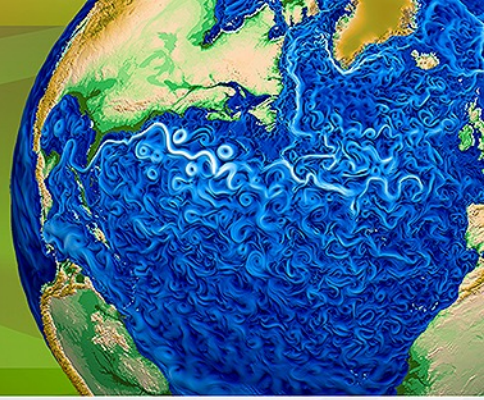
ACME
Accelerated Climate Modeling for Energy



Ocean-Ice v1 Papers

U.S. DEPARTMENT OF ENERGY

published:

Reckinger, Shanon M., Mark R. Petersen, and Scott J. Reckinger.
A study of overflow simulations using MPAS-Ocean: Vertical grids, resolution, and viscosity.
Ocean Modelling 96 (2015): 291-313.

Lee, D., Lowrie, R., Petersen, M., Ringler, T., & Hecht, M. (2016). A high order characteristic discontinuous Galerkin scheme for advection on unstructured meshes. *Journal of Computational Physics*, *324*, 289-302.
(primary suppor through SciDAC Leap)

Ringler, T..D and Saenz, J. A., Wolfram, P. J. and van Roekel, L
A thickness-weighted average perspective of force balance in an idealized circumpolar current},
JPO, accepted (primary support through SciDAC Multiscale)

in progress (working titles and author list):

Evaluation of KPP, Van Roekel et al. (LANL, GFDL, NCAR, other), in preparation.

Wolfram, P.J and T. D Ringler,
Quantifying nonlinearity of eddy-induced mixing in an idealized circumpolar current},
JPO, under revision

Wolfram. P.J. and T. D. Ringler,
Computing eddy-driven effective diffusivity using {Lagrangian} particles},
Ocean Modeling, in preparation

Adrian. Turner, W. H. Lipscomb, E. C. Hunke, N. Jeffery, D. Jacobsen, J. Wolfe, T. Ringler,
"MPAS-seaice: A new variable resolution sea-ice model",
The Cryosphere, in prep.

Hoffman, M.J., M. Perego, S.F. Price, W.H. Lipscomb, A. Salinger, I. Tezaur, R. Tuminaro.
Model for Prediction Across Scales - Land Ice: A variable resolution ice sheet model based on Voronoi grids.
Geosci. Model Dev., (in prep.).

v1 Papers: the whole list ….

#Ocean Overview: Documents the existence and capability of the ACME v1 ocean component
#GlobalOceanMesoscaleDiffusivity: A global, three-dimensional estimate of mesoscale eddy mixing from a strongly eddying simulation using Lagrangian particle methods.
#SouthernOceanMixedLayerVentilation: Tracer ventilation of Southern Ocean waters. Role of upwelling of CDW in ocean/ice shelf interaction. Stratification of SO.
#ArgoFloatComparision: Analysis of diffusivity in the Southern Ocean via simulated Argo floats within an eddying, global ocean model
#AntarcticSlopeFront: A Study of the Antarctic Slope Front: Structure, Variability and Evolution in a Changing Southern Ocean
#MesoscaleMixingInTheSouthernOcean: Mixing of temperature, salinity and tracer constituents (e.g. CO2) along isopycnals by mesoscale eddies in the SO has global consequences for both the current structure of the ocean and how it will evolve under GHG forcing. This paper will also have the opportunity to evaluate the hypothesis of mean-flow suppression of eddy-induced mixing.
#OverflowCharacterizationOfAABW: Pathway and mixing characteristics of overflows have a large impact on ocean water mass properties, currents, and long-term climate. The first step is evaluation of overflows. Focus here will be on the creation, pathway and fate of Antarctic Bottom Water and its relationship to ocean/land-ice interaction.
#SouthernOceanWaterMassTransformation: Creation of oceanic water masses and their transport and modification play a key role in the global circulation, including effects on meridional overturning and heat transport. More regionally, this will have direct effects on formation of CDW and AABW, thus influencing ice shelf melting.
#IndianOceanDipole: The IOD is an example of interannual variability in the climate system that will be assessable by ACME. Since it affects the monsoon, it clearly plays a role in the hydrological cycle.
#SouthernOceanStratification: Reproducing a plausible stratification in the Southern Ocean will be important for deep water mass formation and interactions with the cryosphere. This paper would investigate reasons for possible biases and would compare results from the hydrological-cycle simulation and the SO-enhanced-resolution cryosphere simulation.
#TropicalCyclonesAndBarrierLayers: First investigation of tropical cyclones intensification due to barrier layers in fully-coupled models. Relevant for ACME water cycle science driver. Opportunity to collaborate with ACME Atm group.
#MarineAerosolPrecursors: Document development of a dynamic natural aerosol emission capability
#MPAS-CICEIntro: Introduction and validation of the new ACME model component MPAS-CICE (stand-alone).
#MPAS-CICEVariableResolution: Examines the performance and fidelity of the MPAS-CICE sea-ice model on variable resolution grids and validates this functionality for the ACME coupled simulations.
#MPAS-SeaIceOverview: Documents the capability of the ACME v1 sea ice component in coupled simulations.
#ACMEv1IceGeochemistry: Documents global-scale sea ice biogeochemistry capability.
#ACMEv1BGCandAerosol: Assessing the radiative impact of dust and black carbon aerosols and algae on sea ice.
#ACMEv1IceOceanCoupledBGC: Understand the of coupled ice-ocean biogeochemistry on polar distributions of DMS/organics/aerosol emissions in ACMEv1 as a precursor to full atm-ice-ocean coupling.
#MPAS-CICEIron: How does iron accumulate in sea ice?
#MAPS-SnowonSeaIce: Documents the capabilities and performance of the new snow model enhancements in the ACME v1 sea ice component (if it makes it into v1).
#MAPS-LandIceOverview: Overview paper of new MPAS Land Ice model, using benchmark / standard test cases to verify / validate model for use in realistic simulations of marine-ice sheet evolution
#MPAS-IceOceanCouplingIdealized: Overview paper of submarine ocean circulation physics implementation and testing in MPAS-Ocean (idealized ice sheet - ocean coupling as well, e.g. MISOMIP?)
#CouplingAMarineIceSheetToAClimateModelPart1Description: Description of mechanics ("plumbing") and testing of coupling dynamic Antarctic ice sheet to ACME climate model
#CouplingAMarineIceSheetToAClimateModelPart2DriftAndBiases: Description of coupled model drift and biases resulting from coupling of dynamic Antarctic ice sheet model to ACME climate model
#CoupledModelProcessesControllingSeaLevelRiseFromTheAntarcticIceSheet: Description of important coupled ice sheet / climate model processes that contribute to sea-level rise from Antarctica in ACME simulations

v1 Papers: Southern Ocean - Antarctica

#SouthernOceanMixedLayerVentilation: Tracer ventilation of Southern Ocean waters. Role of upwelling of CDW in ocean/ice shelf interaction. Stratification of SO.

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v1 Papers: aerosols, chemistry and biology.

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#MPAS-CICEIron: How does iron accumulate in sea ice?

v1 Papers: mid to low latitudes

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