

CLIVAR Working Group on Ocean Model Development (WGOMD)



The 10th WGOMD Panel Meeting,
11-13 January 2012, Venice, Italy

Members

G. Danabasoglu (co-chair) (2012) ¹	National Center for Atmospheric Research, USA
H. Drange (co-chair) (2012)	University of Bergen, Norway
E. Curchitser (2013)	Rutgers University, USA
S. Griffies (2013)	Geophysical Fluid Dynamics Lab., NOAA, USA
S. Marsland (2012) ²	CSIRO, CAWCR, Australia
G. Madec (2011)	LODYC, Institute Pierre Simon Laplace, France
R. Greatbatch (2011)	Institut für Meereskunde, Kiel, Germany
H. Tsujino (2011)	Meteorological Research Institute, Japan Meteorological Agency, Japan
D. Holland (2013) ³	Courant Institute of Mathematical Sciences, New York University, USA
K. Fennel (2013)	Dalhousie University, Canada
G. Nurser (2013)	National Oceanography Center, UK

Emeritus

C. Böning	Institut für Meereskunde, Kiel, Germany
A. M. Treguier ⁴	Laboratoire de Physique de Océans, IFREMER, France
R. Gerdes	Alfred Wegener Institut für Polar- und Meeresforschung, Germany
E. Chassignet ³	Florida State University, USA

Information on other activities where WGOMD members are serving:

- 1 - Member of US CLIVAR AMOC Program Executive Committee
- 2 - WGOMD representative on WCRP Climate Model Metrics Panel (WCMMP)
- 3 - Co-Principal Investigator of the Arctic Ocean Model Intercomparison Project (AOMIP)
- 4 - Member of the CLIVAR Atlantic Implementation Panel (AIP)

The ICPO contact for the CLIVAR Working Group on Ocean Model Development is [Anna Pirani](#)



Exchanges

Special Issue

No. 56, Vol. 16, No.2, May 2011

WCRP Coupled Model Intercomparison Project - Phase 5 - CMIP5 -

Physical Ocean Fields in CMIP5

Stephen Griffies¹ and Gokhan
Danabasoglu²

1 NOAA Geophysical Fluid Dynamics Lab, USA

2 NCAR, USA

Pages 32-34

From a physical (oceanography) process perspective, CMIP3 archive suffered from the following shortcomings:

- There was insufficient output to construct global budgets of ocean mass, heat, and salt, with incomplete information regarding the surface boundary fluxes. Furthermore, those boundary fluxes archived were generally *not* on the ocean model native grid.
- There were few (if any) fields of use for studying the impact of subgrid scale parameterizations, with such information of leading order importance for understanding ocean model behaviour.

- Vector fields were remapped to a spherical grid from the non-spherical native grids of most contributing models. Remapping occurred despite the absence of a generally applied algorithm to handle complex land-sea boundaries, thus resulting in incomplete and/or untrustworthy vector fields.
- Fields important for understanding ventilation of abyssal, intermediate, and thermocline waters (relevant for ocean heat or Carbon uptake) were missing - e.g., ideal age, CFCs.

CLIVAR Repository for Evaluating Ocean Simulations

REOS Introduction

This web page aims to organize methods for evaluating ocean simulations by bringing together datasets, analyses/syntheses, tools, papers, and commentary. We solicit input from the modelling, observational, and analysis communities to provide guidance and oversight for the contents of this page.

REOS aims to facilitate the research community's access to

1. basic datasets and analyses/syntheses products
2. metrics for evaluating variability and processes including input by ocean basin proposed by the CLIVAR basin panels
3. guidance on ocean model validation
4. tools available for the community for ocean model data analysis
5. a comprehensive bibliography of papers, linked to the online articles where possible.

The REOS website is still 'work in progress'. As this page matures through usage and input, navigating the content of this web page will improve. Please send any comments and suggestions, as well as input, to [Anna Pirani](#).

Working Group on Ocean Model Development (WGOMD)

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The 10th Session of the WGOMD Panel
11-13 January 2012, Venice, Italy
Hosted by CNR Institute for Marine Sciences (ISMAR)
(Dr. Georg Umgiesser)

MAIN FOCUS (2.5 days): CORE-II simulations, their analysis, and documentation in peer-reviewed journals

INTERACTION WITH LOCAL SCIENTISTS (0.5 days)

www.clivar.org/organization/wgomd/resources/core

Coordinated Ocean-ice Reference Experiments phase II (CORE-II)

Inter-annually varying forcing (IAF) for the 1948-2007 period (Large and Yeager 2004; 2009).

