Use of a GIS application to evaluate the accuracy of forecaster and model predictions of snowfall in eastern New York and western New England

Joe Villani NWS / WFO Albany, NY

Michael Evans / WFO Albany, NY

Vasil Koleci NWS / WFO Albany, NY

Charles Gant NWS / WFO Knoxville, TN

A collaborative project between the National Weather Service Forecast offices in Albany, New York and Knoxville, Tennessee has resulted in the development of a GIS-based application that produces high-resolution analyses of snowfall observations, and calculates errors and biases of corresponding gridded snowfall forecasts based on the analysis, or an analysis from the National Operational Hydrologic Remote Sensing Center (NOHRSC). This presentation will introduce the application, and summarize the results of associated projects that examine topographical influences on patterns of observed snowfall, and the accuracy and biases of various corresponding snowfall forecasts.

Patterns of observed snowfall and their relation to topography were examined by collecting data from two years of snowfall events from eastern New York and western New England. A detailed snowfall analysis was performed for each event. Composites of snowfall patterns were used to identify relationships between snowfall and various terrain features such as the Catskill and Green Mountains, and the Hudson and Mohawk Valleys, and orographic ratios were calculated for each event to quantify the impact of elevation on snowfall. Observations and short-range model forecasts of environmental characteristics such as wind, temperature and stability were utilized to determine how these factors affect the topography's impact on snowfall distribution.

Snowfall observations from our detailed analysis were compared to short-range forecasts of snow depth change from the 3 km NAM and HRRR, and snowfall from the National Weather Service's National Digital Forecast Data Base, to determine how well these forecasts account for terrain effects. Forecast errors were related to wind, temperature and stability to see whether these factors had an impact on the overall quality of the forecasts, as well as the forecasts ability to account for the effects of terrain.