



AMOC in Coordinated Ocean-ice Reference Experiments (COREs)



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CORE-II: An experimental protocol for ocean - ice coupled simulations forced with inter-annually varying atmospheric data sets for the 1948-2007 period (Large and Yeager 2009). This effort is coordinated by the CLIVAR Working Group on Ocean Model Development (WGOMD).

These hindcast simulations provide a framework to

- evaluate ocean models (provides more robust understanding; improves the models, especially by identifying outliers),
- study mechanisms of ocean phenomena and their variability from seasonal to decadal timescales,
- identify forced variability changes,
- develop mechanistic descriptions of observed climate variability and change.
- An alternative to data assimilation in providing ocean initial conditions for decadal prediction simulations.



Participating groups:

- NCAR, USA
- GFDL (MOM, GOLD), USA
- MRI (free, DA), Japan
- ICTP, Italy
- CSIRO, Australia
- U. Bergen (2), Norway
- RAS, Russia
- IfM-GEOMAR, Germany
- FSU (2), USA
- CERFACS, France
- NOC, UK
- MIT (ECCO), USA
- NASA GISS, USA
- AWI, Germany

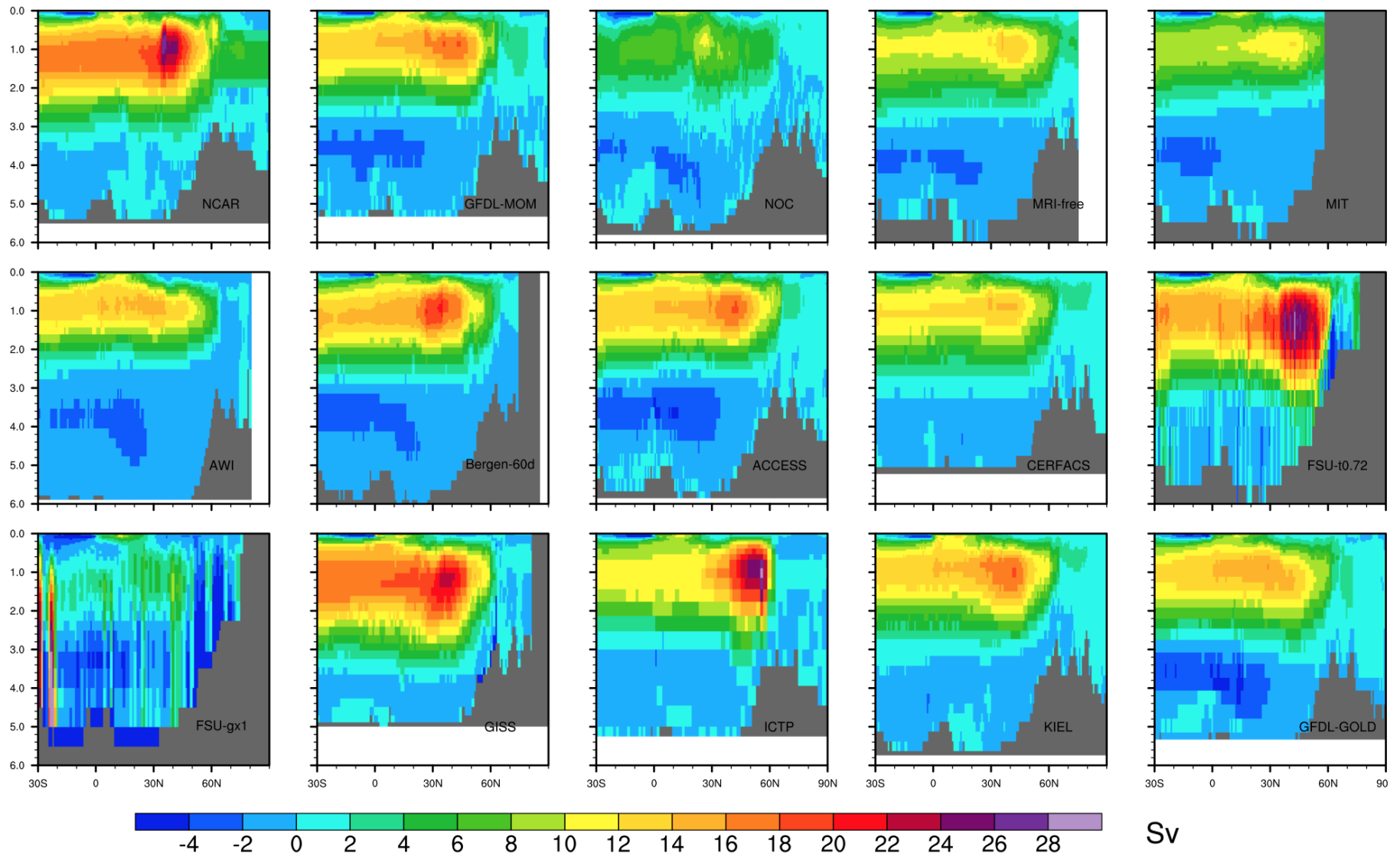
Level, isopycnal, sigma coordinates; free models; DA; mostly nominal 1° resolution

