

Coordinated Ocean-ice Reference Experiments (COREs)

Benchmark simulations for global ocean-ice models with detailed protocols, facilitating solution comparisons from different models.

The key goals of CORE are to provide a workable and agreeable experimental design for global ocean-ice models to be run for long-term climate studies and to establish a framework where the experimental design is flexible and subject to refinement as the community gains experience and provides feedback.

CORE-I: Multi-century simulations with a repeat annual cycle forcing, a.k.a. Normal Year Forcing (NYF, Large and Yeager 2004, 2008).

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ABSTRACT

Coordinated Ocean-ice Reference Experiments (COREs) are presented as a tool to explore the behaviour of

CORE version 2 surface forcing data sets are available from the GFDL web site at <http://data1.gfdl.noaa.gov/nomads/forms/mom4/COREv2.html>

Some issues have been addressed based on the CORE-I experience, e.g., wind speed and rotation corrections (see Large and Yeager 2008). Interannual variability in all fields start only after 1984. The NYF data sets are the same as in version 1 except for the new corrections.

CORE-II: 1948-2007 interannually varying forcing (IAF, Large and Yeager 2004, 2008).

CORE-II hindcast simulations provide a framework both to evaluate ocean model performance and to investigate 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, e.g., AMOC,
- evaluation of robustness of mechanisms across models,
- providing initial conditions for decadal predictability studies.

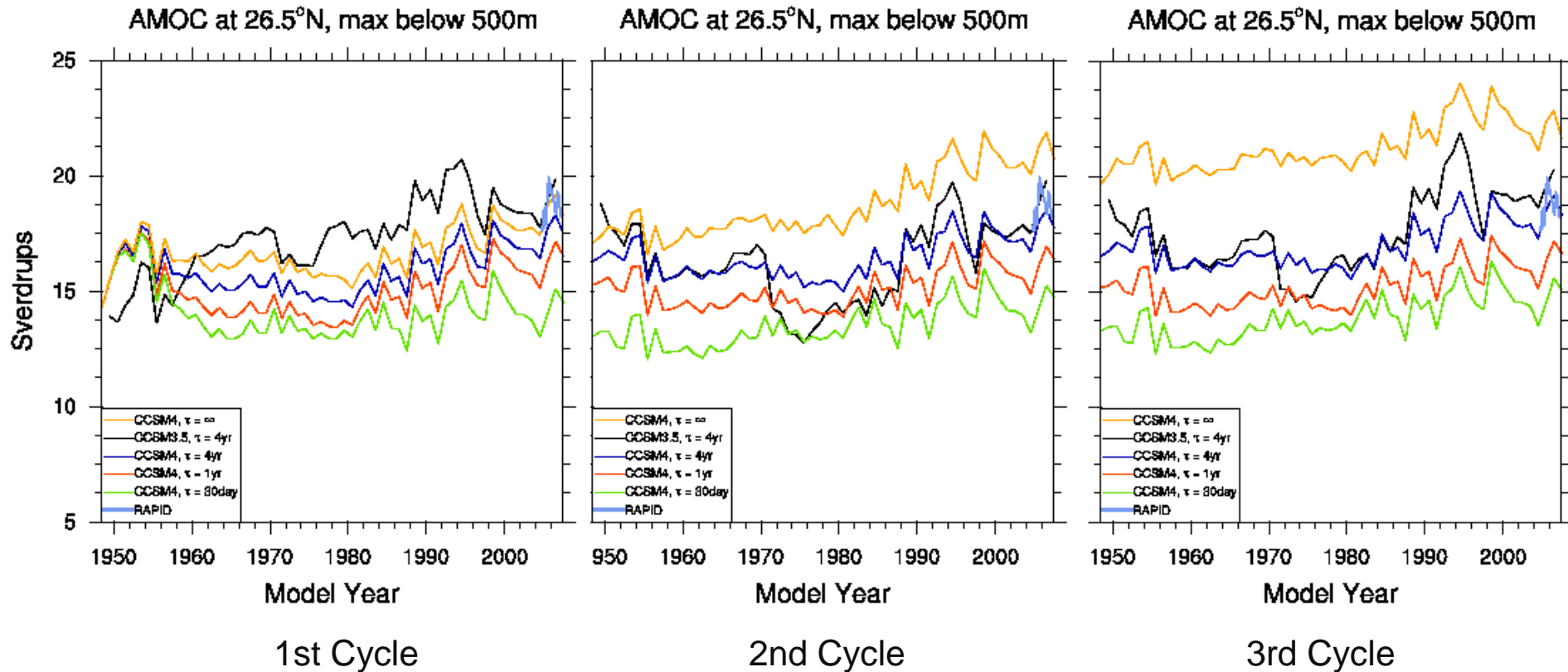
CORE-II complements ocean reanalysis from data assimilation approaches, particularly for the pre-ARGO period.

Continued interaction with CLIVAR Basin Panels and Working Groups. AOMIP has officially accepted CORE-II as their forcing data set.

CORE-II PROTOCOL / GUIDELINES:

- 60-year **repeat** forcing cycle covering the 1948-2007 period.
- Ocean model is initialized using the January-mean PHC2 or PHC3 temperature and salinity data with zero velocities.
- Sea-ice model initialization choice is up to the participating groups. Among the choices is initialization with a “spun-up” state from a simulation forced with either NYF or IAF.
- Choice of salinity restoring (i.e., time scale, subtraction of a horizontal-mean, precipitation factor) is also up to the participating groups and remains rather contentious.
- The minimum number of forcing cycles is 3-4. Studies involving mid-depth and abyssal ocean may require significantly more cycles.
- Initial condition shock diminishes after the first 10-15 years of each forcing cycle: Any analysis should focus on the remaining period.
- A guiding principle is that the main focus of a study should stay rather robust across cycles, e.g., when differenced between the last cycle and the previous one, the differences should be “small”.

Coupled Ocean - Ice



PURPOSES:

- AMOC analysis,
- CORE-II contribution,
- IPCC AR5 decadal prediction initialization.

Ocean Only

AMOC at 26.5°N, max below 500m

AMOC at 26.5°N, max below 500m

