ECOSUPPORT
Advanced modeling tool for scenarios of the Baltic Sea ECOsystem to SUPPORT decision making

Data Integration and Modelling Workshop
14 October,
chair: Brian MacKenzie

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Topics:

-general orientation on the data demands and inputs and output variables for climate, oceanographic, biogeochemical, fish and foodweb models

-horizontal and vertical resolutions/scaling;

-temporal resolution/scaling

-how to store and exchange output data for later use in other models

-uncertainties of different model types; consequences of passing outputs from one model to be used as forcing variables in other models.

-assemble-averaging approaches

-“round-abouts” (solution fixes) for situations when preferred data are not available

-other

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Topics:

- what kind of data are needed to run the foodweb and fish models in wp3 and wp4 and contribute to overall project goals

-which climate-biogeochem. models are able to provide those data

-which scenarios (climate, nutrients, etc.) is the project going to run

-data formats, storage, delivery times. Where will the data be stored? What kind of formats, etc.? When will they be available? We would like to ensure that all the participants are aware of the current status and purposes of the different models, what they are being used for, and especially of the data outputs and inputs.

We therefore invite a representative from each of the main modelling groups or end users of the model outputs to make a brief (3-4 slides, maximum 5 minutes!) presentation of their model or their data needs from the project. Could we please have a presentation of the following models:

-SCOBI-IOW ecosystem model-Baltsem

-Ecopath/ecosim

-Planfish-biological valuation case studies

Markus will make a similar presentation about the climate models and I will make a presentation about some of the simpler fish production models.

Agenda of the Annual General Assemble of ECOSUPPORT 15 October

Time: 15 October 2009, 09:00-17:30

Place: Hörsalen, SMHI, Norrköping, Sweden

09:00-09:30 Markus Meier: Welcome, introduction and general information

09:30-10:00 Brian MacKenzie: Outcome of the data integration and modelling workshop

WP1 (chair: Markus Meier)

10:00-10:15 Ralf Döscher, Lars Bärring, and Erik Kjellström: Regional Climate Simulations

10:15-10:30 Chantal Donelly and coworkers: Hydrological modelling using HYPE

10:30-11:00 Coffee

11:00-11:30 Tuija Ruoho-Airola: Atmospheric deposition

11.30-11:45 Frederik Schenk and Eduardo Zorita:

WP2 (chair: Bo Gustafsson)

11:45-12:00 Thomas Neumann and Ivan Kuznetsov: Status of ERGOM simulations

12:00-12:15 Bo Gustafsson and Oleg Savchuk:

12:15-13:15 Lunch

Agenda of the Annual General Assemble of ECOSUPPORT 15 October

13:15-13:45 Kari Eilola and coworkers: Validation of the three biogeochemical models during 1960-2007

13:45-13:52 Anders Höglund: Validation of atmospheric forcing for oceanographic models

13:52-14:00 Robinson Hordoir and coworkers: Results of the first transient scenario simulation using RCO-SCOBI 1960-2100

WP3 (chair: Brian MacKenzie)

14:00-14:15 Thorsten Blenckner and Susa Niiranen:

14:15-14:30 Brian MacKenzie:

14:30-14:45 Anna Gårdmark: PLANFISH

14:45-14:50 Markus Meier for Jon Havenhand:

WP4 (chair: Urmas Raudsepp)

14:45-15:00 Urmas Raudsepp and coworkers:

15:00-15:30 Coffee

Agenda of the Annual General Assemble of ECOSUPPORT 15 October

15:30-15:45 Boris Chubarenko and coworkers:

15:45-16:00 Jan Marcin Weslawski, Joanna Piwowarczyk and coworkers:

16:00-16:15 Anders Hansson and coworkers

16:15-16:30 Marcus Reckermann: BALTEX information and the ECOSUPPORT homepage, presentation of the logo

16:30-17:00 Markus Meier: Technical information, e.g. deliverables, EPSS, dissemination email list, consortium agreement, Swedish Board of Fisheries as associated partner, ECOSUPPORT poster, next meeting, management group meeting

17:00-17:30 Discussions (will be continued in smaller groups until 19:00)

19:00 Dinner

Agenda of the international workshop “The marine ecosystem in changing climate – on the added value of coupled climate-environmental modeling for the Baltic Sea”, 16 October, 10:00-17:00

10:00 Welcome

10:05-12:25 Presentations (max 15 min plus 5 min for questions), chair: Brian MacKenzie

10:05-10:25 Markus Meier, SMHI: Impact of changing climate on biogeochemical cycles in the Baltic Sea – An introduction

10:25-10:45 Bo Gustafsson, Baltic Nest Institute: First results from coupled physical-biogeochemical modelling within the BONUS+ project ECOSUPPORT (An advanced modeling tool for scenarios of the Baltic Sea ECOsystem to SUPPORT decision making)

10:45-11:05 Christoph Humborg, Baltic Nest Institute: First results from the BONUS+ project RECOCA (Reduction of Baltic Sea Nutrient Inputs and Cost Allocation within the Baltic Sea Catchment)

11:05-11:25 Ivan Kuznetsov, Baltic Sea Research Institute, Warnemünde: Simulation of the carbon cycle in the Baltic Sea

11:25-11:45 Anders Omstedt and Anna Rutgersson, Gothenburg and Uppsala University: Building predictive capability regarding the Baltic Sea organic/inorganic carbon and oxygen system

11:45-12:05 Zhenwen Wan, Danish Meteorological Institute: Modeling Study on the seasonality of Ecosystem Dynamics in the Baltic Sea

12:05-12:25 Agneta Andersson, Umeå University: Effect of increasing load of allochtonous organic carbon and inorganic nutrients on the efficiency of a marine pelagic food web

12:25-13:15 Lunch

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Agenda of the international workshop “The marine ecosystem in changing climate – on the added value of coupled climate-environmental modeling for the Baltic Sea”, 16 October, 10:00-17:00

13:15-14:35 Presentations (max 15 min plus 5 min for questions), chair: Thorsten Blenckner

13:15-13:35 Jan Marcin Weslawski, Institute of Oceanology, Sopot: Biological valorization of the Southern Baltic Sea

13:35-13:55 Per Jonsson, Gothenburg University: Dispersal of marine organisms in the Baltic Sea estimated from Lagrangian trajectories driven by ocean circulation models

