



A Statistical/Dynamical Hybrid Model Approach to Atlantic Basin Seasonal Hurricane Prediction

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Colorado State University (CSU) has been issuing Atlantic basin seasonal hurricane forecasts since 1984. These forecasts have primarily used a statistical methodology in the past and are currently issued in early April and are then updated in early June, early July and early August. While these forecasts have shown skill in 35 years of real-time forecasts, there have also been notable busts, especially with early outlooks issued in April and June. The most recent large bust in the CSU seasonal forecast was in 2013.

With the significant improvements in skill of dynamical models in recent years, we develop a statistical/dynamical hybrid model which uses the European Centre for Medium Range Weather Forecasts (ECMWF) System 5 to forecast values of the predictors going into the early August statistical prediction scheme. Given that the early August forecast is immediately prior to the peak of the Atlantic hurricane season, it has the highest level of both hindcast as well as real-time forecast skill of any of CSU's forecast models. System 5 has hindcast data extending back to 1981, allowing for a \sim 40 year development dataset to test the skill of the model. We find that this hybrid model shows comparable skill to our existing statistical models issued at the April, June and July lead times. When the hybrid scheme developed here is combined with the existing statistical scheme, significant improvements in hindcast skill can be achieved at the April, June and July forecast lead times. These forecasts have been implemented in real-time for the 2019 Atlantic hurricane season.