

5-3-2014

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Recommended Citation

Caruthers, Alex and Connelly, Ryan, "Synoptic and Lake-Effect Classification of Snowfall in the Lake Michigan Region: Deriving Clarity Using WRF Simulations" (2014). *Symposium on Undergraduate Research and Creative Expression (SOURCE)*. 317.
<https://scholar.valpo.edu/cus/317>

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Synoptic and Lake-Effect Classification of Snowfall in the Lake Michigan Region: Deriving Clarity Using WRF Simulations

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Lake-effect snowfall in the area surrounding Lake Michigan often forms in the wake of a synoptic-scale system that also produces precipitation, making it difficult to differentiate lake-effect events from synoptic-scale system events. This differentiation is necessary in constructing a climatology of lake-effect snowfall events. As part of an ongoing project to construct a database of November lake-effect snowfall events in the regions surrounding Lake Michigan, simulations from the Weather Research and Forecasting (WRF) model are used to identify precipitation in ambiguous cases as either resulting from lake-effect snowfall or a synoptic-scale system. This unique database includes more than 900 events of either lake-effect or synoptic-scale precipitation from 1950-2012. Using NCEP/NCAR Reanalysis Project (NNRP) data, the WRF is run with 12 km grid spacing to create high resolution evolutions of weather patterns in the Lake Michigan domain for each precipitation event. The results of this study will serve as a useful foundation for the creation of a Lake Michigan regional November snowfall climatology and will aid in assessing multi-decadal trends in November lake-effect snowfall in this region. Three example cases will be presented to demonstrate how these simulations can be used to differentiate the otherwise ambiguous cases.

Information about the Authors:

The authors are a group of junior and senior meteorology students gaining experience in the field of research under the guidance of Professor Kevin Goebbert and Professor Craig Clark. Since lake-effect snow impacts Valparaiso University, having the opportunity to research the phenomenon in-depth has been invaluable. Each author is interested in continuing his education to the graduate study level within the atmospheric science realm.

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