Hypothesis: Models forced with the same CORE-II data will produce similar solutions.

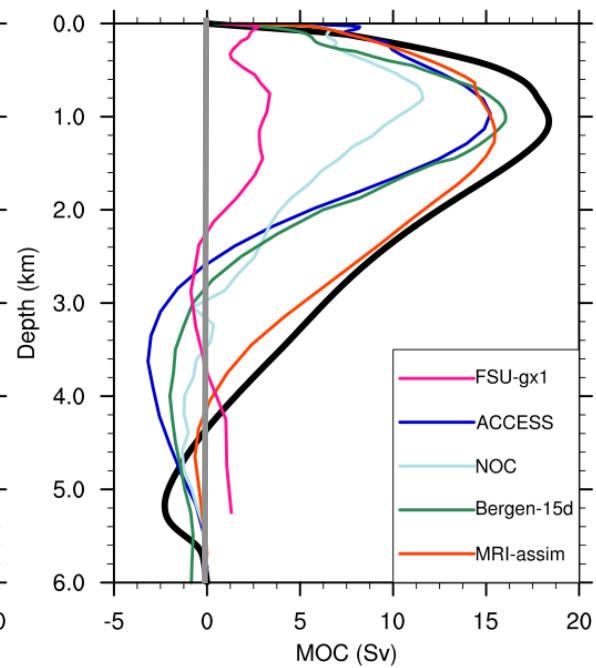
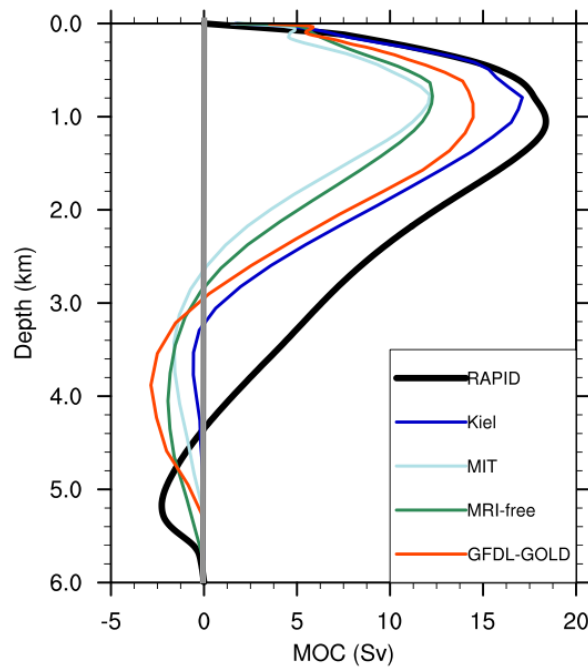
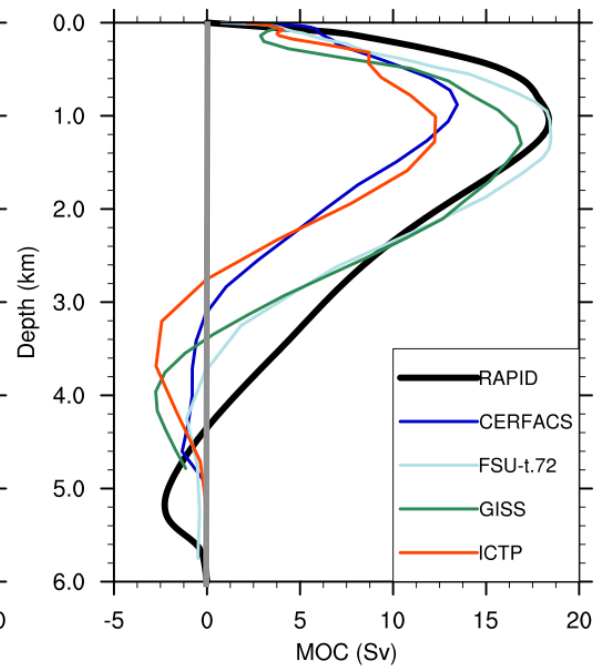
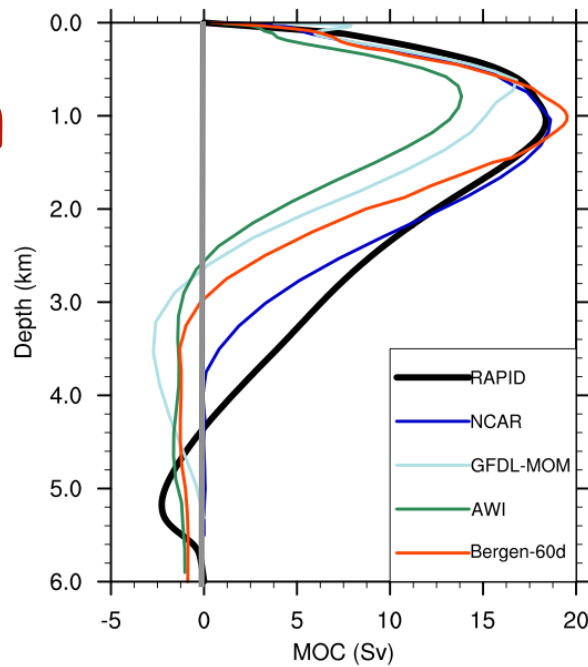
We test this hypothesis, considering the mean state and variability in the North Atlantic with a focus on AMOC.

