**SESSION: (C2) Research to operation (includes seamless prediction)**

**(C2-03)**

## US Navy's Earth System Prediction Capability Effort

Reynolds C, Barton N, Bishop C, Flatau M, Frolov S, Janiga M, McLay J, Ridout J, Ruston B, Whitcomb T (1), Eleuterio D (2), Hogan P, Jacobs G, Metzger E J, Rogers E, Rowley C (3), Richman J (4)

NRL Marine Meteorology, USA (1), Office of Naval Research, USA (2), NRL Oceanography, USA (3), Florida State University, USA (4)

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, U. S. Navy is developing a fully coupled global system including the Navy Global Environmental Model (NAVGEM), the HYbrid Coordinate Ocean Model (HYCOM), the Los Alamos Community Ice CodE (CICE), and the Wavewatch III ocean surface wave model. 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 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). One aspect that makes the system unique is the relatively high resolution of the ocean and ice models, reflecting the Navy's strategic and tactical interests in these realms. A 17-year archive of 45-day 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. The performance of the system in simulating the Madden-Julian Oscillation and other tropical phenomena is comparable to other state-of-the-art systems. The Navy system has also shown good performance relative to other systems in multi-month forecasts of arctic sea ice as part of the Sea Ice Prediction Network September Sea Ice Outlook. Plans for ensemble design, coupled data assimilation, and other future developments will also be presented.