

CLIVAR

Ocean Model Development Panel

(Prev. WGOMD)

Baylor Fox-Kemper and Julien Le Sommer (co-Chairs)
Working Group on Numerical Experimentation (WGNE) Meeting
Wednesday Nov 4, 2020, 22:00-22:30 GMT

Terms of Reference

1. To stimulate the development of **ocean models for research in climate** and related fields.
2. To encourage investigations of the effects of **model formulation on the results** of ocean models, making use of **sensitivity studies and intercomparisons**.
3. To promote interaction amongst the ocean modelling community and between this and **other communities** through workshops and other activities.
4. To stimulate the validation of ocean models when used in **stand alone mode** and as part of a **coupled ocean-atmosphere model**, using oceanographic data and other methods, and to advise on the observational requirements of such studies.
5. To publicise developments in ocean models amongst the climate modelling community.
6. To **collaborate with other activities** in areas of overlapping responsibility.
7. To advise on ocean modelling and related issues and to report on its activities to the CLIVAR Scientific Steering Group and the CLIVAR co-chair of WGCM.

Members

Baylor Fox Kemper	Co-Chair	2021	Brown Uni.	USA
Julien Le Sommer	Co-Chair	2021	IGE, CNRS	France
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Stephen Yeager	Member	2020	NCAR	USA
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Laure Zanna	Member	2022	Courant Institute, NYU	USA
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Adele Morrison	Member	2022	Australian National University	Australia
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Qiang Wang	Member	2022	Alfred Wegener Institute	Germany
Zhao Jing	Member	2022	Key Laboratory of Physical Oceanography, Ocean University of China	China

Gokhan Danabasoglu (1, 3, 4)	Emeritus		National Center for Atmospheric Research	USA
Enrique Curchitser	Emeritus		Rutgers University	USA
Simon Marsland (2)	Emeritus		CSIRO	Australia
George Nurser	Emeritus		National Oceanography Center	UK
Claus Böning	Emeritus		GEOMAR	Germany
Anne Marie Treguier	Emeritus		IFREMER	France
Eric Chassignet (3, 5, 6)	Emeritus		Florida State University	USA
Stephen Griffies (3)	Emeritus		NOAA/GFDL	USA
Fangli Qiao	Emeritus		FIO/SOA	China
Mats Bentsen	Emeritus		Uni Climate, Uni Research Ltd	Norway
Helene Hewitt	Emeritus		Met Office Hadley Centre	UK
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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	1258	2009
Coordinated ocean-ice reference experiments (COREs) SM Griffies, A Biastoch, C Böning, F Bryan, G Danabasoglu, ... Ocean modelling 26 (1-2), 1-46	622	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	450	2000
The CCSM4 ocean component G Danabasoglu, SC Bates, BP Briegleb, SR Jayne, M Jochum, WG Large, ... Journal of Climate 25 (5), 1361-1389	411	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	373	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	292	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	206	2012

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		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	3	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	3	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	3	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	3	2020
Estimating the sea ice floe size distribution using satellite altimetry: theory, climatology, and model comparison C Horvat, LA Roach, R Tilling, CM Bitz, B Fox-Kemper, C Guider, K Hill, ... Cryosphere 13 (11), 2869-2885	5	2019
Comparing ocean surface boundary vertical mixing schemes including Langmuir turbulence Q Li, BG Reichl, B Fox-Kemper, AJ Adcroft, SE Belcher, G Danabasoglu, ... Journal of Advances in Modeling Earth Systems 11 (11), 3545-3592	12	2019
Challenges and prospects in ocean circulation models B Fox-Kemper, A Adcroft, CW Böning, EP Chassignet, E Curchitser, ... Frontiers in Marine Science 6, 65	23	2019
Synergies in operational oceanography: the intrinsic need for sustained ocean observations FJ Davidson, E Chassignet, PN Vinayachandran, Y Lu, GC Smith, X Zhu, ... Frontiers in Marine Science 6 (JUL)	12	2019

What We Plan:

Ongoing (Discussed at October, 2020 meeting):

- 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 perspective: responsive to SWOT Adopt-a-Crossover, eddy statistics, energy fluxes
- 4) A study on the Arctic in hires OMIP-2
- 5) A lores+hires OMIP-2 study on North Atlantic Current biases versus model formulation

Exploration Stage, Planned for followup at May Meeting:

- 6) Ocean-only future climate forcing for lores & hires
- 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

Next in Person Meeting (Includes both Panel & Public Meeting):



Interface with WGNE & Questions

Atmosphere-ocean coupling in NWP & Climate

Ocean-Sea Ice biases & impacts on Climate & Weather

Ocean & Sea-Ice Forcing Datasets

Numerics

Model Data Analytics at scale (cloud analysis)

High Performance Computing (hybrid GPUs, mixed precision)

Ocean & Sea-Ice Parameterizations
(incl. stochastic, machine learning, etc.)