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Simulation of a lake effect snowstorm with a cloud resolving numerical model

T. Maeaska, (1), G.W.K. Moore (1), A. Liu (1), K. Tsuboki (2)

(1) Department of Physics, University of Toronto, Toronto, Canada, (2) Hydrospheric Atmospheric Research Center, Nagoya University, Nagoya, Japan
(moore@atmosp.physics.utoronto.ca / Fax: 416 978 8905 Phone: 416 978 4686)

Lake effect snowstorms are common weather phenomena that occur along the lee shores of the North American Great Lakes during the winter months. These snowstorms typically occur 1-2 days after the passage of a synoptic-scale low-pressure system when northwesterly flow is established over the region. As the cold and dry arctic air flows over the lakes, it is warmed and moistened as a result of the transfer of sensible and latent heat. This transfer can trigger atmospheric convection that is typically organized into long, $\sim$100km, and narrow, $\sim$5km, quasi-two-dimensional features known as cloud streets or band clouds. High winds, heavy snowfall and blowing snow are often associated with these band clouds.

In this talk, we will present a numerical simulation of a lake effect snowstorm that occurred on January 13 2003. The simulation was performed in a domain that encompassed the entire Great Lake region, 1300km by 660km, at a horizontal resolution of 500m. The high spatial resolution allows for an explicit representation of the band clouds; while the large domain allows for a complete description of their evolution as they pass over the lake and land surfaces. Using radar data from both the ground and space, we will show that many interesting properties of these band clouds are captured by the model.