CORE-II hindcast simulations provide a framework to evaluate ocean model performance and study mechanisms of ocean phenomena and their variability from seasonal to decadal time scales.

In particular, CORE-II directly contributes to

- evaluation, understanding, and improvement of the ocean component in ESMs,
- investigation of mechanisms for inter-annual to decadal variability,
- evaluation of robustness of mechanisms across models,
- providing initial conditions for decadal predictability studies,
- bridge observations and modeling.

CORE-II complements ocean reanalysis from data assimilation approaches, particularly for the pre-ARGO period.

CORE-II PARTICIPANTS

ACCESS MOM, Australia

NCAR CESM POP, USA

GFDL MOM, USA

GFDL GOLD, USA

HYCOM, USA

ECCO and MITgcm, USA

NorClim, Norway

ORCA, Germany

FESOM, Germany

MRI, Japan

INMOM, Russia

ICTP, Italy

CERFACS NEMO, France

NOCS NEMO, England

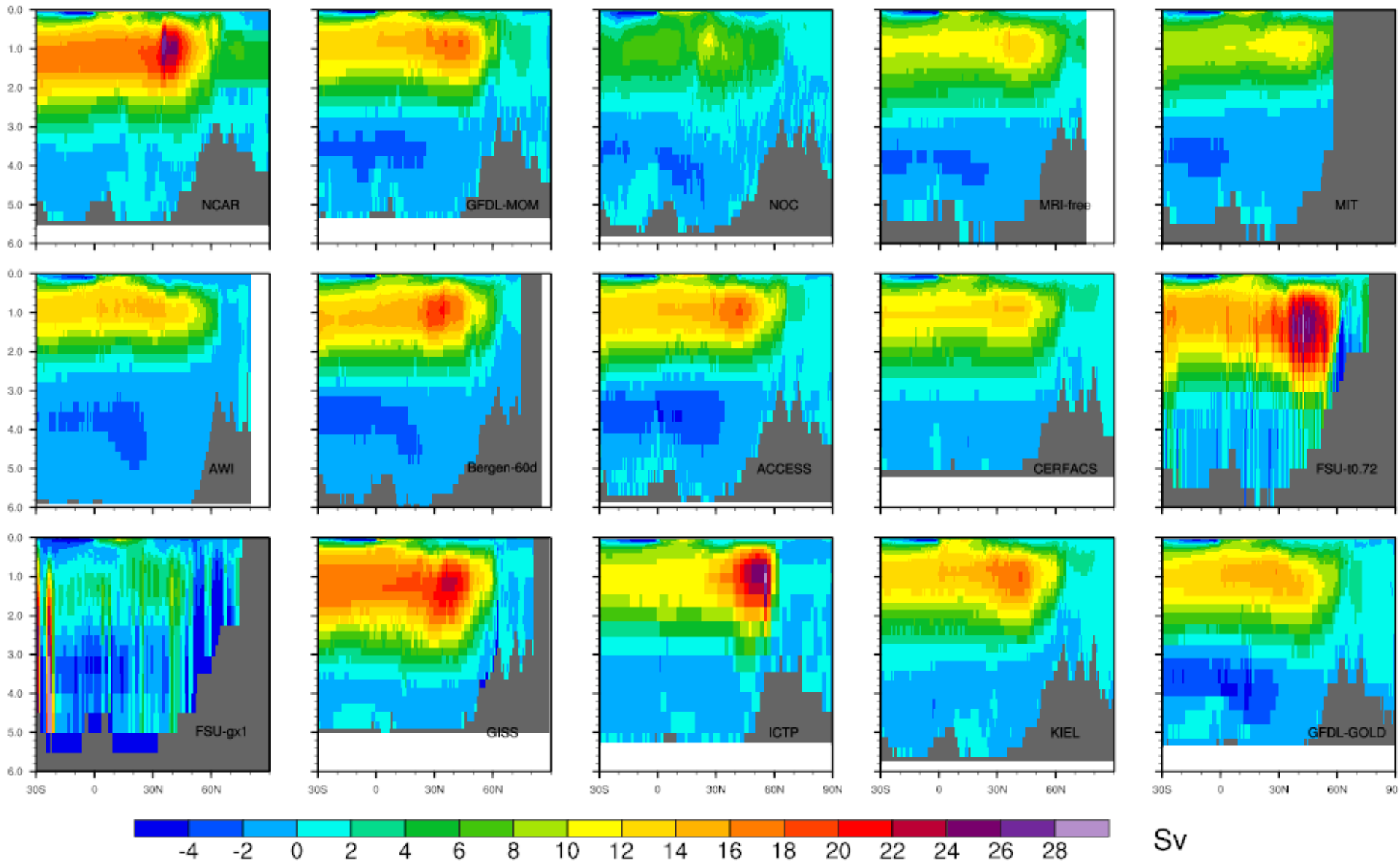
NASA GISS, USA

Hypothesis: Forward models forced with the same inter-annually varying data will produce similar solutions.

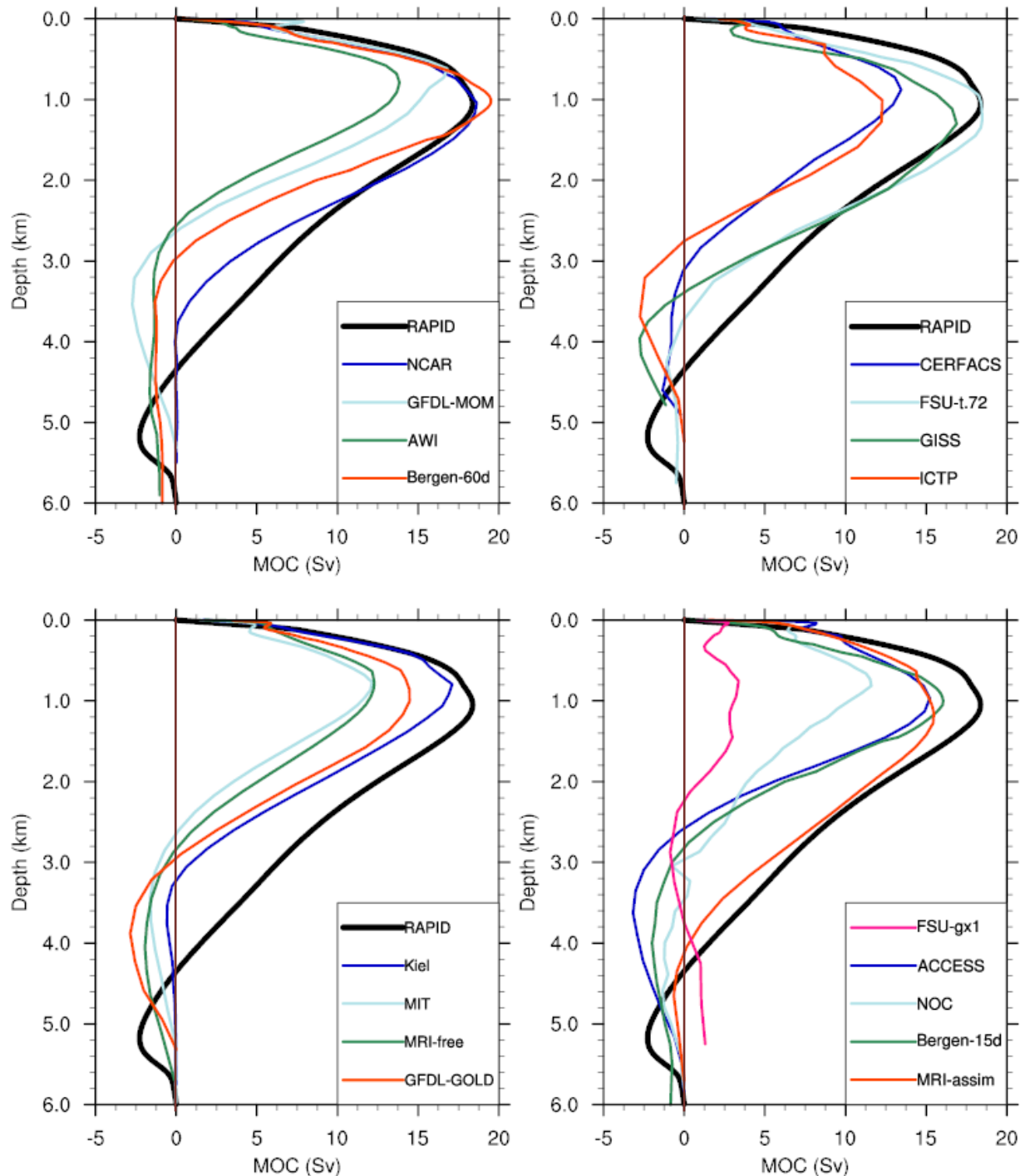
Planned papers (next 1-1.5 years):

