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Sensitivity of resolution and vertical grid types on 3D overflow simulations using mpas-ocean SHANON RECKINGER, Fairfield University, MARK PETERSEN, Los Alamos National Laboratory, SCOTT RECKINGER, Brown University — The Model for Prediction Across Scales (MPAS) is a climate model framework that supports unstructured, variable resolution grids. Since a primary issue in ocean modeling is the treatment of the vertical coordinate, MPAS-Ocean has been developed to allow for a variety of options in the vertical coordinate choice. The representation of overflows has been shown to be difficult at horizontal resolutions coarser than a few kilometers. Therefore, the combination of the unstructured horizontal grid and the variety of vertical grid choices available with MPAS-Ocean provides a unique approach. MPAS-Ocean is used to simulate an idealized density driven overflow using the dynamics of overflow mixing and entrainment (DOME) setup. Numerical simulations are carried out at a variety of resolutions to compare the accuracy and computational cost of increasing the vertical versus the horizontal resolution. Additionally, various vertical grid types are studied including z-level, z-level with partial bottom cells, and sigma coordinates. Entrainment and transport metrics are calculated and analyzed in order to compare the results from the various grid setups.

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