Caveat... participants are free in their choices of surface freshwater / salt flux treatments and sea-ice models.

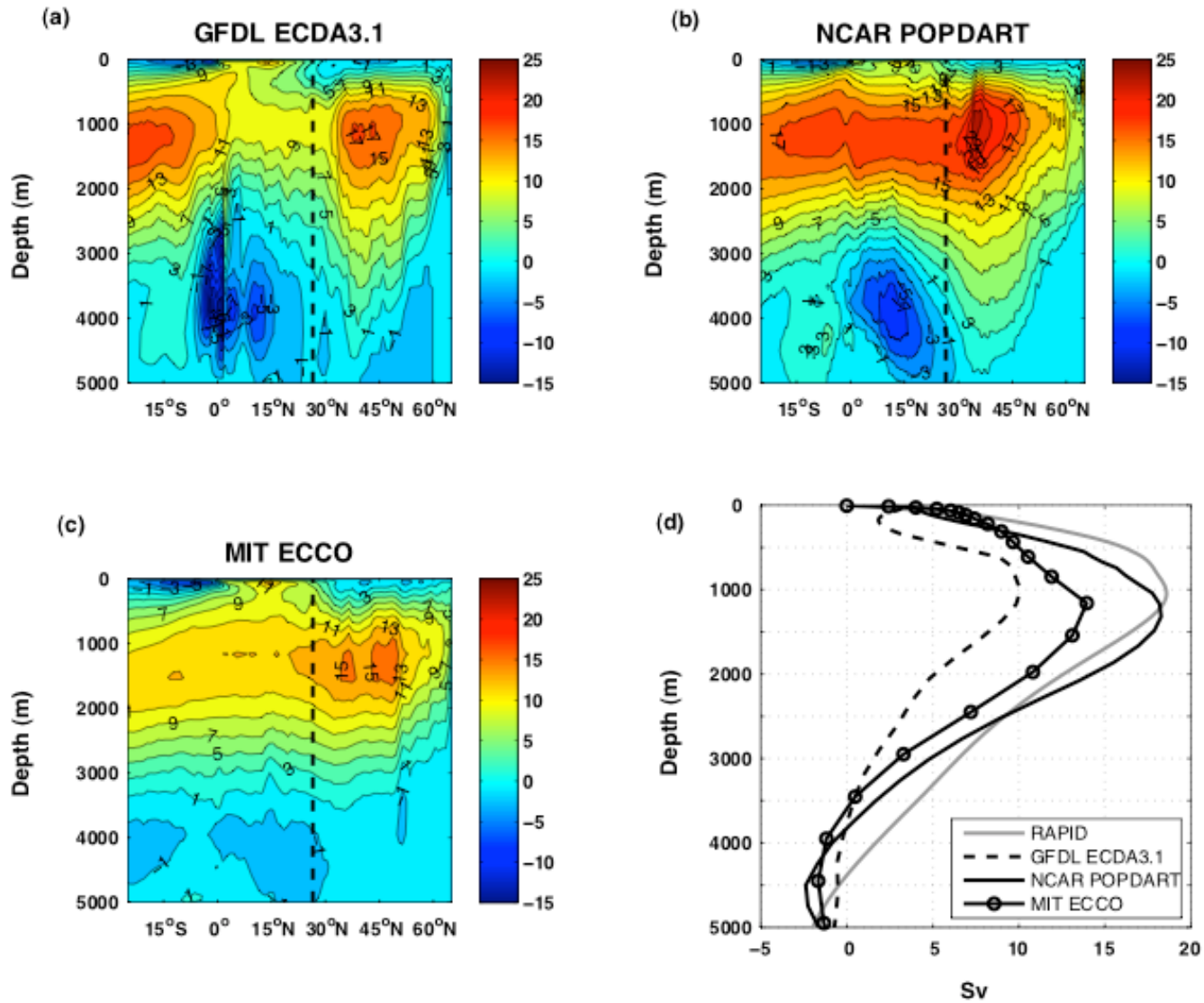
AMOC Mean (1988-2007)



AMOC at 26.5°N
(2004-2007
mean)



