High-impact model biased right of track winter storms in the northeast United States

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Forecasters making predictions of snowfall and other storm-related impacts associated with winter storms along the northeast U.S. coast rely on accurate model forecasts of cyclone tracks. Over the past several years, several notable storms have occurred in this area that exhibited a right of track model forecast error, meaning that the model forecast cyclone track was to the right of what was observed. This error can contribute to heavy snow farther north and west than forecast, and the observed rain / snow line being north and west of the forecast. These recent storms have led many forecasters to believe that this right of track error is a consistent characteristic of model forecasts in this area, but recent research on forecasts from the Global Ensemble Forecast System (GEFS) showed no overall tendency for right of track errors vs. other types of error for a large dataset of storms. However, a review of high-impact winter storms along the northeast coast of the United States indicates that a significant subset of these storms is characterized by right of track model forecast errors, and an improved understanding of this bias would present forecasters with a target of opportunity to improve forecasts and IDSS messaging for winter storms.

This presentation will summarize results from a study of high-impact east coast storms characterized by a right of track error in the GEFS forecasts. A comparison of forecasts and observations will be presented for several cases, along with a summary of the impacts from these. A composite analysis from the North American Regional Reanalysis shows that these events are typically Miller A storms, characterized by the presence of a strong southern branch jet stream. It is hypothesized that reduced static stability and convection over the southeastern United States in advance of these storms may be one factor that leads to right of track errors. Finally, factors responsible for errors in model placement of heavy snowfall other than lower-tropospheric storm track will be discussed.