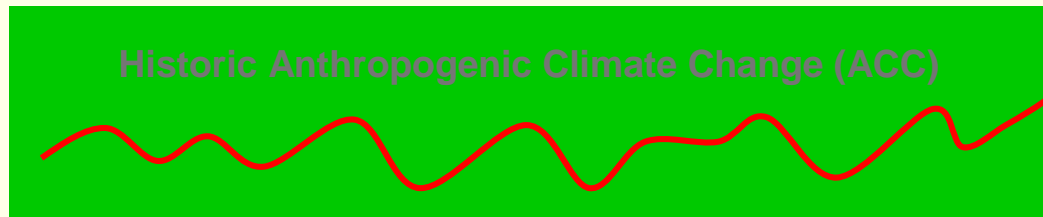
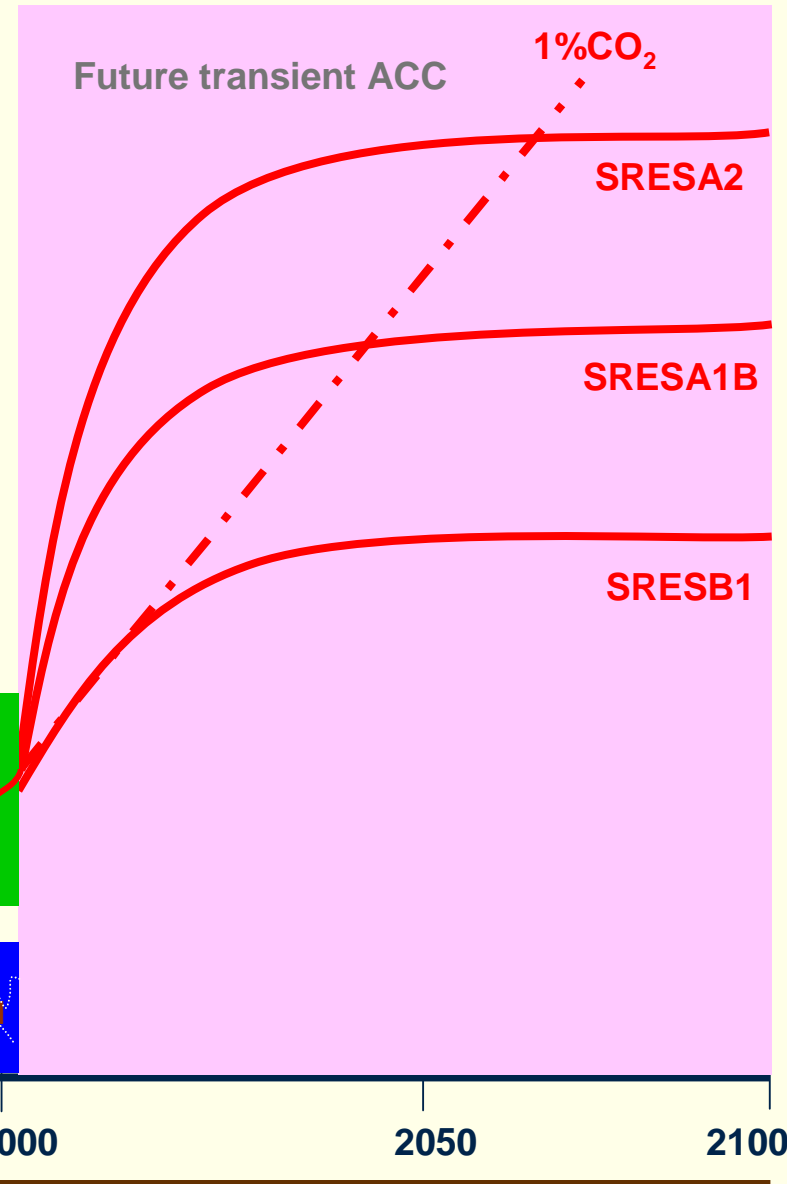
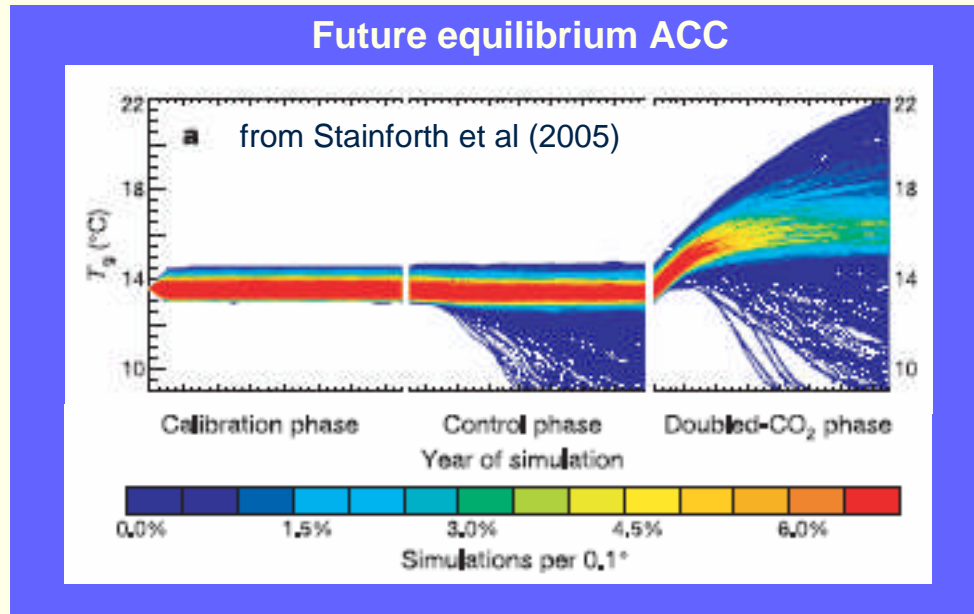
**ENSEMBLES Climate Model Data:**  
**Availability**  
**Archiving**  
**Dissemination**  
during the first project phase