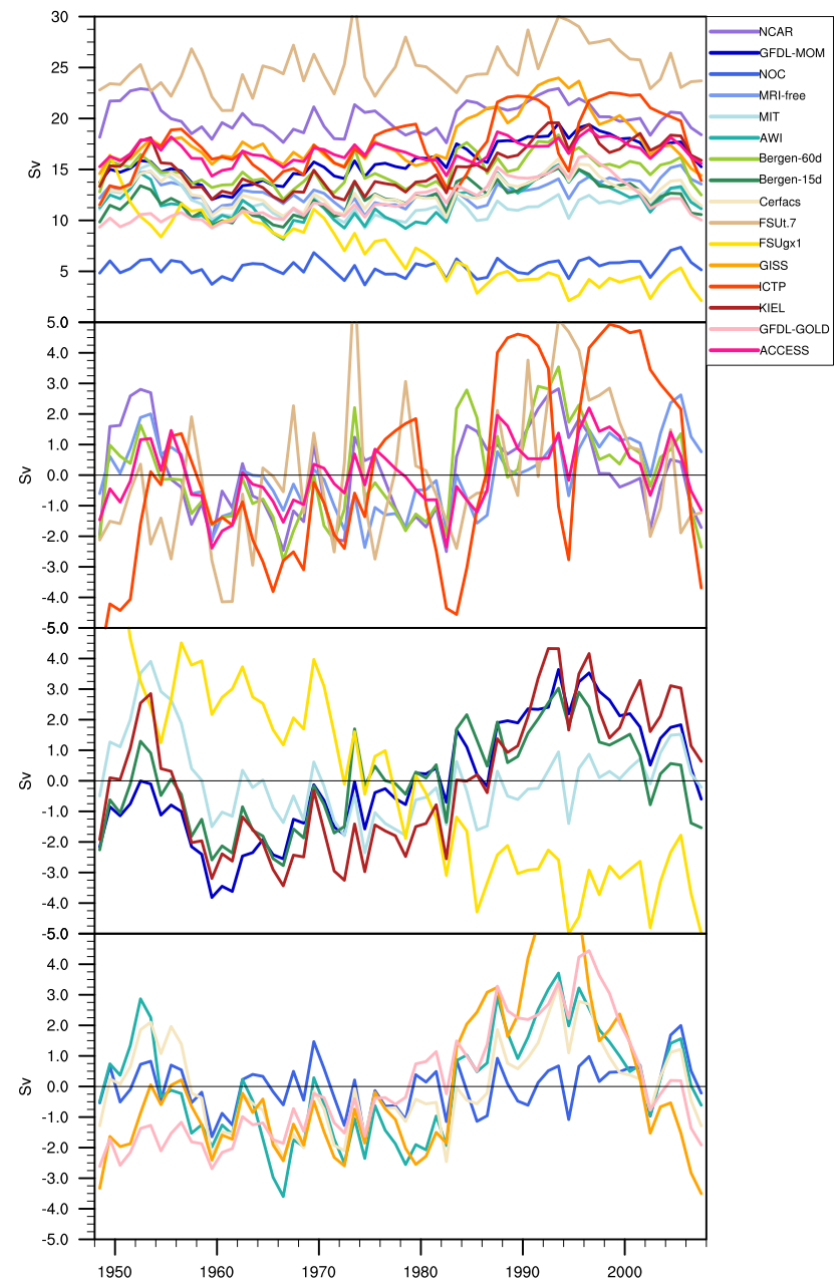
