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The U.S. Navy's Emerging Sea Ice Prediction Capabilities

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The U.S. Navy's regional and global coupled sea ice modeling activities are described. The Arctic Cap Nowcast Forecast System (ACNFS) is a 3.5 km coupled sea ice-ocean model that produces 7 day forecasts of the Arctic sea ice state in all ice covered areas in the northern hemisphere (poleward of 40°N). The ocean component is the HYbrid Coordinate Ocean Model (HYCOM) and is coupled to the Los Alamos National Laboratory Community Ice CodE (CICE) via the Earth System Modeling Framework (ESMF). The ocean and sea ice models are run in an assimilative cycle with the Navy's Coupled Ocean Data Assimilation (NCODA) system. The ACNFS was transitioned to operations at the Naval Oceanographic Office in 2013 to serve its customer, the National Ice Center. The Global Ocean forecast System (GOFS3.1) is essentially an extension of ACNFS to the globe at 1/12° (equatorial) resolution, still 3.5 km in the Arctic, and it will provide sea ice predictions for the Arctic and Antarctic. Testing and validation is underway and an operational transition is planned for 2015, when GOFS3.1 will replace the ACNFS. A relocatable regional capability is being developed by coupling CICE to the Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS). This new system will have an advanced snow-ice albedo representation and produce coupled forecasts out to 7-10 days with resolutions for the atmosphere and sea ice models at 1-3 km. Examples of these emerging capabilities will be presented.