**Antje Weisheimer**

European Centre for Medium-Range Weather Forecasts

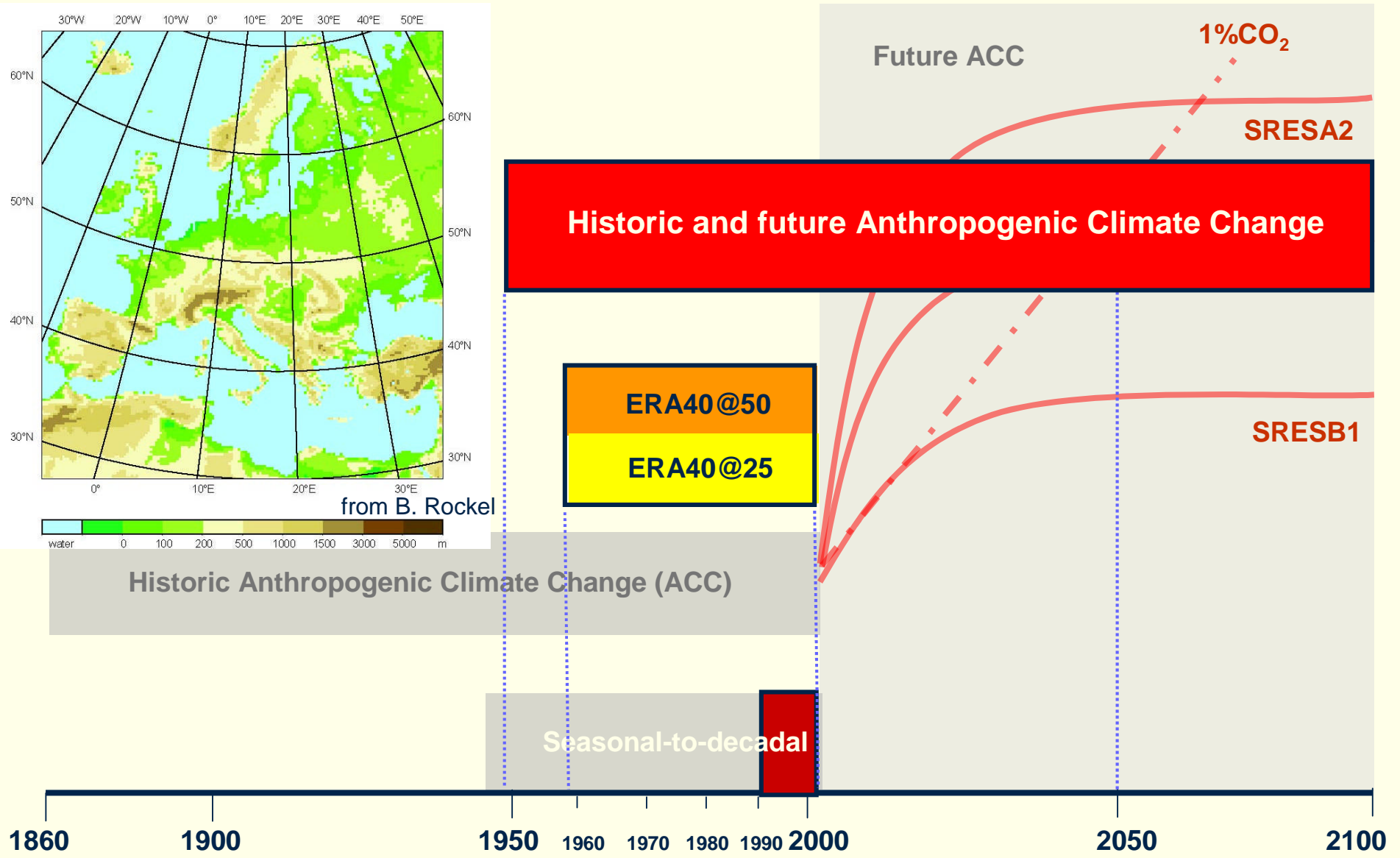


# Global simulations from 1860 to 2100



1860    1900    1950    1960    1970    1980    1990    2000    2050    2100

# Regional simulations from 1860 to 2100



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## **Seasonal-to-decadal (s2d)** **simulations**

## Ensemble set-up: Seasonal-to-decadal simulations

### stream 1

month 18-24

Three approaches to tackle model uncertainty:

- **Multi-model:** 7 coupled GCMs, each 9 IC ensemble members
  - **Perturbed physics:** 2 coupled GCMs, each 9 IC ens. members
  - **Stochastic physics:** 1 coupled GCM, 9 ensemble members
- hindcast production period: 1991-2001
  - **seasonal runs** (7 months): two start dates per year (May, Nov)