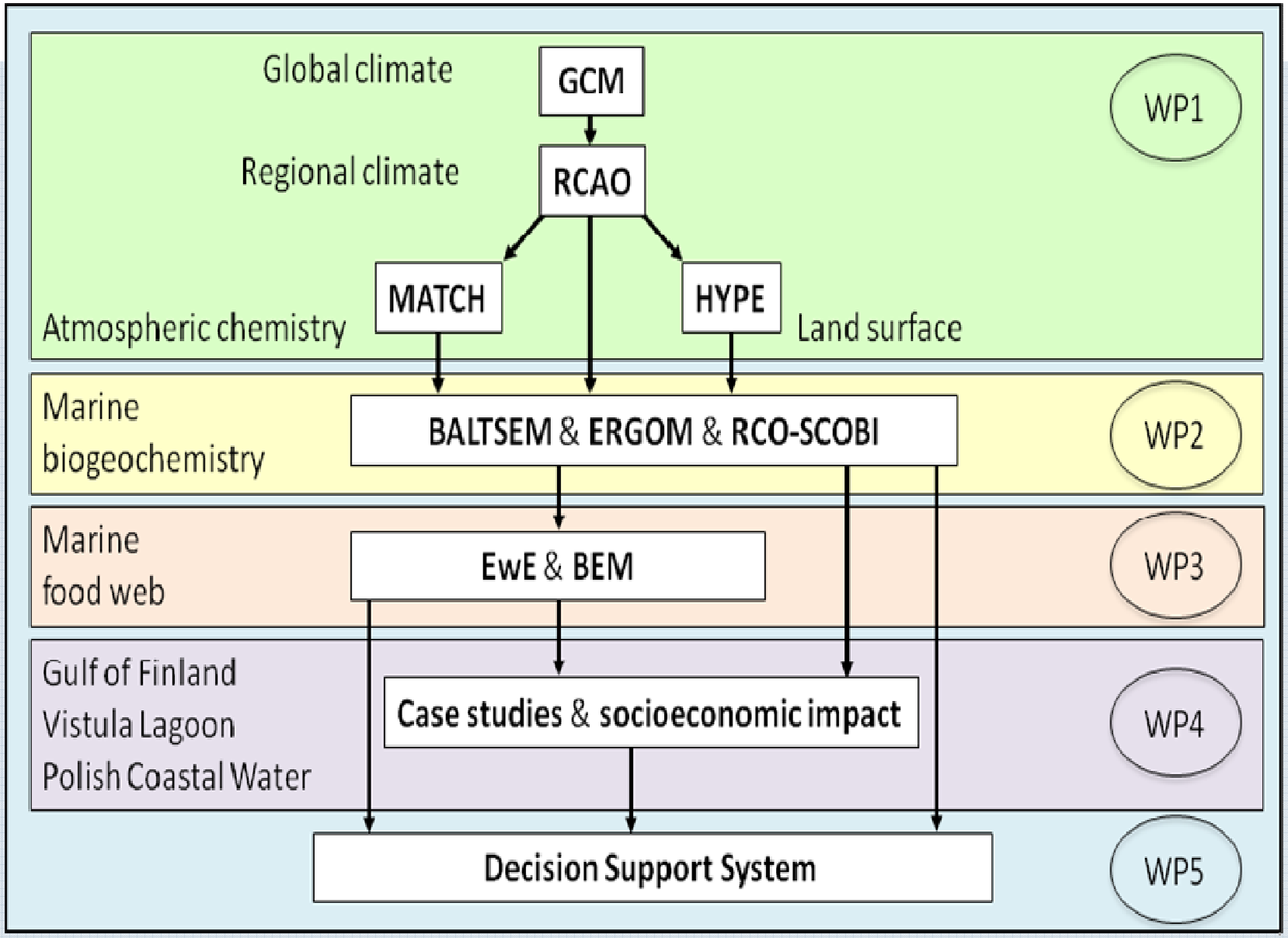
13:55-14:15 Inari Helle, Helsinki University: IBAM - Integrated Bayesian risk analysis of ecosystem management in the Gulf of Finland

14:15-14:35 Anna Gårdmark, Swedish Board of Fisheries: Biological Ensemble Modelling to improve fisheries science and management

14:35-15:00 Coffee + Poster

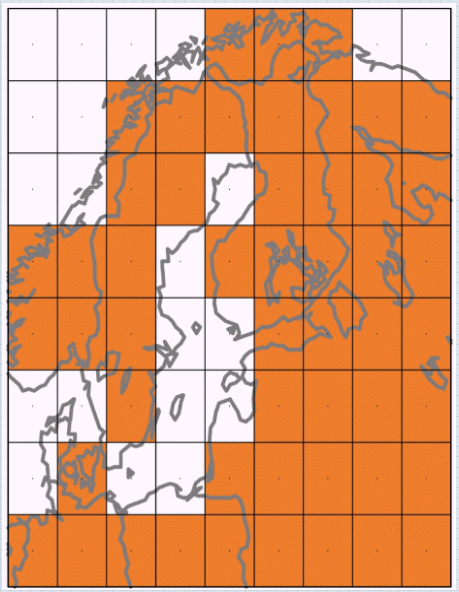
15:00-17:00 Discussion of collaboration and data exchange, chair: Brian MacKenzie

Model hierarchy in ECOSUPPORT

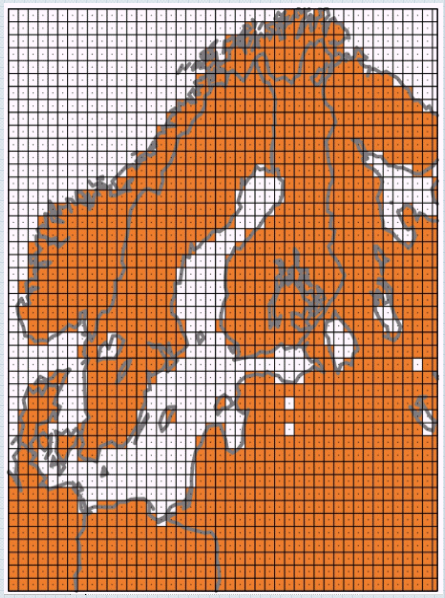


Regional climate models:
Improving global climate scenarios

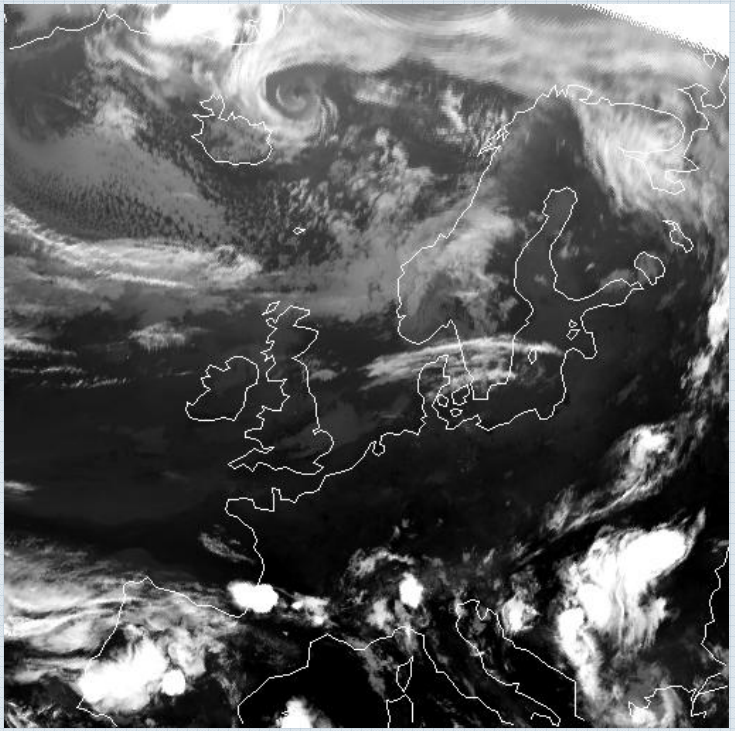
- Increased resolution → detailed regional forcing
- Greater number of explicitly resolved processes



Global



Regional



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Suggested ECOSUPORT simulations:

1. One hindcast simulation 1960-2007:
   RCAO/ERA-40, 50 km (delivered RCA/ERA-40, 25 km) change!
2. Four transient simulations 1960-2100:
   RCAO/GCM, 50 km
3. Which GCM, emission scenario, nutrient load scenario? Decision needed!
4. Past climate simulation 1850-2007 based upon a reconstruction

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Regional climate modelling

Rossby Centres ensemble

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The R
cen

No	AOGCM (Institute, country)		Emission scenario	Horisontal resolution (km)
1	Arpège (CNRM, France)		A1B	50
2	BCM (NERSC, Norway)		A1B	50
3				25
4	CCSM3 (NCAR, USA)		A2	50
5			A1B	50
6			B2	50
7	ECHAM4 (MPI-met, Germany)		A2	50
8			B2	50
9	ECHAM5 (MPI-met, Germany)		*A2*	50
10			A1B	50
11				50
12				50
13				25
14				*12.5*
15			B1	50
16	HadCM3 (Hadley Centre, UK)	ref (Q0)	A1B	50
17		low (Q3)		50
18		high (Q16)		50
19		low (Q3)		25
20	*IPSL-CM4 (IPSL, France)*		*A1B*	*50*

