

# **Characteristics of Northeast Winter Cyclones Associated With Significant Upper Level Easterly Wind Anomalies**

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Northeast winter cyclones can disrupt the lives of millions of people and, as a result, have been thoroughly studied. Much progress has been made in characterizing certain types of cyclones by analyzing the dynamics associated with their genesis and subsequent lifecycle. An investigation of historical data reveals that a smaller subset of northeast winter cyclones tends to be associated with an uncharacteristically strong 300-hPa easterly wind anomaly poleward of the surface cyclone. This sub-category of cyclones may be associated with a well-defined upper level cutoff circulation as well as a significant low-level temperature anomaly dipole over the northeast U.S. This presentation will feature a climatological and case study analysis of these cyclone events with a focus on significant synoptic and mesoscale features.

Preliminary results indicate that the Arctic Oscillation (AO) exhibits a negative tendency during the lifespan of many of these deep easterly flow cyclone cases, indicative of a blocked upper level flow pattern in the mid to high latitudes. Significant upper level easterly wind anomalies ( $>25 \text{ m s}^{-1}$ ), and in some cases easterly jet streaks, appear during the mature phase of the cyclones and are often associated with northerly low-level warm-air advection wrapping cyclonically around the poleward and western sides of the surface cyclone. This sub-category of cyclones may exhibit highly localized precipitation maxima as a result of northwesterly low-level flow favoring lake and orographic enhancement.