  - **annual runs** (14 months): at least one start date per year (Nov)
  - **multi-annual/decadal runs** (10 years): starting in 1965 and 1994
  - **model level data** available for 3 of the multi-model GCMs

### stream 2

month 48

- multi-model of 5 coupled GCMs
- hindcast production period 1960-2001
- 4 start dates per year
- one annual run per year, one multi-annual run every 5 years

## Variables: Seasonal-to-decadal simulations

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### List of common variables

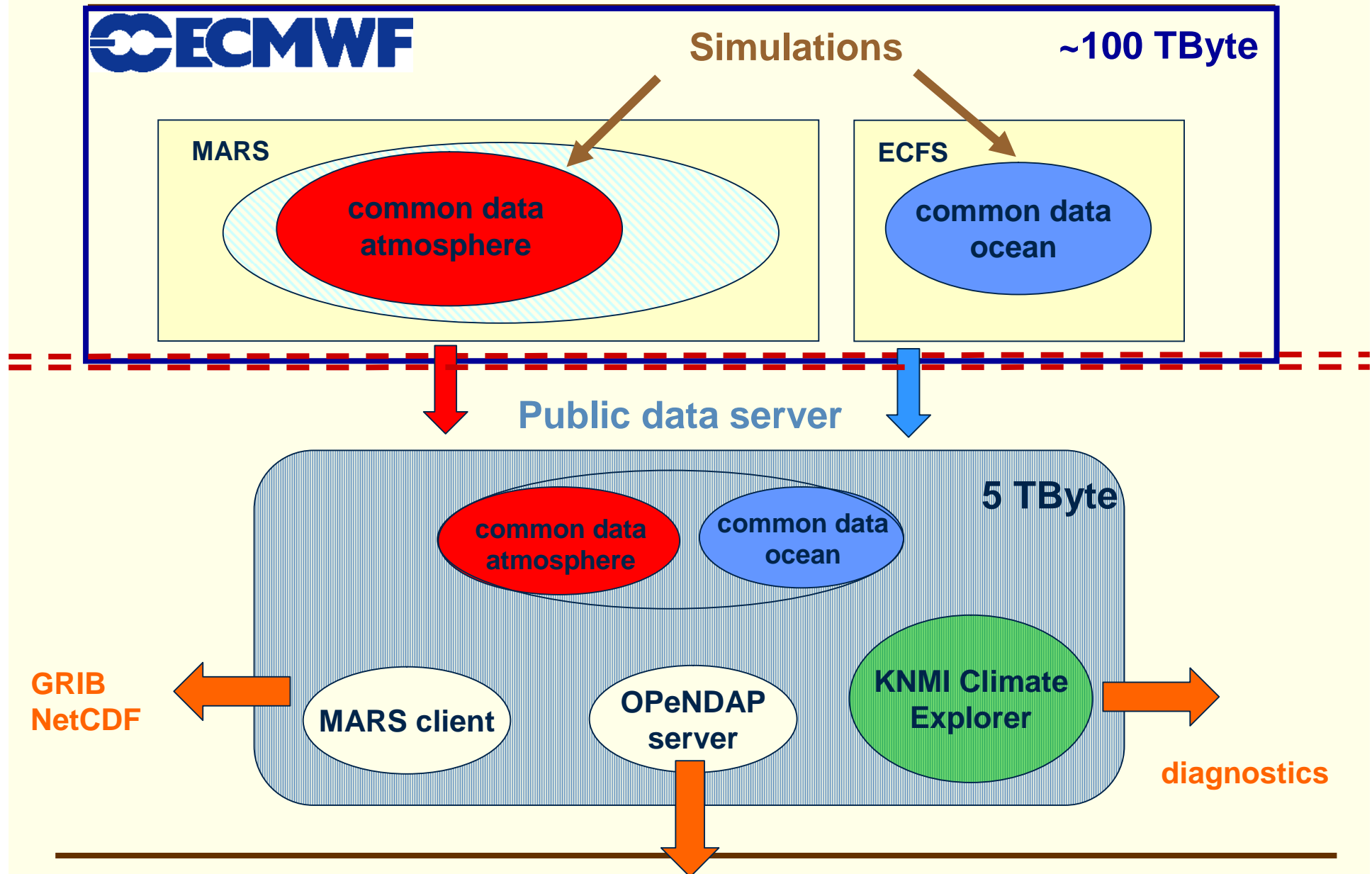
- **Atmosphere**
  - 4 pressure levels (850, 500, 250, 50 hPa): Z,T,u,v,q
  - surface data
  - daily data (at 00 GMT or accumulated) and monthly means
  - common 2.5°x2.5° grid
- **Ocean**
  - 3D and 2D fields
  - Levitus grid (ENACT convention)
- **Additional:** model level data 6 hourly (3 GCMs)