All simulations on the ENSEMBLES grid with RCA3

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The Rossby centre ensemble

Different AOGCMs

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The Rossby centre ensemble

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Different model formulation (GCM)

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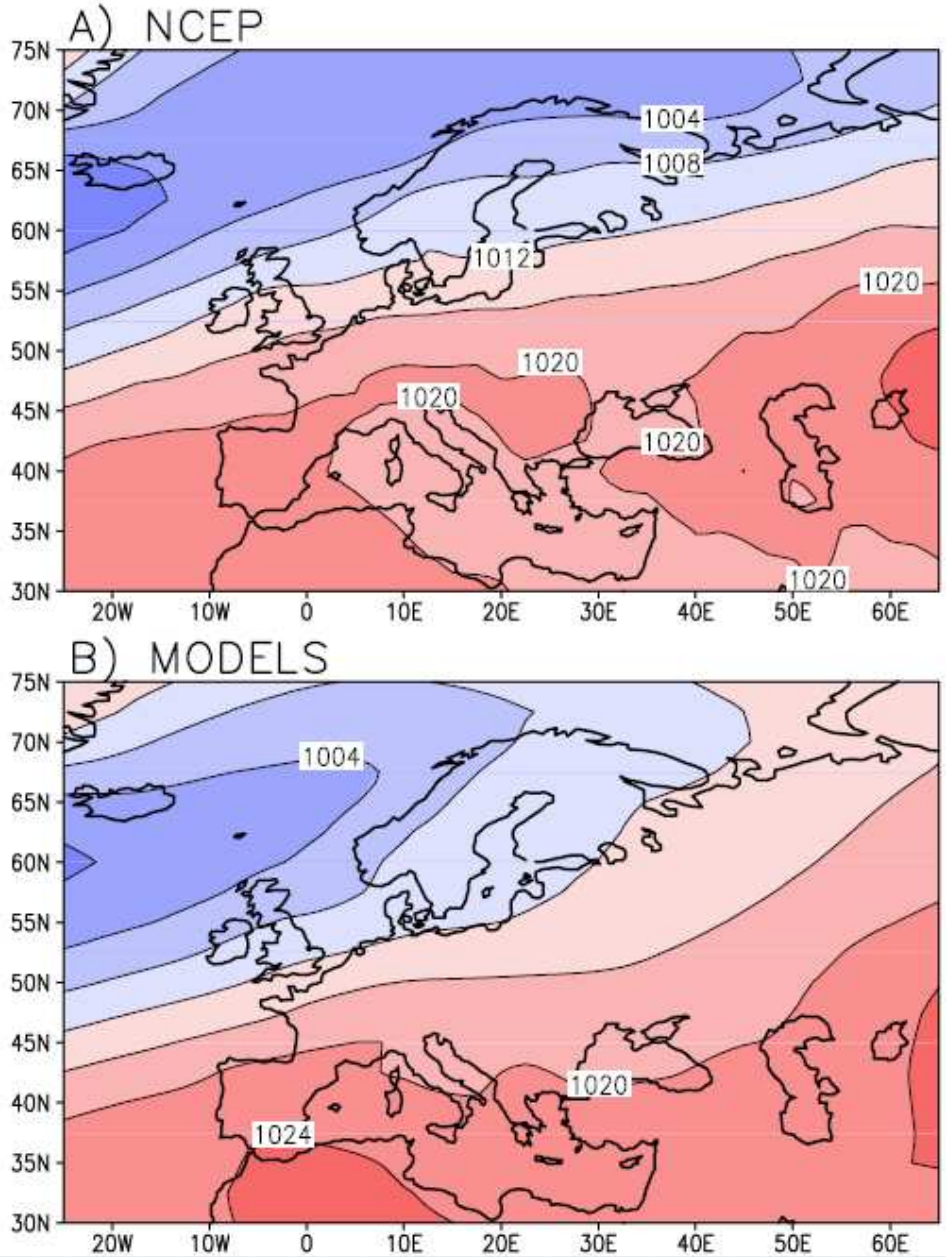
How good are GCMs at representing today's climate?

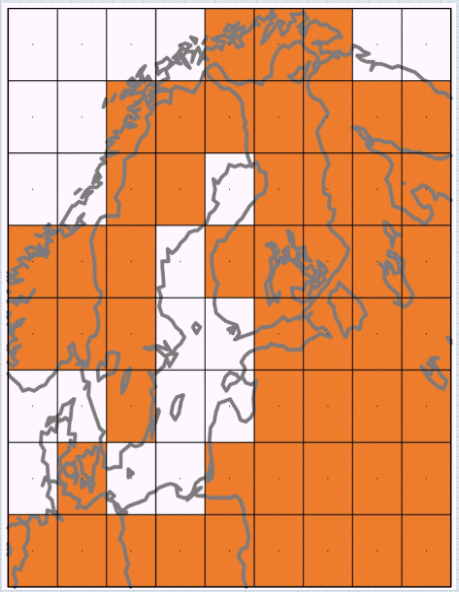


Winter (DJF) MSLP (1961-1990)
Multi(24)-model mean

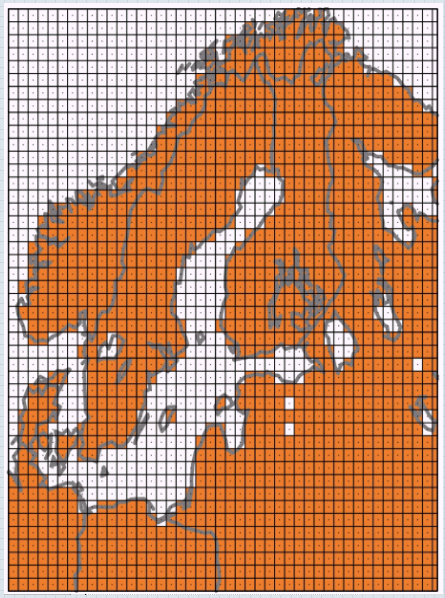
- Icelandic low is not deep enough
- Bias in MSLP pattern lead to a too weak southwesterly transport of mild air to western Europe in winter
- Also, N of cyclones underestimated at coarse resolution

Regional climate models:
Improving global climate scenarios

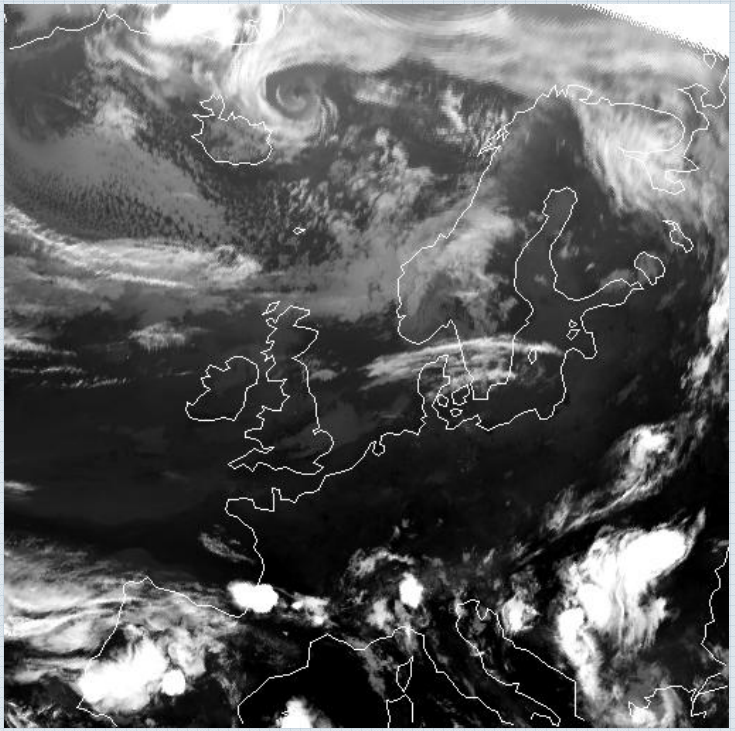
- Increased resolution → detailed regional forcing
- Greater number of explicitly resolved processes



