Statistical Ensemble Prediction of Sea Surface Temperature Anomalies in the Tropical North Atlantic

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Submitted to Weather and Forecasting
September, 2001

ABSTRACT

The seasonal predictability of boreal summer tropical north Atlantic (10^{o}N-20^{o}N, 20^{o}W-60^{o}W) sea surface temperatures (SSTs) is investigated using a new statistical ensemble forecasting scheme. The interannual variability of August-September-October SSTs in this region is linked to seasonal Atlantic hurricane activity, and to rainfall in the Caribbean and Central America. Our prediction model - the UCL1 (University College London 1) model - is a statistical 6-member ensemble model employing the optimal hindcast combination of global teleconnected SST predictor regions identified using sound, but different, tests for correlation significance, field significance and temporal stability. The model's skill and uncertainty is assessed carefully on 15 years (1986-2000) of independent data for 1-, 2- and 3-month target periods, each at monthly leads out to 10 months. The UCL 1 model offers significant predictive skill over climatology and persistence for forecast leads out to 4 to 6 months for every 1-, 2- and 3-month boreal summer target period. At a given lead, the predictive skill is similar for each target period duration. The model highlights the growing predictive long-lead influence on the summer tropical north Atlantic of the spring and early summer SSTs underlying the Atlantic northeast trade wind region extending from the Bay of Biscay to northwest Africa and west to Central America.