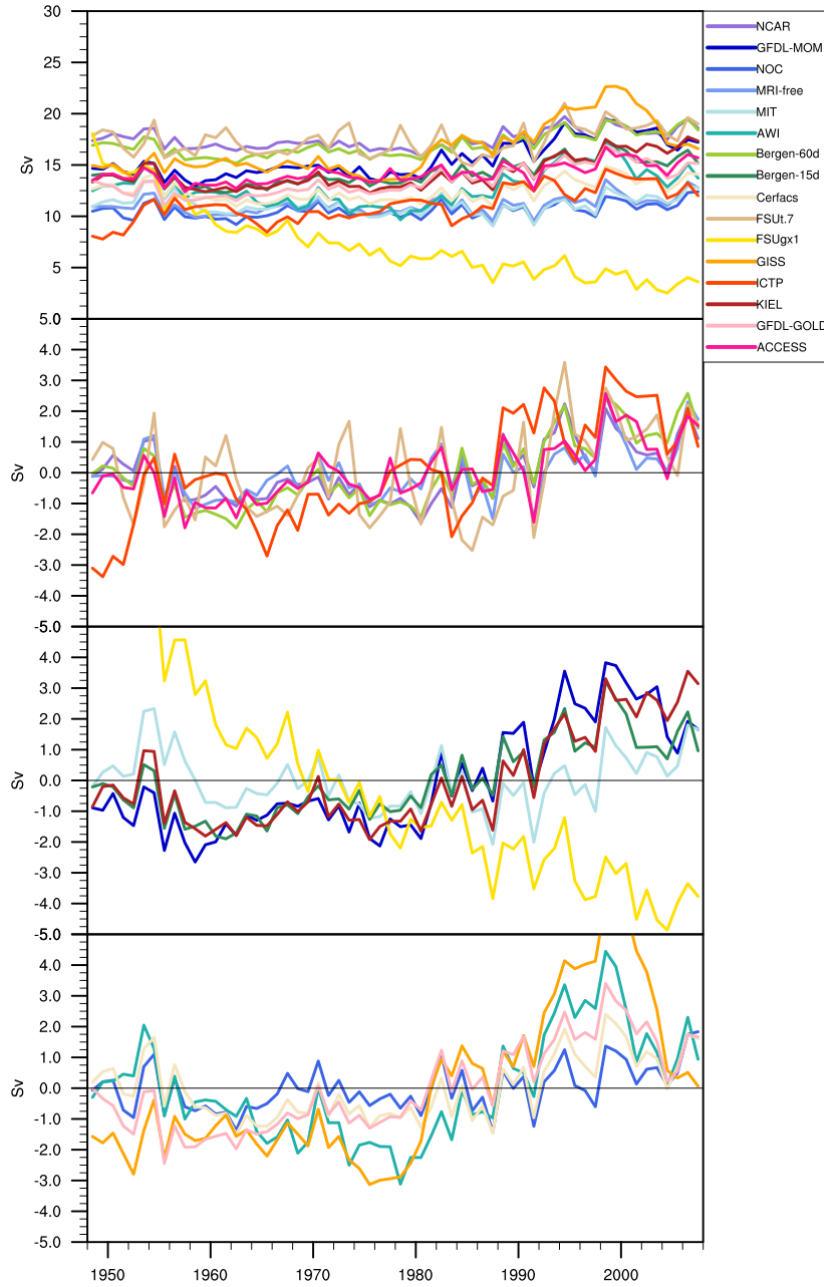
AMOC (2000-2005 MEAN)