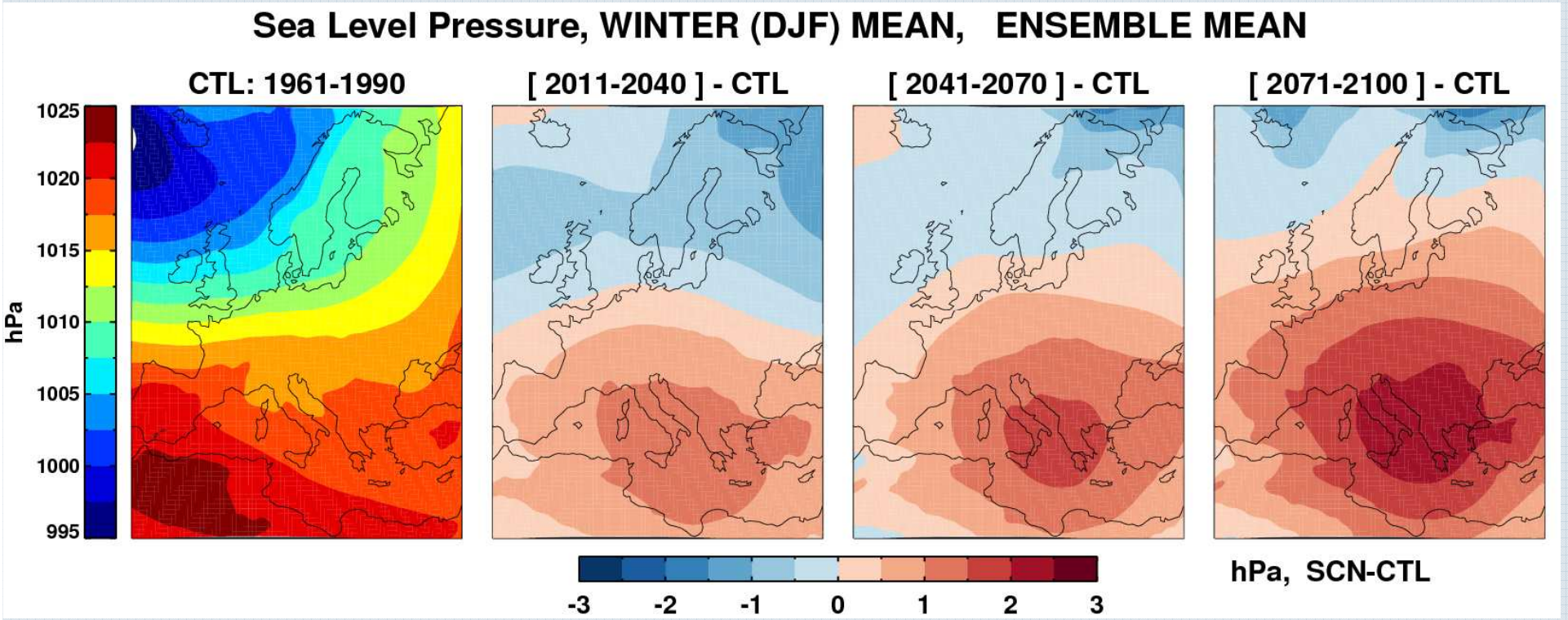
Global



Regional

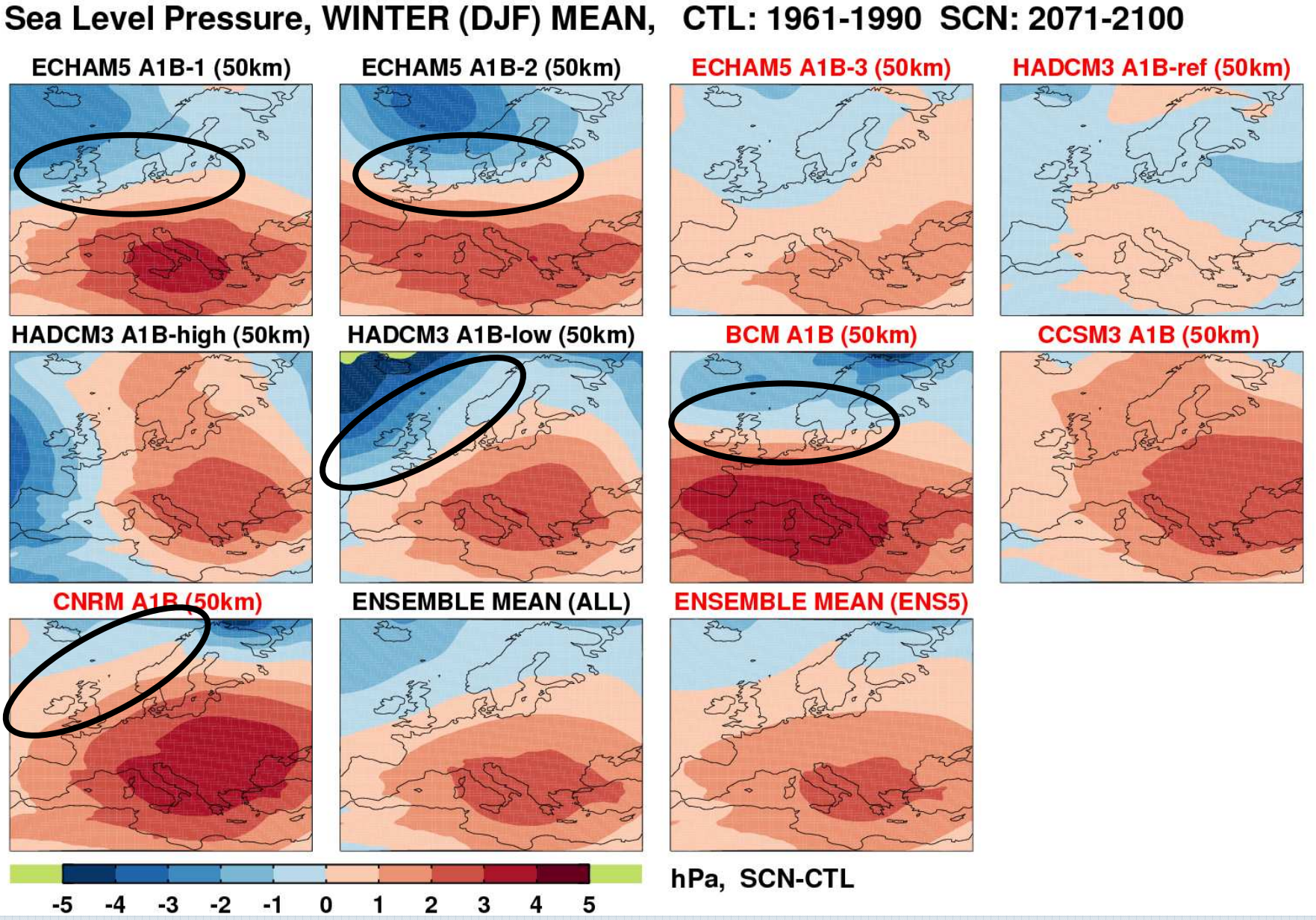


Future simulated changes in the large-scale circulation in the European area