**See also:**

[http://www.ecmwf.int/research/EU\\_projects/ENSEMBLES/news/common\\_variables.html](http://www.ecmwf.int/research/EU_projects/ENSEMBLES/news/common_variables.html)

[http://www.ecmwf.int/research/EU\\_projects/ENSEMBLES/news/enact\\_ocean\\_archiving.html](http://www.ecmwf.int/research/EU_projects/ENSEMBLES/news/enact_ocean_archiving.html)

# Data archiving and dissemination: Seasonal-to-decadal simulations



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# Global anthropogenic climate change (ACC) simulations

## Ensemble set-up: Global ACC simulations – Multi-model

Partners	1860-2000	B1	A1B	A2	1% CO2	IPCC AR-4	Availability of daily fields	Model levels
METO-HC	X X +	+	X	X	XX	X	Not yet (BADC)	(X)
IPSL	X X +	X	X	XX	XX	X	DODS	X
MPI	3X 2X 3+	3X	3X	3X	XX	X	CERA	X
FUB L 19 L 39	X 5*3x	+	+	+	+	+	On request	X
CNRM	X X	X	X	X	XX	X	DODS	(x)
NERSC	X +	X	X	X	XX	X	On request	X
DMI	X +		X			Not yet	? +	X

from J.-F. Royer (RT2A)

## Ensemble set-up: Global ACC simulations – perturbed physics

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### Equilibrium (spin-up,control,2xCO<sub>2</sub>) ACC simulations with HadSM3

- 53 ensemble members based on 29 single-parameter perturbations (Hadley Centre, Murphy et al.,2004)
- 128 ensemble members based on 29 multiple-parameter perturbations (Hadley Centre, Collins et al.,2005; Webb et al.,2005)
- 2578 ensemble members based on 6 multiple-parameter perturbations (University Oxford, Stainforth et al.,2005)

### Transient (spin-up,control,1% CO<sub>2</sub>,historical,A1B) ACC simulations with HadCM3

- 16 ensemble members based on a subset of the 29 multiple parameter perturbations (Hadley Centre, Collins et al.,2005)

## Variables: Global ACC simulations - Multi-model

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### Multi-model

- comprehensive model output list provided by RT2A based on discussions with other RTs, see

<http://www.cnrm.meteo.fr/ensembles/prive/tables.html>

#### **However:**

- there is currently no capacity available to store all these data in Hamburg at MPI-M&D/DKRZ as originally anticipated
- outcome from the discussions in Athens:
  - RT2B and RT6 will re-review the list of data with the aim of finding potential to reduce it
  - a final decision will be made based on the evaluation of this reduced list

## **Variables: Global ACC simulations - perturbed physics**

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### **Perturbed physics**

#### **Hadley Centre**

- feasible subset of variables will be made available,
- dependent on user needs and balanced against the time-consuming task of extracting the data

#### **Oxford University (climateprediction.net)**

- initial quality controlled subset is available via ftp for registered users
- see <http://www.climateprediction.net>

## Data archiving and dissemination: Global ACC simulations

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### Multi-model –archiving strategies ?

