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Poster Presentation Abstract

Examination of Forcing Mechanisms Leading to a Surprise Heavy Snow Event

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ABSTRACT

On 12 January 2004 a relatively brief but heavy snow event occurred across western New York. As much as 28 cm (11 in.) of snow fell during a 12-h period, accompanied by reports of lightning and thunder. While thundersnow is not uncommon in the eastern Great Lakes region (most notably during lake-effect snow events), it was an Alberta clipper that produced the heavy snow. Such systems are known mainly for their high forward speed and origins over relatively dry source regions. As such, most clipper systems do not yield impressive snowfall totals, usually on the order of a few inches of light, powdery snow. Forecasters are generally concerned with the system's surface winds, which can be significant as a result of their tight, compact pressure centers, resulting in blizzard conditions along the storm's track. The transport of very cold air in the wakes of clippers often produces lake-effect snowbands as it flows over the relatively warm waters of Lakes Erie and Ontario.

This study focuses on the potential causes of this clipper's heavy convective snowfall. Upon close post-analysis it becomes evident that as the clipper approached the eastern Great Lakes area it came under the influence of coupled upper-level jet streaks. Plan-view and cross-sectional analyses illustrate the presence of an enhanced transverse circulation in the vicinity of the clipper, resulting in strong upward vertical motion and subsequent +TSSN over western New York. The information provided in this study should alert operational meteorologists that not all weather systems are created equally, and that a careful four-dimensional evaluation of the atmosphere should be an integral part of the daily operational forecast regime.