S2S Real Time Pilot Workshop

15th – 17th November 2022. Virtual Workshop

Presentation Title: Subseasonal Tropical Cyclone Prediction Skill in the Navy Earth System Prediction Capability Ensemble

Presenter & co-author names: Matthew A. Janiga[1], Stephanie Rushley[2], William Komaromi[1], Kurt Hansen[2], Carolyn A. Reynolds[1]

Presenter & co-author affiliations: Naval Research Laboratory Marine Meteorology Division[1]

National Research Council[2]

Session Title: Theme 1: Translating S2S forecasts into information relevant to user decisions

Abstract:

The Navy Earth System Prediction Capability (Navy ESPC) is a coupled global model consisting of the Navy Global Environmental Model (NAVGEM) atmospheric model coupled to the Global Ocean Forecast System (GOFS), which consists of the Hybrid Coordinate Ocean Model (HYCOM) and the Los Alamos Community Ice Code (CICE). We examine the prediction skill and biases in tropical cyclone (TC) tracks, the large-scale TC environment, and the Madden-Julian Oscillation (MJO) in the operational Navy ESPC 16-member ensemble forecasts initialized weekly during 2017, 2020, and 2021. The prediction skill and biases in the TC environment and MJO are compared to models from the Subseasonal-to-Seasonal (S2S) database including the NCEP CFSv2, ECMWF, and UKMO ensembles.

The Tempest Extremes package is used to identify TCs based upon sea level pressure minima, surface wind maxima, and upper-tropospheric warm cores. Biases in the TC genesis count and number of TC days in Navy ESPC are related to model biases in the genesis potential index (GPI), an empirical index based upon shear, humidity, low-level vorticity, and relative SST anomalies. Navy ESPC prediction skill and biases in the GPI and its component terms are compared to those in the S2S database models. We also examine MJO prediction skill using several different measures, including the Real-time Multivariate MJO (RMM) index and Real-time OLR MJO Index (ROMI) as well as OLR that has been wavenumber-frequency filtered for the MJO. MJO prediction skill and biases are related to the subseasonal prediction skill in the GPI and its component terms. Specifically, we are interested in whether mean state biases or MJO prediction skill and biases are more important to the TC environment prediction skill.