Working Group for Ocean Model Development (WGOMD) Report to SSG-15

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15Aug2007

Coordinated Ocean-ice Reference Experiments (CORE)

WGOMD activities for the past years have been focused on the completion of a comparison of seven global ocean-ice models run for 500 years using the same atmospheric forcing. This comparison, known as the Coordinated Ocean-ice Reference Experiments (CORE-I), is a major effort involving many international groups. WGOMD and collaborators are preparing a manuscript that documents, in the peer-review literature, the experimental design and simulation results.

Since CORE-I compares simulations from the state-of-the-art in global ocean-ice climate models, it has direct relevance to the following CLIVAR cross-cutting themes:

- Anthropogenic Climate Change
- Decadal Predictability
- International Polar Year
- Sea Level Rise.

Interest in CORE-I originated from the WGCM's desire to better identify and understand the wide diversity of model results contributing to the IPCC process. Although CORE-I does not represent a formal "MIP", which was the original proposal from WGCM, CORE-I serves in many ways to satisfy the needs of the community to have global ocean-ice models run with the same atmospheric forcing.

CORE-II is a follow-on to CORE-I, in which CORE-II focuses on interannually varying forcing based on reanalysis and observational products. CORE-II will address many needs of the CLIVAR panels aiming to use models to identify mechanistic descriptions of observed variability and change. The CORE-II effort will provide a common framework for running ocean-ice models for hindcast purposes. Fleshing out the details of the experimental protocol, and then documenting a suite of model simulations with this protocol, will form a focus of near-future WGOMD activities. Notably, CORE-II efforts directly address many requests from CLIVAR panels aiming to better understand observational datasets. In turn, the simulations will provide useful model input to the OceanObs09 conference.

New Activities

CORE-I documentation will be completed late 2007 and published early 2008.

CORE-II experimental protocol will be explored during 2007-2009, with plans for a peer-review paper late 2009.

Repository for Evaluating Ocean Simulations (REOS): This is a planned CLIVAR web page that will be coordinated by WGOMD whose purpose is to provide guidance to the ocean modelling community for how to rationally evaluate a simulation. The motivation for this web page stems from the growing needs of the modelling community to provide a thorough job at evaluating their simulations, and to make use

of newer observational datasets having been generated the past decade. Efforts at developing a prototype REOS web page will occupy WGOMD activities during 2008.

Expected Legacy of WGOMD Activities

WGOMD activities span two broad categories:

A) Facilitating the science underpinning ocean models,
B) Facilitating the science obtained from ocean modelling.

Category (A) has been achieved through the publication of an extensive review article (Griffies et al., 2000) which documents the state-of-the-art in ocean climate models. Arguably this document formed the basis for many of the AR4 ocean models. Category (A) has also been supported by the WGOMD sponsored workshops

- 2004: State of the Art in Ocean Climate Modelling (GFDL/Princeton ~100 attendees)
- 2005: Southern Ocean Modelling (CSIRO/Hobart ~100 attendees)
- 2007: Numerical Methods for Ocean Models (Nansen Centre/Bergen ~100 attendees).
- 2009: Proposed workshop on parameterizing ocean mesoscale eddies

Category (B) is supported by the CORE efforts aimed at providing a common benchmark experimental design for running ocean-ice models, both with a repeating annual cycle (CORE-I), hindcast (CORE-II), and fresh water perturbation (CORE-III), and potentially other related efforts. Category (B) is also supported by REOS.

The development of CORE has been ongoing for many years and has involved dozens of scientists. It represents a new stage in the evolution of ocean-ice climate modelling, whereby many previously confused and undocumented experimental fundamentals provided a barrier towards a scientifically rational comparison between models from different institutions. Granted, there will remain many details that are not exactly the same between various groups. However, by bringing modellers towards a common forcing protocol, CORE greatly reduces the phase space affecting simulation differences, and thus provides a more robust methodology for comparing and understanding global ocean-ice simulations.

Issues for SSG-15

Membership: Marika Holland (NCAR) is stepping down from WGOMD. Both NCAR and WGOMD, both endorse Gokhan Danabasoglu (NCAR) as her replacement. WGOMD asks for SSG approval.

Annex B

Proforma for CLIVAR Panel and Working Group requests for SSG approval for meetings

Requests should be made through D/ICPO (hyc@noc.soton.ac.uk), against the following headings:

1. Panel or Working Group: WGOMD

2. Title of meeting or workshop: 8th WGOMD panel meeting

3. Proposed venue: Hadley Centre, UK

4. Proposed dates: April or May, 2009

5. Proposed attendees, including likely number: 20

6. Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved: WGOMD is relevant to many CLIVAR activities

7. Specific objectives and key agenda items: CORE-II and REOS

8. Anticipated outcomes (deliverables): CORE-II and REOS

9. Format: usual panel meeting

10. Science Organising Committee (if relevant)

11. Local Organising Committee (if relevant)

12. Proposed funding sources and anticipated funding requested from WCRP:

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Requests should be made through D/ICPO (hyc@noc.soton.ac.uk), against the following headings:

13. Panel or Working Group: WGOMD

14. Title of meeting or workshop: Workshop on Ocean Mesoscale Eddy Parameterization:

15. Proposed venue: Hadley Centre, UK

16. Proposed dates: April or May, 2009

17. Proposed attendees, including likely number: 120

18. Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved: The proposed topic remains a critical element of global ocean models. Nearly 20 years will have passed since the pivotal paper by Gent and McWilliams (1990) placed the models on a new level of physical integrity. Many questions remain to be answered, and the community will certainly be interested in participating in a workshop aiming to identify relevant research and development paths.

19. Specific objectives and key agenda items: Provide a venue to identify research and development paths for understanding and parameterizing ocean mesoscale eddies.

20. Anticipated outcomes (deliverables): Nurturing of collaborations and intellectual transfer of knowledge. A short workshop report to be distributed containing a preliminary evaluation of the effects of mesoscale eddies on ocean climate, a community statement on best practices for ocean climate model parameterization, the identification of the key remaining challenges in eddy parameterizations and an assessment of the needs of ocean climate models to resolve the mesoscale eddy spectrum.

21. Format: 2-3 days with selected presenters and debate

22. Science Organising Committee: WGOMD

23. Local Organising Committee: Helene Banks

24. Proposed funding sources and anticipated funding requested from WCRP: WGOMD panel members will already be in UK for the 8th WGOMD panel meeting. As with previous WGOMD sponsored workshops, participants will generally be expected to obtain independent funding sources. As Hadley Centre is centrally located, and the workshop topic is of broad interest, there should be minimal problems for participants to obtain funds to attend. WCRP funding is nonetheless requested to support PhD/post-doc participants so that the workshop can particularly engage the participation of emerging young scientists.