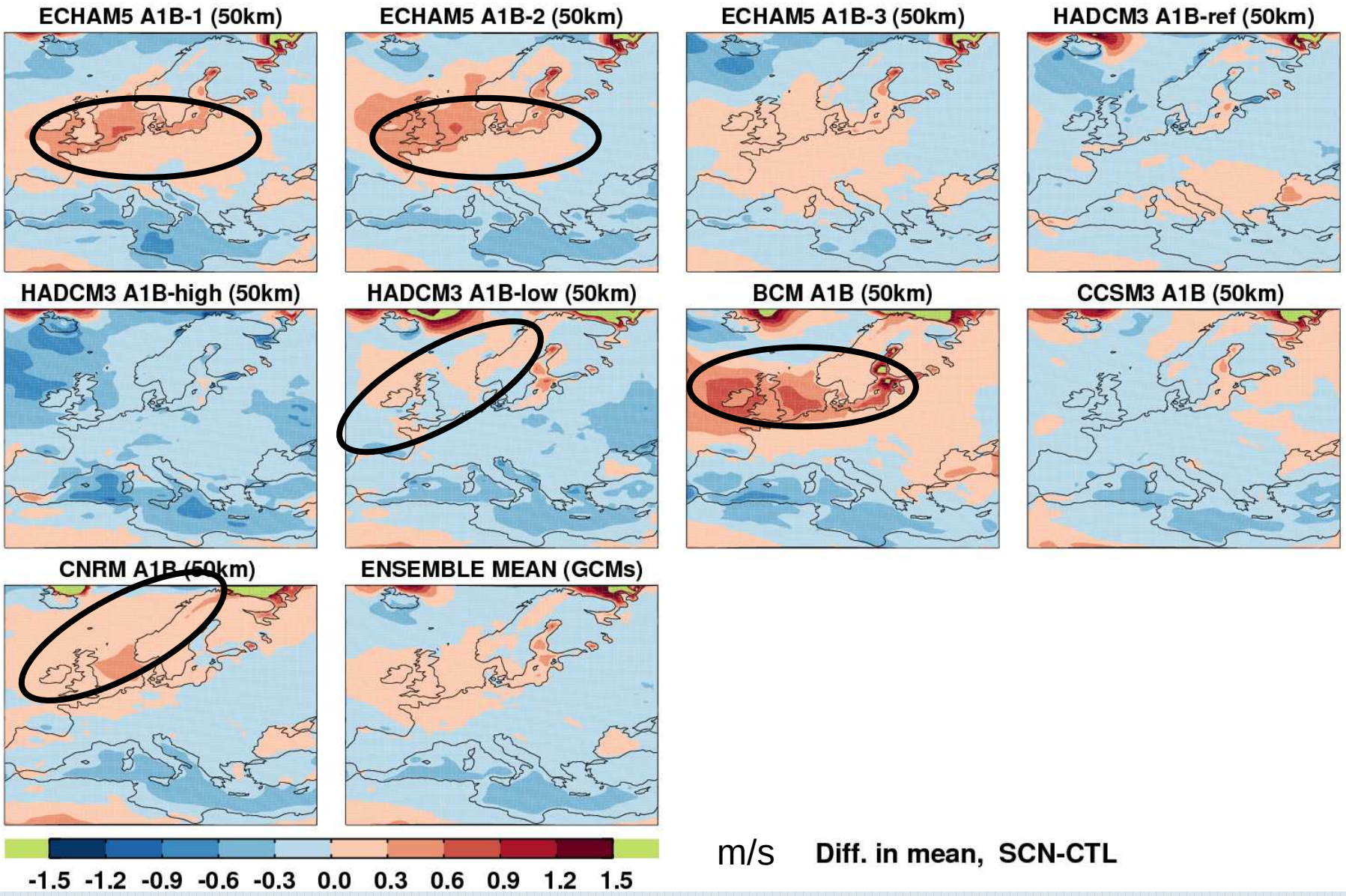


Increasing N-S pressure gradient over time

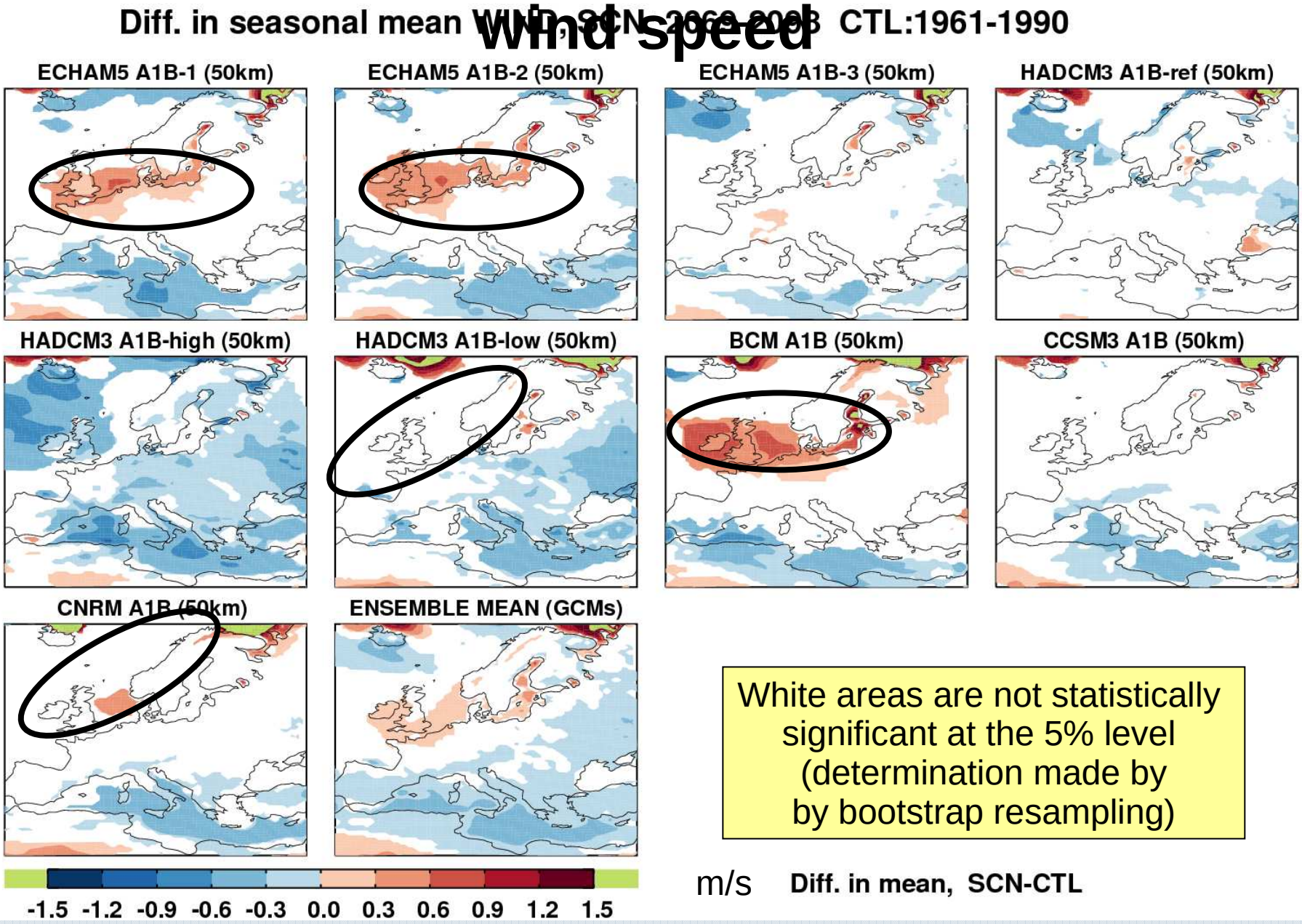
Is it the same in all simulations?



