

Abstract: MJO modulation of western hemispheric tropical cyclone activity

Initialization errors and chaotic atmospheric variability lead to diminishing atmospheric predictability from dynamical numerical weather prediction beyond about seven days. However, accurate guidance of tropical cyclone (TC) activity on one- to two-week timescales would be highly useful to many users, including forecasters, energy traders, and emergency managers. For basins where the period from genesis to landfall is often only a few days, such as the Gulf of Mexico, Caribbean Sea, and the eastern East Pacific adjacent to Mexico, short-term guidance for expected TC activity is especially needed. Because currently-available dynamical guidance does not provide reliable predictions for TC activity beyond about five days, establishing controlling relationships between longer-period oscillations – such as the MJO – and TC activity will provide great benefit in the short- and long-term planning

This study used the NOAA CPC MJO Index to investigate associations between the MJO and North Atlantic and East Pacific TC activity. TC activity was defined across several metrics: genesis, intensification, and landfall. The statistical significance of the modulation was calculated by contrasting observed TC activity in each basin with expected TC activity during each MJO phase. The degree of modulation by the MJO was found to vary between basin and index; however, statistically significant relationships were found for each basin and across the MJO indices. For example, when MJO Index 6 was in an “enhanced” phase, only thirteen TCs made landfall in the North Atlantic from 1977-2006. However, when Index 6 was in a “suppressed” phase, 65 TCs made landfall, a ratio of five to one. These results advance our understanding of the MJO and the atmospheric-oceanic system and highlight the need for accurate MJO prediction. They

provide motivation for improved NWP predictions on the MJO timescale and will be presented in a poster display at the upcoming MJO workshop.