Abstract Submitted
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A six-grid, two-way coupled Mediterranean Sea and North Atlantic ocean model: results and interpretations[1] DAVID E. DIETRICH, AcuSea Inc., YU-HENG TSENG, Computational Research Division, Lawrence Berkeley National Laboratory, RAUL MEDINA, MARIE LISTE, MAITANE OLABARRIET, Universidad de Cantabria, Spain — A multiple-grid, two-way coupled Mediterranean Sea and North Atlantic (MEDiNA) Ocean model is presented. The model uses six grids with resolution varying from 1/24° in the Strait of Gibraltar to 1/4° in the central North Atlantic Ocean. The flexible multiple-grid coupling approach produces nearly seamless flow patterns across the nested boundaries and facilitates realistic modeling of multi-scale processes that couple deep ocean and coastal dynamics. The method is efficient and provides high resolution where it is needed most. The shortcircuited Arctic Ocean is parameterized by: an artificial continental shelf along the northern and northeastern boundary; restoring to climatology at high latitudes; nudging the total longitudinal volume flow north of Iceland toward a specified value; and a specified freshwater source along the northern boundary. The open equatorial boundary condition includes a slow nudging toward a quasi-Neummann condition. Results from all six grids are shown, including the Gulf of Mexico Loop Current with big warm-core eddy shedding and realistic Gulf Stream meanders that pinch off cold/warm-core eddies. These results compare well with observation and show significant advantages of our multiple-grid approach in modeling multi-scale ocean dynamics.

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Yu-heng Tseng
Lawrence Berkeley National Laboratory

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