Changes in 10m mean

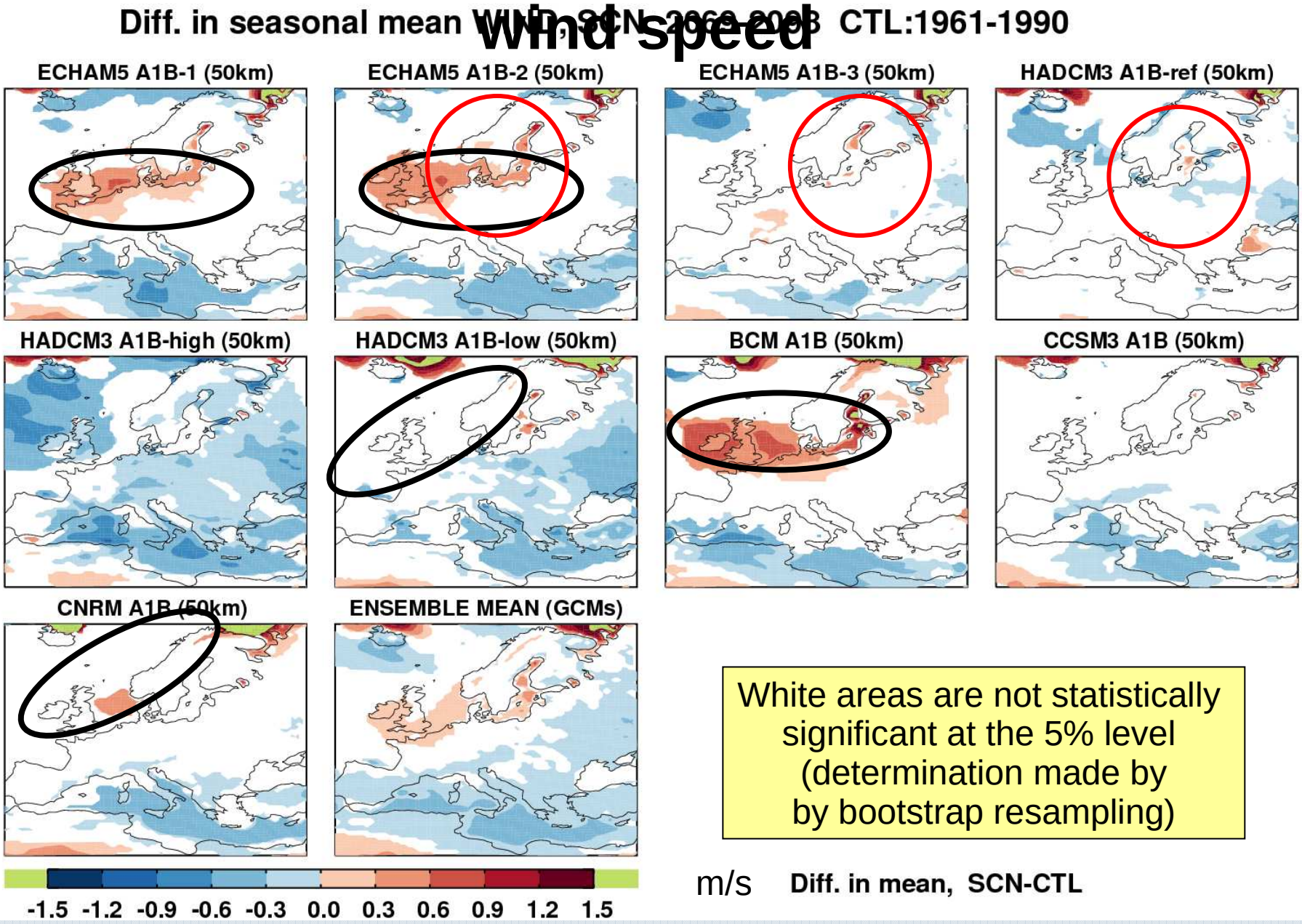


Changes in 10m mean wind speed



White areas are not statistically significant at the 5% level (determination made by by bootstrap resampling)

Changes in 10m mean wind speed



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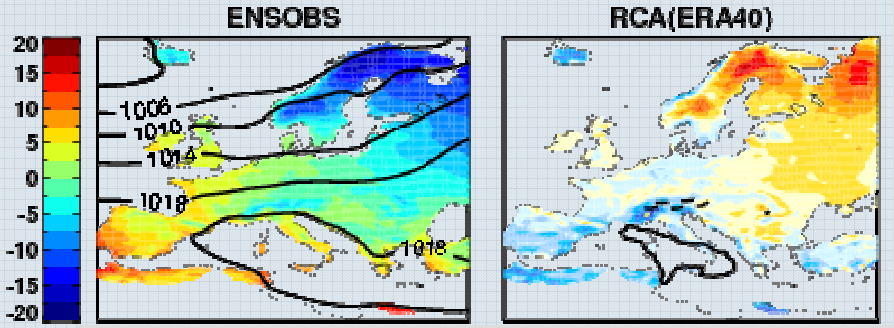
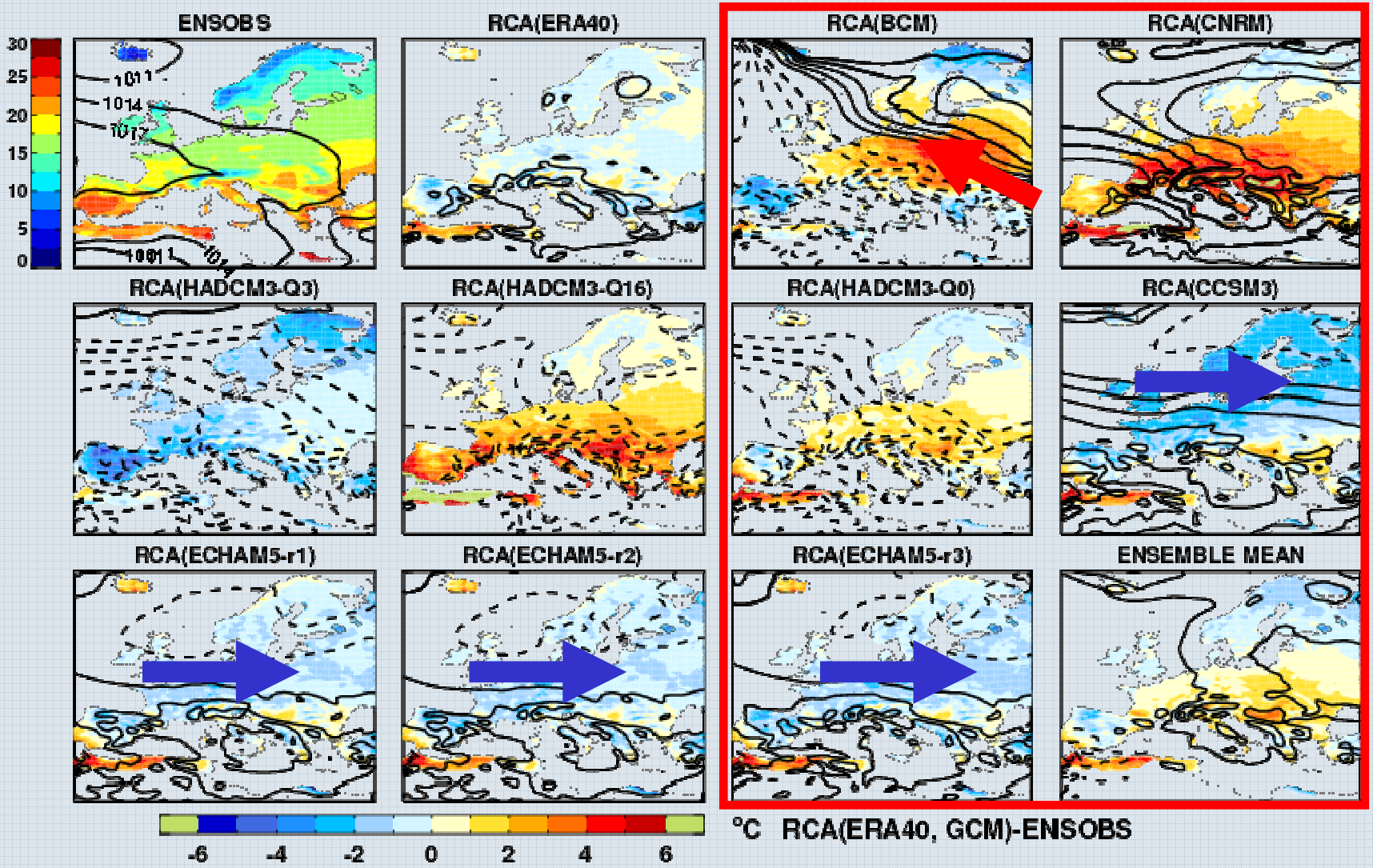
Biases in the recent past climate (1961-1990): winter (DJF) mean temperature and MSLP



