OCEAN MODEL DEVELOPMENT PANEL

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&

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26th Session of the CLIVAR Scientific Steering Group Meeting
8-11 March, 2021
https://global.gotomeeting.com/join/269765293

OCEAN MODEL DEVELOPMENT PANEL

- Key Meetings
  - Virtual Meeting OMDP5, October 2020.
  - Joint Session with WGNE35 2-5 Nov., 2020
  - Virtual Meeting OMDP5.5, ~May 2021.
  - Planned [postponed] Meeting in Kiel, Germany in 29 Sept.-1 Oct., 2021.
    - Future Directions in High-resolution Ocean Modelling Workshop + OMDP6
    - Request Carry-Forward of Funds ($5000)
- Updates—Publications & Projects
- Membership
  - Improving Geographic & Gender Diversity
  - Maintaining Representation of Modeling Types & Centers

IN 2020—5 articles:

TITLE	CITED BY	YEAR
Resolving and parameterising the ocean mesoscale in earth system models HT Hewitt, M Roberts, P Mathiot, A Biastoch, E Blockley, EP Chassignet, ... Current Climate Change Reports, 1-16	2	2020
Impact of horizontal resolution on global ocean–sea ice model simulations based on the experimental protocols of the Ocean Model Intercomparison Project phase 2 (OMIP-2) EP Chassignet, SG Yeager, B Fox-Kemper, A Bozec, F Castruccio, ... Geoscientific Model Development 13 (9), 4595-4637	8	2020
Evaluation of global ocean–sea-ice model simulations based on the experimental protocols of the Ocean Model Intercomparison Project phase 2 (OMIP-2) H Tsujino, LS Urakawa, SM Griffies, G Danabasoglu, AJ Adcroft, ... Geoscientific Model Development 13 (8), 3643-3708	10	2020
JRA55-do-based repeat year forcing datasets for driving ocean–sea-ice models KD Stewart, WM Kim, S Urakawa, AMC Hogg, S Yeager, H Tsujino, ... Ocean Modelling 147, 101557	10	2020
An assessment of the Indian Ocean mean state and seasonal cycle in a suite of interannual CORE-II simulations H Rahaman, U Srinivasu, S Panickal, JV Durgadoo, SM Griffies, ... Ocean Modelling 145, 101503	5	2020

Ocean Model Development Panel (OMDP)

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Ocean Model Development OMDP WGOMD

TITLE	CITED BY	YEAR
The global climatology of an interannually varying air–sea flux data set WG Large, SG Yeager Climate dynamics 33 (2-3), 341-364	1321	2009
Coordinated ocean-ice reference experiments (CORES) SM Griffies, A Biastoch, C Böning, F Bryan, G Danabasoglu, ... Ocean modelling 26 (1-2), 1-46	640	2009
Developments in ocean climate modelling SM Griffies, C Böning, FO Bryan, EP Chassignet, R Gerdes, H Hasumi, ... Ocean Modelling 2 (3-4), 123-192	464	2000
The CCSM4 ocean component G Danabasoglu, SC Bates, BP Briegleb, SR Jayne, M Jochum, WG Large, ... Journal of Climate 25 (5), 1361-1389	439	2012
An ERA40-based atmospheric forcing for global ocean circulation models L Brodeau, B Barnier, AM Treguier, T Penduff, S Gulev Ocean Modelling 31 (3-4), 88-104	381	2010
North Atlantic simulations in coordinated ocean-ice reference experiments phase II (CORE-II). Part I: mean states G Danabasoglu, SG Yeager, D Bailey, E Behrens, M Bentsen, D Bi, ... Ocean Modelling 73, 76-107	300	2014
A decadal prediction case study: Late twentieth-century North Atlantic Ocean heat content S Yeager, A Karspeck, G Danabasoglu, J Tribbia, H Teng Journal of Climate 25 (15), 5173-5189	214	2012

