

Abstracting ENSO Spatial Patterns' Impact on Atlantic Tropical Cyclone Seasonal Frequency

2012-05-14

1 Introduction

The ability to forecast individual cyclogenesis events is of tremendous scientific and societal interest. However, current gaps in both knowledge and technology make cyclogenesis forecasts a daunting challenge. As a resort, seasonal forecasting has been an active field of research. While seasonal forecasts cannot not inform us of the frequency or intensity of landfalling hurricanes – a subject of keen public interest – they are still useful to policy makers and insurance companies. Furthermore, increased accuracy in seasonal predictions would allow scientists to infer the environment's response to such seasonal activity such as ocean heat transport and phytoplankton bloom. One of the well-documented influencers of Atlantic tropical cyclone (TC) activity on seasonal timescales are Pacific sea surface temperatures (SST). Traditionally, Pacific SST's impact of the Atlantic has been abstracted by monitoring the warming of fixed oceanic regions (e.g. NINO3.4). However increasing evidence is suggesting that the spatio-temporal context of the warming must be considered (relative SST, NINO Modoki, etc.) We propose a new index that accounts for the spatial distribution of warming of Pacific SSTs and are able to explain 60% of the seasonal variability in Atlantic TC frequency. The index is able to resolve the large-scale conditions during the Atlantic hurricane season better than warming-based indices. Such an index, coupled with other seasonal prediction methods based on Atlantic variables (e.g. Kneuston et al 2007, Emanuel et al 2008) can prove to be a significant addition to dynamical and statistical forecast models.

References