1. World Data Centre for Climate (WDCC) in Hamburg, maintained by M&D/MPI-M and DKRZ, see <http://www.wdc-climate.de>
  - **CERA data base**, see <http://cera-www.dkrz.de/CERA/index.html>
  - supported formats: netCDF/CF and GRIB
2. **IPCC AR4 data base at PCMDI**, see <http://www-pcmdi.llnl.gov>;
  - netCDF format
3. Local storage at the individual modelling centres (daily data, model level data), accessible via OPeNDAP/DODS servers

### Perturbed physics (Hadley Centre)

- data are available in the Met Office mass storage system
- dissemination strategy is under discussion
- perhaps lodging the data at other archive locations (PCMDI, Hamburg)

### Perturbed physics (Oxford University, [climateprediction.net](http://climateprediction.net))

- netCDF via ftp after registration at <http://www.climateprediction.rl.ac.uk/dataportal/subprojects>

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## **Regional simulations**

## Ensemble set-up: Regional simulations

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### Downscaling of ERA40 over Europe (RT3)

- ERA40@50 month 18
- ERA40@25 month 24
- 10 (14) atmospheric RCMs
- 1961-2000, common minimum domain

### Transient climate runs over Europe (RT2B)

- 10 atmospheric RCMs at 20-25 km resolution month 36
- 1950-2050 or 1950-2100 (HC,DMI,MPI-M)
- details of experimental matrix (boundary conditions from RT2A scenarios) not finally decided yet

### Downscaling of s2d simulations

- 6-hourly boundary data 1991-2001 from 3 GCMs (available at ECMWF MARS)
- INM: Europe
- ICTP: Europe and/or South East Asia?

## Variables: Regional simulations

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- common minimum output list provided by RT3 and RT2B, see

<http://ensemblesrt3.dmi.dk/>

## Data archiving and dissemination: Regional simulations

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- **RCM data base at DMI in Copenhagen**
  - central server (OPenDAP/DODS) set up by DMI month 18
  - hardware provided by DMI
  - ENSEMBLES funding to establish and maintain it
  - data format: netCDF
  - along the lines of PRUDENCE, see <http://prudence.dmi.dk>
  
- Optional fields and additional output to be stored locally for each RCM at modelling centres

## Ideas – suggestions- proposals

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**User-friendly central documentation on data availability including easily accessible and clearly understandable information on:**

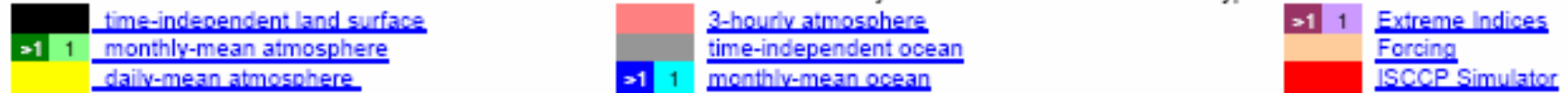
- Tables of intended runs and likely completion
- Up-date of status of simulations (incl. log files of errors)
- Data access to the different archives
- Data formats

→ working example: IPCC AR4 data at PCMDI

# Ideas – suggestions- proposals

Data Availability Summary (as of 17 August 2005)

shaded area indicates that at least some but not necessarily all fields are available for data type indicated



	Piontri	PDontri	20C3M	Commit	SRESA2	SRESA1B	SRESB1	1%to2x	1%to4x	Slab onli	2xCO2	AMIP
BCC-CM1, China												
BCCR-BCM2.0, Norway												
CCSM3, USA												
CGCM3.1(T47), Canada												
CGCM3.1(T63), Canada												
CNRM-CM3, France												
CSIRO-Mk3.0, Australia												
ECHAM5/MPI-OM, Germany												
ECHO-G, Germany/Korea												
FGOALS-g1.0, China												
GFDL-CM2.0, USA												
GFDL-CM2.1, USA												
GISS-AOM, USA												
GISS-EH, USA												
GISS-ER, USA												
INM-CM3.0, Russia												
IPSL-CM4, France												
MIROC3.2(hires), Japan												
MIROC3.2(medres), Japan												
MRI-CGCM2.3.2, Japan												
PCM, USA												
UKMO-HadCM3, UK												
UKMO-HadGEM1, UK												

[http://www-pcmdi.llnl.gov/ipcc/data\\_status\\_tables.htm](http://www-pcmdi.llnl.gov/ipcc/data_status_tables.htm)

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**Thanks for the input from all of those  
who answered my email requests ...**

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