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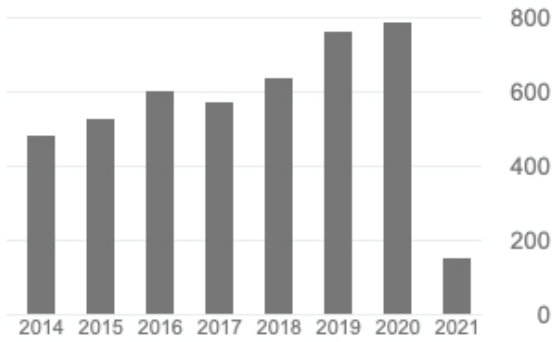
	All	Since 2016
Citations	6139	3515
h-index	31	24
i10-index	51	44



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Scientific plan (each of these has a panelist team leader and a slack channel, many map directly onto lighthouse activities as mentioned in our lighthouse activity survey):

a) Ongoing:
   1) JRA55-do vs. CORE II, 1D mixing comparison and ocean & climate model impact
   2) A hires OMIP study on ML in forced vs coupled
   3) A group to discuss comparison of hires OMIP-2 runs from a eddy statistics perpsective: cf SWOT AdAC, eddy-statistics, energy fluxes
   4) A study on the Arctic in highres OMIP-2
   5) A lores+hires OMIP-2 study on North Atlantic Current biases versus model formulation
   6) Ocean-only future climate forcing for lores & hires

b) Exploration Stage, Planned for Followup at May Meeting:
   7) A hires OMIP study on T&S characteristics in the subpolar North Atlantic
   8) Automated extension of JRA55-do
   9) Spin up time of a variety of models

i. Explaining and predicting earth system change

The OMDP is fundamentally oriented toward prediction systems (e.g., the ocean and sea ice components of the CMIP system that are our primary topic) and understanding and explanation of these systems (e.g., our development of forcing products such as JRA55-do and our development and evaluation of parameterizations such as the recent paper on 1D mixing schemes by Li et al. 2019). Our tradition is to work on simulations of the historical period, so that metrics for observation-model comparisons can also be developed and used.

ii. My climate risk

The OMDP has traditionally not worked on risk frameworks, but we do work on regional aspects of our modeling to evaluate biases and observational comparisons. It would be natural to incorporate a risk-hazard-exposure framework within these regional studies in collaboration with other CLIVAR panels.

iii. Safe Landing climates

For the reasons mentioned above of comparison to observations, the OMDP has typically focused on historical or idealized simulations. However, inspired by the FAFMIP approach, we are planning on making an OMIP-future forcing dataset as a new project. This will allow us to bring the same precision of numerical and parameterization analysis, but with a future impacts and sensitivity perspective.

iv. Digital earths

All of the work that OMDP does is digital, and we have enlisted new panelists with expertise and ongoing collaborations in better sharing of exascale datasets online, as well as machine learning approaches to data analysis. This is a new direction for OMDP, but has synergy with other groups with whom we've recently met, such as WGNE and the US Climate Process Team.

Plus: WCRP Academy, OF COURSE!!

2. Do you envisage a strong connection between your panel and either of the two new core projects in WCRP? If so, explain this connection, and how it can be facilitated, e.g. by moving your panel into the new core project, by making your panel joint between the new core project, by holding joint activities, or other suggestions.

   i. Earth System Modeling and Observational Capabilities
   Yes. All of our activities are in line with this objective. We are the CLIVAR hub for the development and evaluation of CMIP ocean and sea ice components. The CMIP diagnostics for the ocean and sea ice fields are usually developed by OMDP and then adopted by the CMIP protocols (most recently, Griffies et al. 2016).

   ii. Regional Climate Information for Societies
   The growing use of nested and variable resolution models in our panel (e.g., Chassignet et al. 2020) provides an opportunity to scale down to regional impacts. This is a potential growth or collaborative opportunity for us.

Additionally, our preliminary meetings with WGNE and DAO have been very positive. A planned collaboration on spin up of ocean models in coupled systems is underway.

CONCLUSIONS & QUESTIONS

- After a major overturn of membership, the team is strong and enthusiastic.
- Our first virtual meeting resulted in an ahead-of-schedule follow up!
- We have 6 projects in the works, 3 in discussion
- All of these projects map on to the Lighthouse Activities
- We have a few minor concerns on maintaining links to all of our modelling center partners.