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US Navy Research and Development under the National Earth System Prediction Capability Partnership

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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 earth prediction system. The overarching goal is to meet the need for a new operational global earth system model consisting of high-resolution atmosphere, ocean, ice, land, and space components capable of seamless prediction from hours to decades within the next ten years. This presentation will provide an overview of the US Navy's progress under this ESPC partnership. The Navy is developing a fully coupled global system including the Navy Global Environmental Model (NAVGEM), the HYbrid Coordinate Ocean Model (HYCOM), the Los Alamos Sea Ice Model (CICE), and the Wavewatch III ocean surface wave model. The design and implementation of the coupled architecture uses the earth system modeling framework (ESMF) with the National Unified Operational Prediction Capability (NUOPC) standard. Coupling NAVGEM to CICE reduces low-level polar temperature biases over the stand-alone NAVGEM system. Fully-coupled NAVGEM-HYCOM simulations have smaller SST RMSE and bias than "loosely-coupled" simulations. Fully coupled NAVGEM-HYCOM-CICE monthly and seasonal integrations have been performed for several applications. These include successful reforecasts of the Madden-Julian Oscillation during November 2011, and September minimum sea-ice extent predictions that are in line with other system predictions for 2014 and 2015. Plans for future development, with the goal of demonstrating initial operational capabilities in 2018, will also be presented.