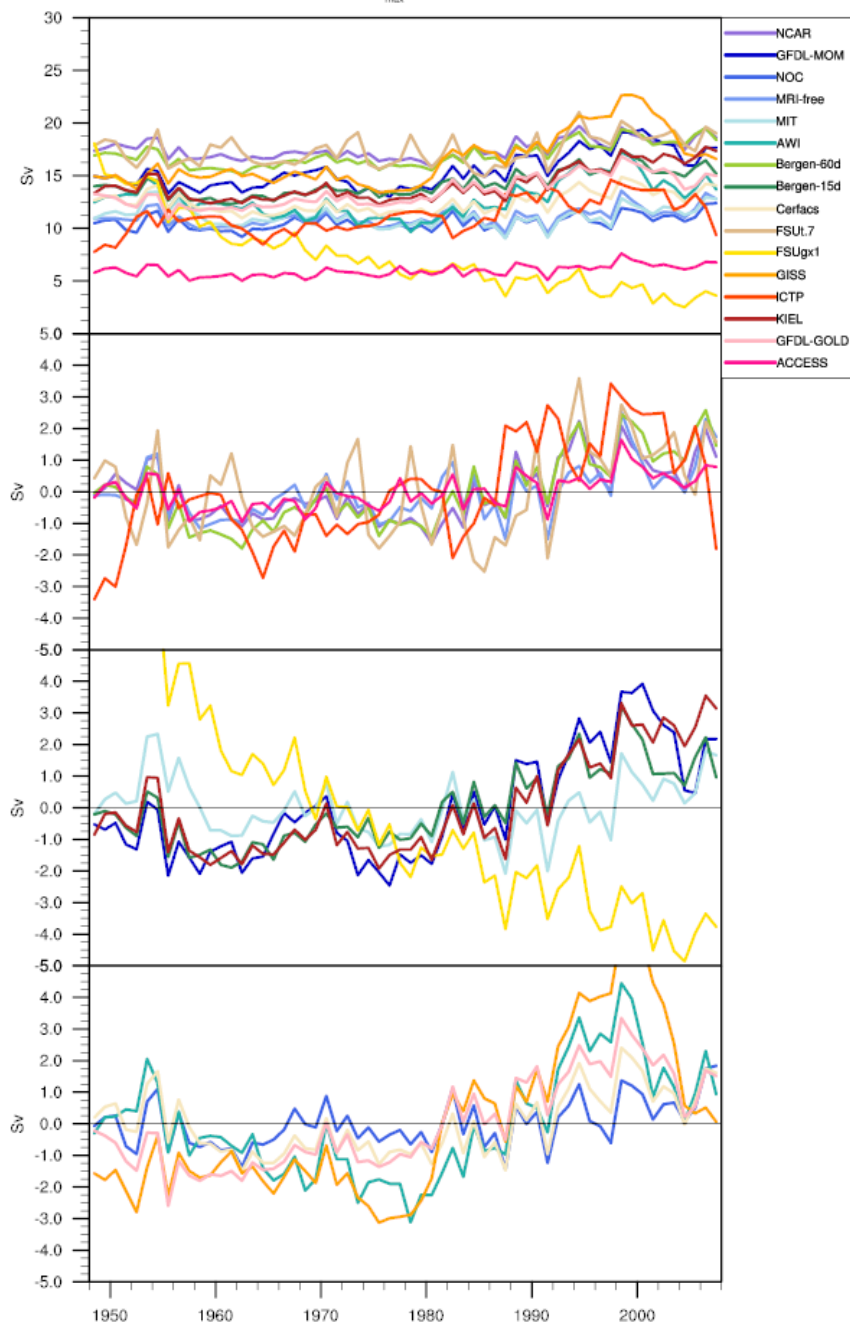
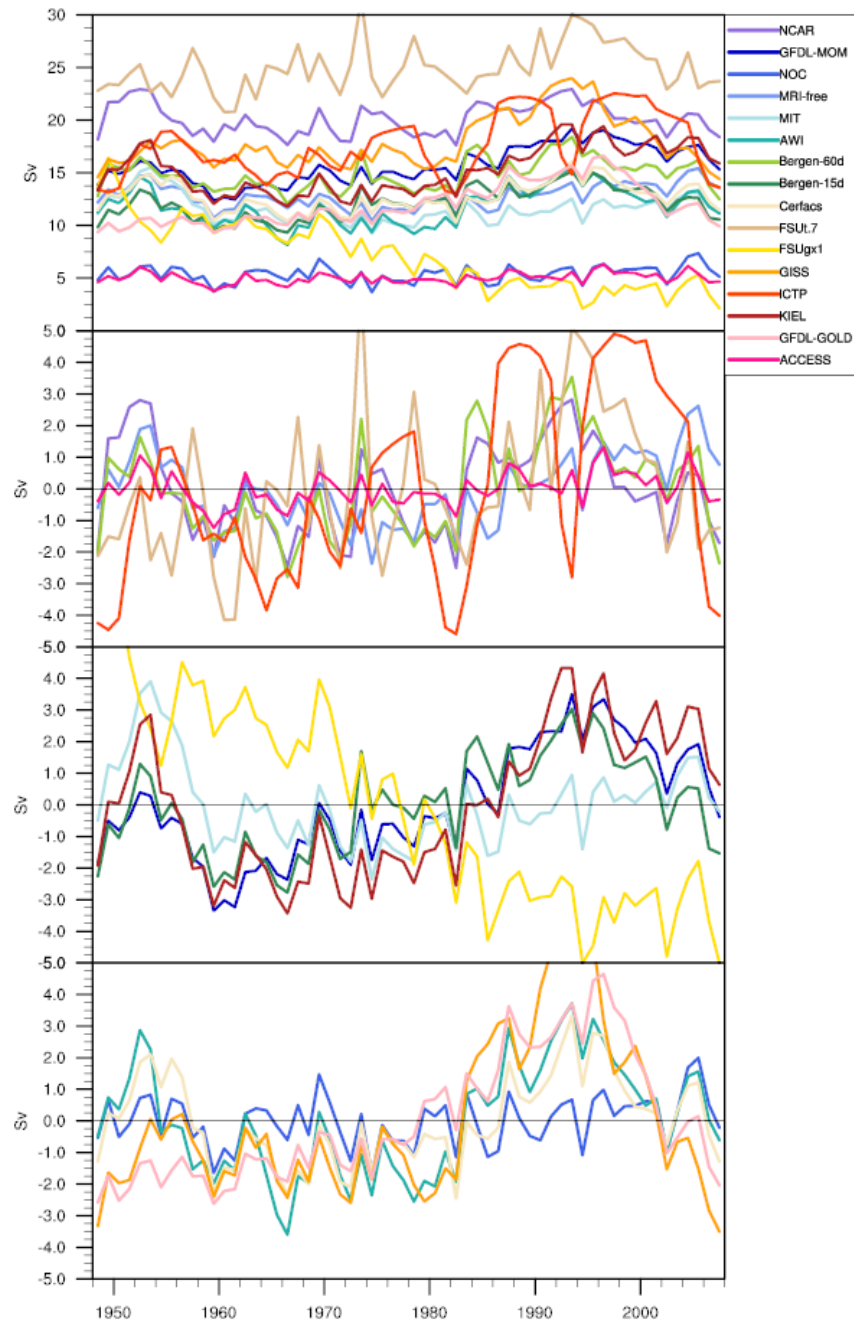
- North Atlantic mean and variability with a focus on Atlantic Meridional Overturning Circulation (AMOC) and sub-polar gyre
- Mean state, drift, and variability (Global, except North Atlantic)
- Sea surface height and variability
- Arctic Ocean and AOMIP related analysis
- Ventilation with a focus on the Southern Ocean