°C RCA(ERA40, GCM)-ENSOBS

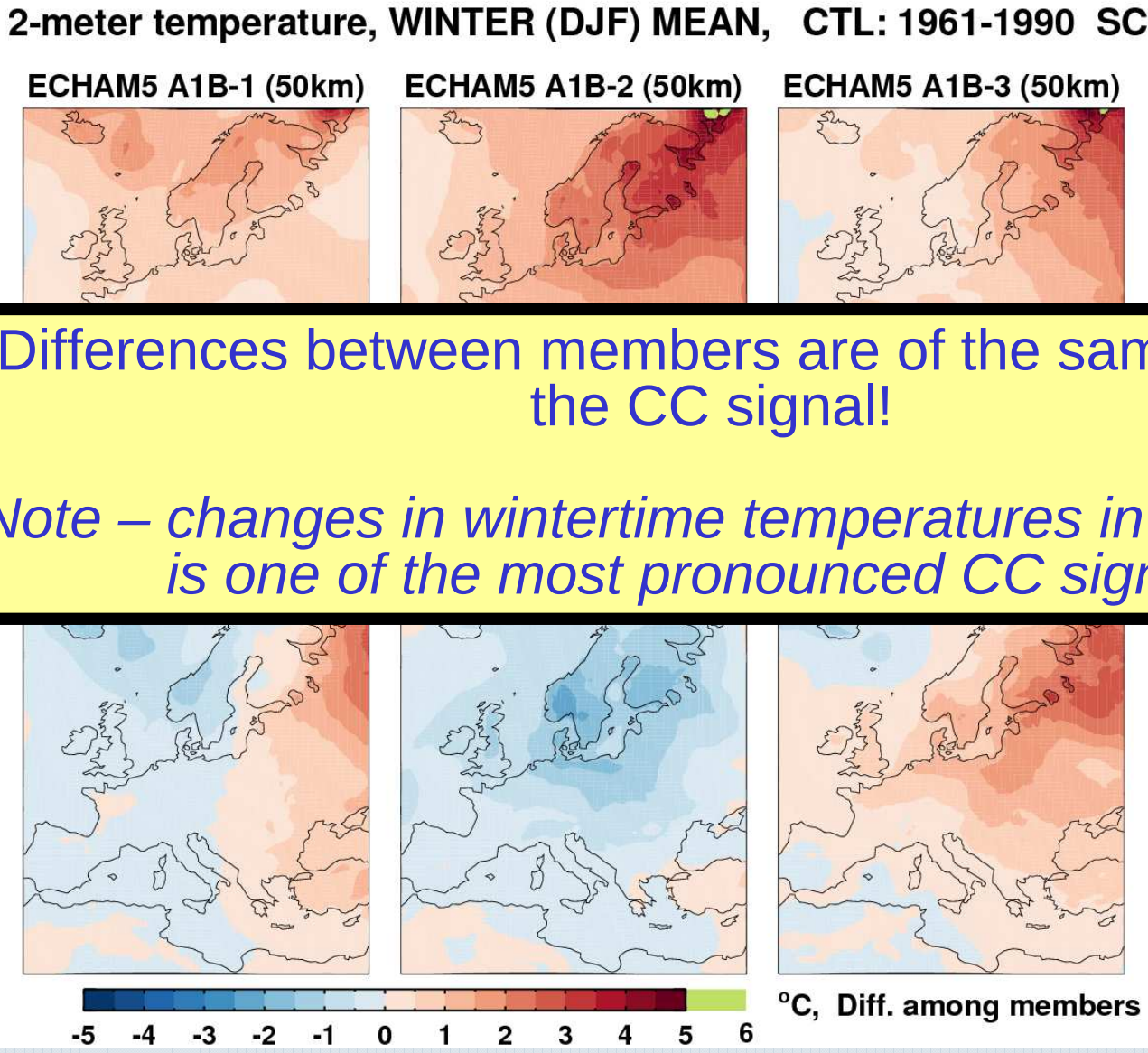
Biases in the recent past climate (1961-1990): summer (JJA) mean temperature and MSLP



Control climate (1961-1990)

- RCA3ERA40 differs from obs. T2m with +/- 2K
- GCM-driven RCA3-runs show larger differences (central/eastern Europe, northernmost Scandinavia)
- Differences in MSLP explains parts of T2m differences
- Many GCMs are too zonal leading to warm/cold (DJF/JJA) biases
- Differences between GCMs larger than differences between ensemble members
- Ensemble mean better than most GCMs

Two examples of CC in the next few decades (1)



Differences between members are of the same order as the CC signal!

Note – changes in wintertime temperatures in NE Europe is one of the most pronounced CC signals.

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The next few decades (2011-2040)

- **Large contribution to uncertainty from natural variability**
- **Differences between ensemble members very much linked to different changes in circulation**
- **Low signal-to-noise ratio**

