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The US Navy's Extended-range Prediction System with High-resolution Ocean and Ice models

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The National Earth System Prediction Capability (National ESPC) is a U.S. multi-agency collaborative effort to leverage resources to develop the next generation environmental forecasting system. As part of this effort, the U. S. Navy is developing a fully coupled global system including the Navy Global Environmental Model (NAVGEM), the HYbrid Coordinate Ocean Model (HYCOM), and the Los Alamos Community Ice CodE (CICE). This system is being developed to meet Navy needs for high-resolution global environmental forecasts on timescales from days to months. The design and implementation of the coupled architecture uses the Earth System Modeling Framework (ESMF) with the National Unified Operational Prediction Capability (NUOPC) standard in order to maximize flexibility in adopting future models. Initial operational capability is planned for 2019-2020 and will include daily high-resolution deterministic forecasts (with 19 km atmospheric resolution, 1/25o ocean and sea ice resolution, and 1/8o wave model resolution) and weekly extended-range ensemble forecasts (with 37 km atmospheric resolution, 1/12o ocean and sea ice resolution, and 1/4o wave model resolution). A 20-year archive of 45-day deterministic forecasts four times per week at the ensemble resolution has been produced as part of the Navy's participation in the NOAA Subseasonal eXperiment (SubX) project. An aspect that makes the system unusual and will be highlighted is the relatively high resolution of the ocean and ice models, reflecting the Navy's strategic and tactical interests in these realms. The performance of ocean, atmosphere, and ice components of both the deterministic (high-resolution) and ensemble (lower-resolution) components of the system will be summarized, including comparisons to persistence and climatology. Identification of current short-comings and planned future upgrades will also be summarized.

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