

Impact of Ocean Initial Conditions on Operational Hurricane Forecasting

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Although previous studies have demonstrated the importance of ocean initial conditions for coupled tropical cyclone prediction models, comprehensive studies still need to be performed using operational coupled forecast systems. We conduct a study of the sensitivity of Hurricane Weather and Forecast (HWRF) system intensity forecasts to the accuracy of ocean initial conditions. Two versions of HWRF, the operational one coupled to the Princeton Ocean Model (POM) and an experimental one coupled to the HYbrid Coordinate Ocean Model (HYCOM), are used to determine the sensitivity of results to ocean model parameterizations. The ocean models are initialized with different fields obtained from climatology, from unconstrained ocean model simulations, and from a realistic global ocean analysis product (the Real Time Ocean Forecast System, or RTOFS). Substantial sensitivity of intensity forecasts to ocean model initialization is documented, as is sensitivity to the choice of ocean model. A specific impact study is highlighted for a real case (Hurricane Blanca, 2015, in the Eastern Pacific). High-quality ocean observations are important for constraining errors in ocean model initial fields.