AMOC Maximum Transport Time Series

26.5°N

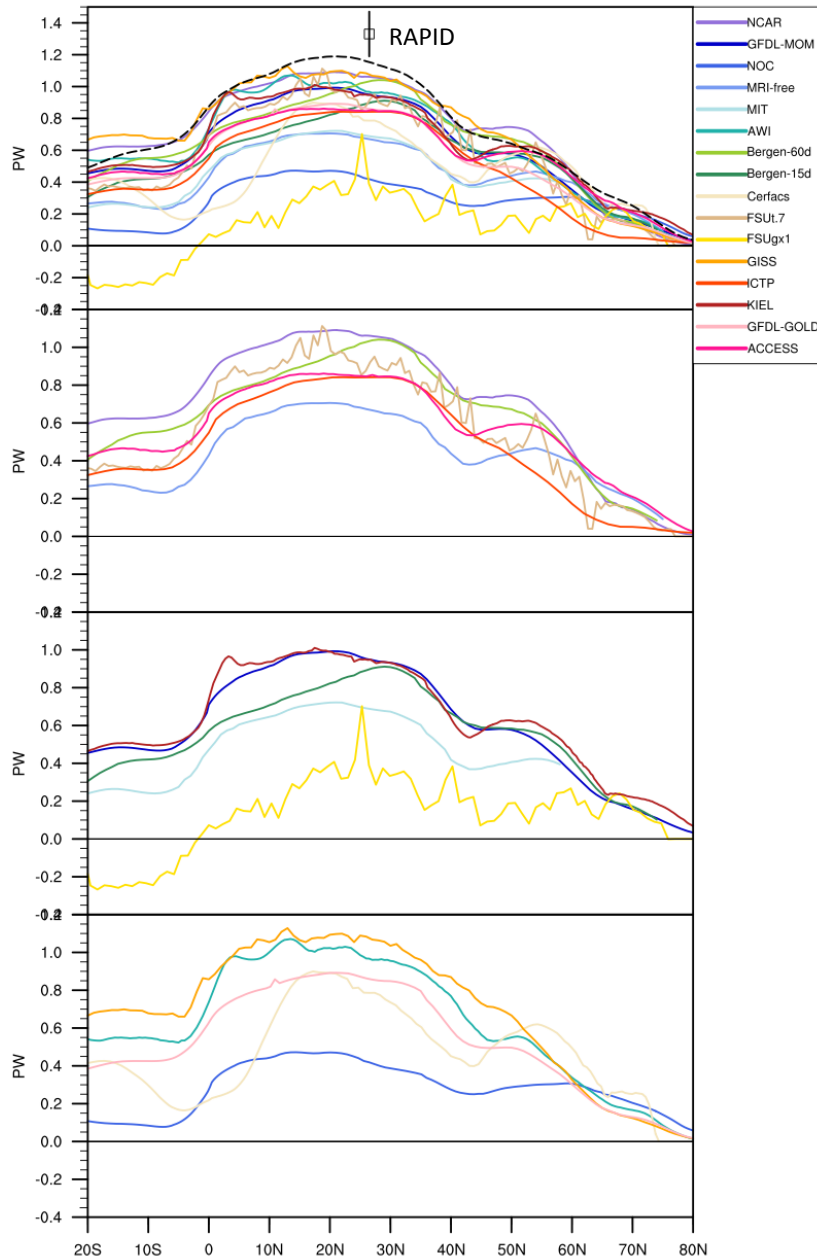
45°N



Atlantic Northward Heat Transport (NHT)

