

## Climatology of Inverted Troughs over the Gulf of Maine

Joseph E. Cebulko (1), Jason M. Cordeira (2)

(1)National Weather Service Albany, NY(2)Plymouth State University

Inverted Troughs (ITs) over the Gulf of Maine are cool season phenomena that are responsible for unexpected high-intensity snowfall over coastal New England. An IT is a north and westward extension of relatively low atmospheric pressure that contains an easterly component of wind and cyclonic relative vorticity. These ITs have the ability to focus moisture into a low-tropospheric convergence zone, lift the air parcel into an unstable atmosphere, and produce high-intensity banded precipitation over a given region.

This study creates an inceptive 25-year cool season (September–May) climatology of ITs over the Gulf of Maine from 1989 to 2013. The dynamical characteristics of high-intensity IT-influenced precipitation events are investigated via composite analyses that compare ITs with a National Weather Service issued winter storm warning or winter weather advisory to ITs without a warning or advisory over the Gulf of Maine. This study describes and presents the roles of both quasi-geostrophic processes and mesoscale characteristics that influence IT genesis and evolution via composite cross section analyses.

Results suggest that (1) north and westward extensions of quasi-geostrophic forcing for upward vertical motion removed from the sea-level pressure minimum of a parent-low pressure system can result in the genesis of ITs, (2) IT axes contain similar characteristics to frontal boundaries, and (3) the moist air along and upstream of the IT axes has potential to become unstable and produce quasi-stationary convective precipitation bands over a given region. This presentation will provide background information on ITs, discuss the 25-year temporal, spatial, and quantitative climatology, and exhibit composite analyses in order to understand the dynamics associated with ITs over the Gulf of Maine and their associated precipitation