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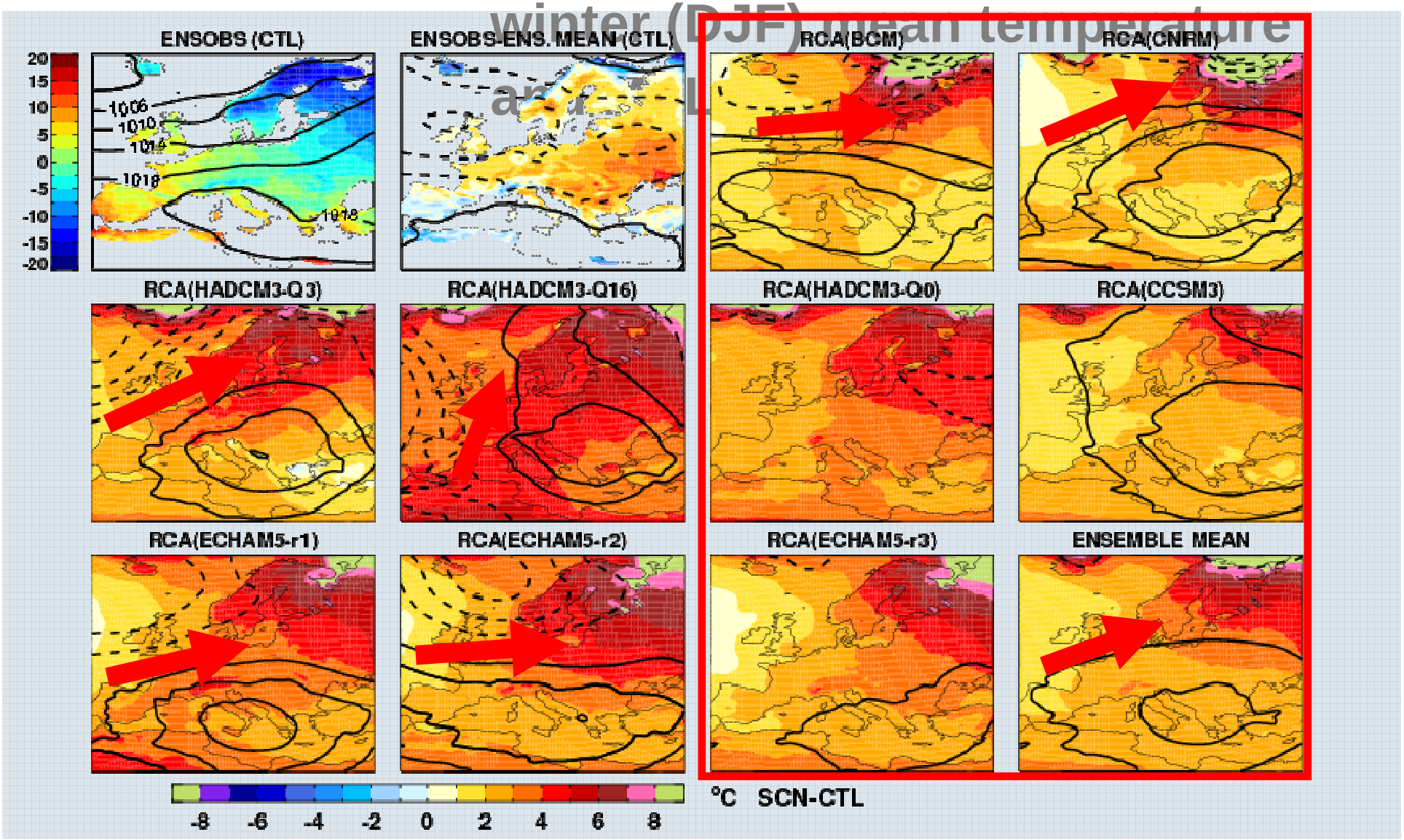
Climate change (2071-2100 vs 1961-1990):

winter (DJF) mean temperature and [illegible]



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Climate change (2071-2100 vs 1961-1990):

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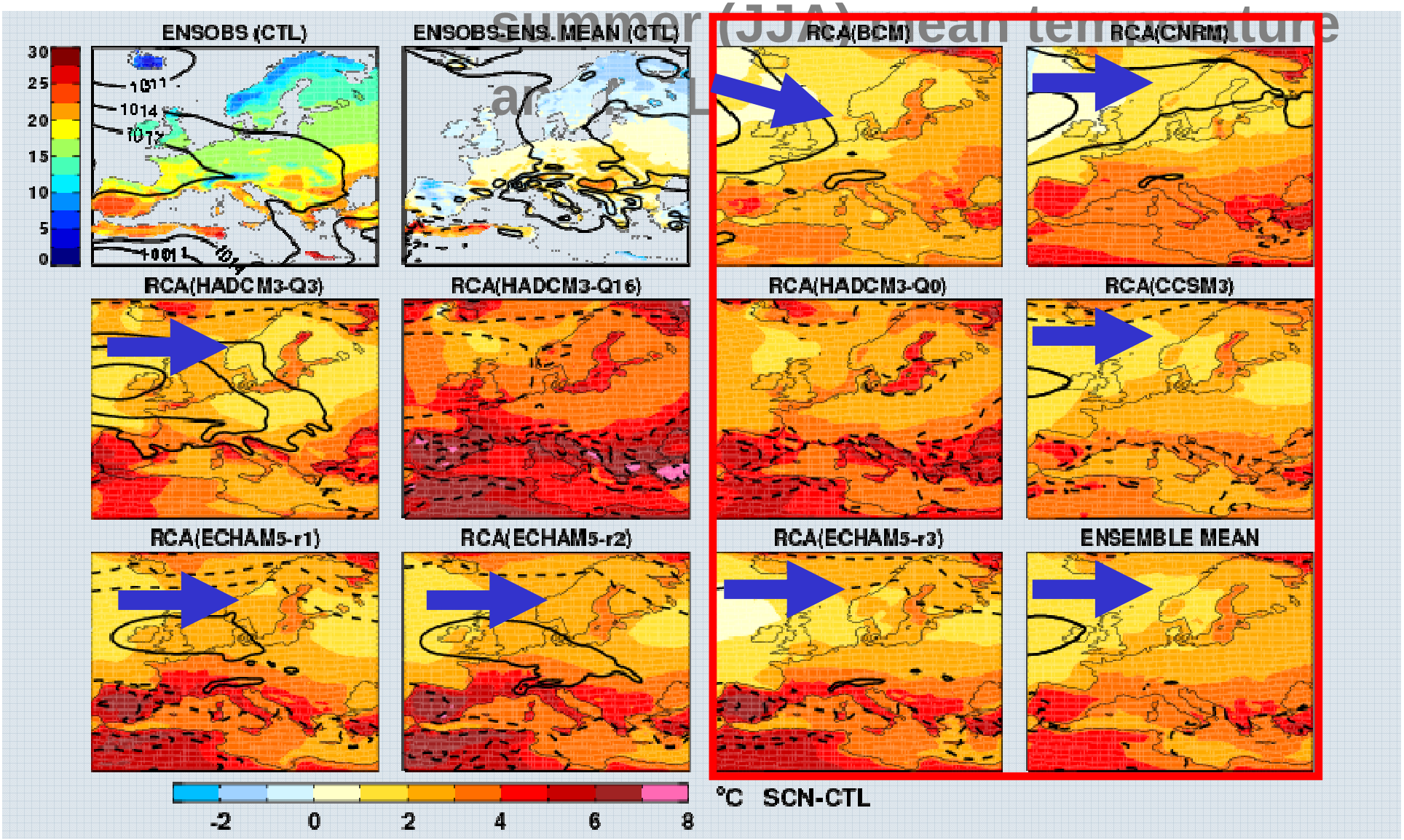

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End of the century (2071-2100)

- CC signal mostly larger than biases in CTRL period
- Contribution to winter warming from circulation changes (increased zonality)
- Moderate summer warming in the north due to circulation changes (increased zonality)
- Differences between GCMs mostly larger than differences between ECHAM5 ensemble members

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ECOSUPPORT simulations:

1. One hindcast simulation 1960-2007: RCAO/ERA-40, 50 km (delivered RCA/ERA-40, 25 km) an additional run!
2. Four transient simulations 1960-2100: RCAO/GCM, 50 km
3. Which GCM, emission scenario, nutrient load scenario? Decision needed!
4. Past climate simulation 1850-2007 based upon a reconstruction

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The Rossby centre ensemble

Different AOGCMs

Different initial conditions

Different model formulation (GCM)

Different emission scenarios

Different horizontal resolution

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