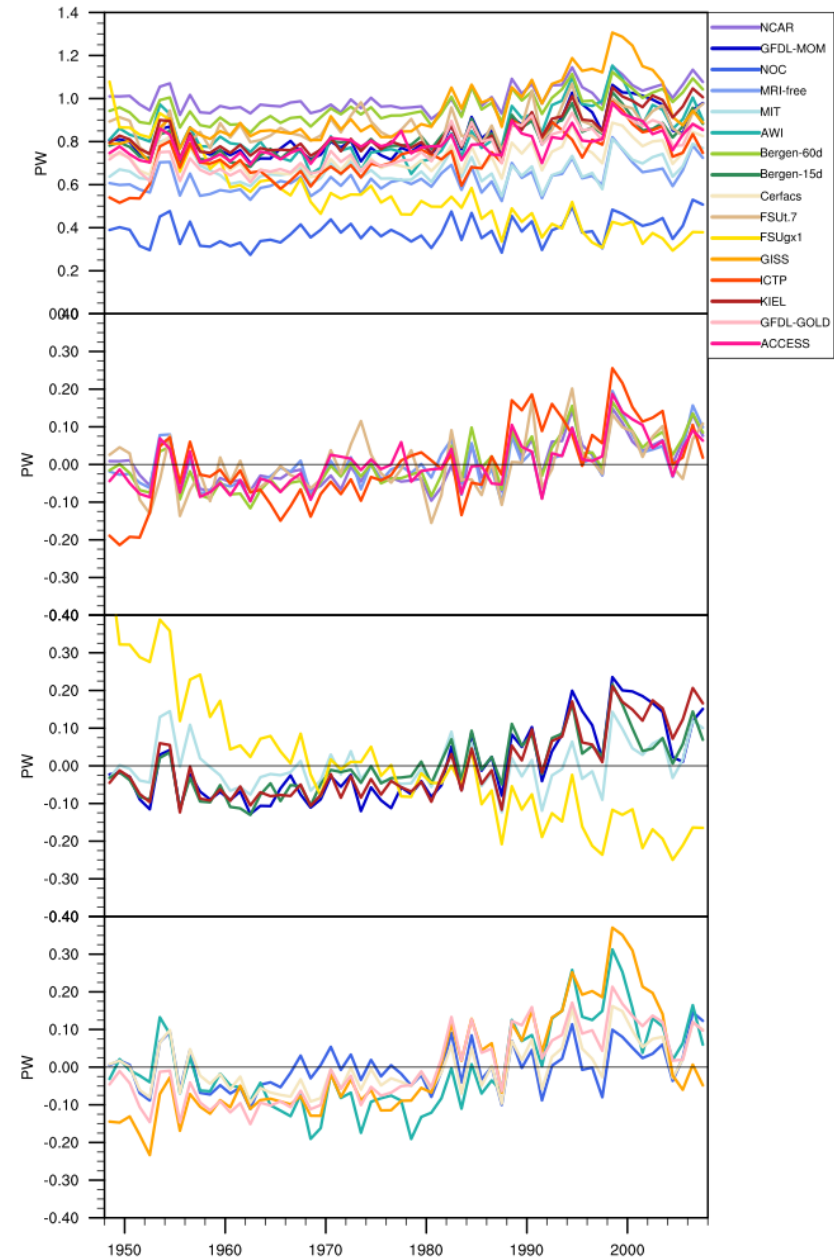
1988-2007 mean

Mean NHT (281-300)