ATLANTIC MERIDIONAL OVERTURNING CIRCULATION (1988-2007 mean)



Model AMOC
comparisons
with the
RAPID data
at 26.5°N



AMOC_{max} at 26.5°NAMOC_{max} at 45°N

NEAR-TERM PLANS (1-3 YEARS)

- Finish CORE-II related projects,
- Explore forcing ocean models with partial coupling, i.e., with an interactive atmosphere, but controlled forcing. Consider designing a suite of experiments within the CORE framework.

KEY SCIENCE QUESTIONS OVER THE NEXT 1-10 YEARS

- Continue to look at model biases and improve model physics, considering biogeochemistry and ecosystems,
- High resolution modeling and regional/coastal modeling,
- Sea level and interactions with ice sheets,
- Role of ocean in decadal variability,
- Operational oceanography and data assimilation.

Challenges

Our biggest challenge is a lack of new ocean model developers. The new generation of scientists are mostly model users rather than developers - in other words, 'black box' modelers who do not have a good understanding of what ocean models can actually do. Gender, geographical, and age diversity is a major issue, likely to be discussed by the modeling council.

Workshop on Sea Level Rise, Ocean - Ice-Shelf Interactions, and Ice Sheets

CSIRO, Hobart, Australia, 18-20 February 2013

In collaboration / contact with:

- CLIVAR/CliC/SCAR Southern Ocean Panel,
- CliC,
- WCRP/IOC Task Force on Sea Level Rise,
- US CLIVAR Working Group on GReenland Ice Sheet - Ocean Interactions (GRISO WG)

Secured AUS \$30K from CSIRO as seed funding.

Goals:

- Evaluate state-of-science of ocean and land-ice interactions,
- Identify strengths and weaknesses of ocean models with respect to sea level change,
- Identify priorities for reducing uncertainties in the projections of global and regional sea-level rise,
- Investigate pathways for the development of the next generation of climate models incorporating interactive land-ice components.

Outcome:

- Interactions among the participating groups, including Early Career Scientists,
- Increase participation in WGOMD CORE-II experiments,
- CLIVAR Exchanges Special Issue on sea level rise and ice sheet modeling,
- A multi-model CORE-II paper on sea level rise.

The 11th Session of the WGOMD Panel
21-23 February 2013, Hobart, Australia
Hosted by CSIRO
(Dr. Simon Marsland)

We will use the meeting to wrap up our CORE-II activities, specifically finalizing related publications. We will initiate new activities within the CORE framework on ocean-atmosphere partial coupling. Other topics that will be addressed include ocean biogeochemistry and high resolution ocean modeling. Collaboration possibilities with other groups will also be explored.

In addition, we plan to meet jointly with the CLIVAR/CliC/SCAR Southern Ocean Panel and the WCRP/IOC Task Force on Sea Level Rise to discuss the outcomes of the workshop and to promote coordinated research activities on ocean, ice shelf, and ice sheet interactions.

SSG-18 Action Items

ACTION ITEM 16: Encourage the ocean basin panels to exploit the CORE-II WGOMD experiments (*Basin panels, WGOMD*)

See responses from AIP, IOP, PP, and SOP; Ongoing

ACTION ITEM 27: Increase interactions between GSOP and WGOMD on the inter-comparison, evaluation and development of ocean syntheses products and free running ocean models (*GSOP, WGOMD*)

Preliminary inter-comparison of ocean state estimation models and free running ocean models is underway as part of CORE-II; WGOMD is requesting creating a new position to bring in a representative of the operational ocean modeling (forecasting, assimilation) community; Bernard Barnier from GSOP participated in our panel meeting.

ACTION ITEM 30: Explore linkages with Arctic Ocean community (i.e., AOSB) to provide guidance and advice to facilitate Arctic Ocean data synthesis (*ClIC, WGOMD, GSOP*)

Links with AOMIP, but not with AOSB yet.

MEMBERSHIP

For terms ended in 2011:

Greatbatch: rotate off, but will remain active

Helen Johnson (University of Oxford, UK)

Carsten Eden (University of Hamburg, Germany)

Sergey Danilov (AWI, Germany)

Emily Shuckburgh (BAS, UK)

Claudia Cenedese (WHOI, USA)

Fiamma Straneo (WHOI, USA)

LuAnne Thomson (University of Washington, USA)

Madec: rotate off

A replacement is actively being sought.

Tsujino: request renewal for another term - active CORE-II participant

MEMBERSHIP

For terms ending in 2012:

Danabasoglu, Drange, and Marsland

We request that all are extended for another term, including the current co-chairs, to ensure continuity and completion of CORE-II projects.

Request a new member to represent the operational ocean modeling community, providing expertise in ocean data assimilation and ocean model verification.

Magdalena Balmaseda (ECMWF, UK)

Mike Bell (UK Met Office, UK)

Representative from BlueLink, BoM, Australia

Representative from MERCATOR, France

Griffies: Became a new member of the Southern Ocean Panel. He will likely rotate off at the end of his current term, but will remain active.