EMS Annual Meeting Abstracts
Vol. 14, EMS2017-2, 2017

Role of Large-Scale Tropospheric Circulation and Energetics in the Latitudinal Distribution of the Tropical Cyclone Lifecycle.

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Trends can be identified in the latitudinal distribution of tropical cyclone (TC) activity throughout the cyclone lifecycle. Notably for example, the latitude of lifetime maximum intensity (LMI) has been shown to be migrating poleward in both hemispheres and has been linked to an expansion in the tropical atmosphere. In this study, observed trends in both hemispheres at tropical cyclogenesis, LMI and lysis are computed and decomposed to investigate the role of the mean bulk horizontal tropospheric circulation (the so-called steering flow), vertical circulation and ocean-atmosphere enthalpy fluxes (latent and sensible heat). Extreme interannual modulations (as expected) are largely determined by ENSO, while some interdecadal changes are shown to be associated with zonally homogenous patterns in enthalpy fluxes, convective available potential energy (CAPE), and intensified Hadley circulation. Patterns of variability are significantly more coherent in the Northern Hemisphere. These results suggest that, since differing large-scale conditions conspire to effect TC lifecycle points differently, the overall latitudinal distribution of the TC lifecycle does not modulate in a wholesale fashion.