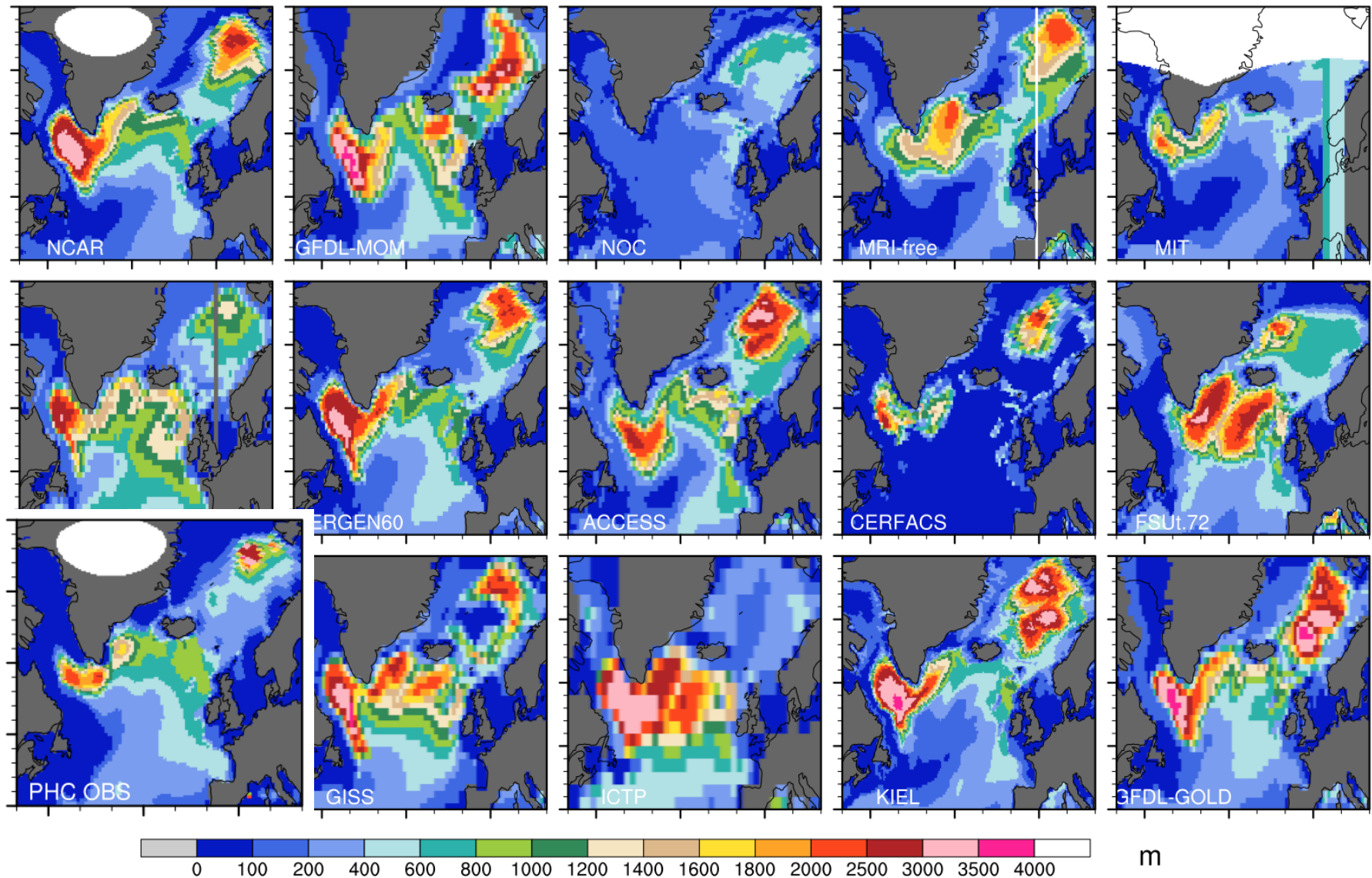


Time series at 26.5°N

NHT at 26.5°N



March-mean Mixed Layer Depth (1988-2007)



SUMMARY

- Models forced with the same CORE-II data will produce not so similar solutions.
- In addition to the mean states, there are important differences in variability properties.

WGOMD members and CORE participants are actively analyzing these simulations, and there are 5 planned papers focusing on AMOC and North Atlantic, SSH, Southern Ocean and ventilation, Arctic Ocean, ...

We welcome participation from interested people....

<http://www.clivar.org/organization/wgomd/core>