An overview and verification of two terrain-influenced snowstorms in eastern New York

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Two snow events in eastern New York from the winter of 2021-2022 are examined. In both cases, the distribution of snowfall was strongly influenced by the topography of eastern New York. Heavy snow fell in the Taconic Hills east of the Hudson River in one event, while very little snow fell to the west. In the other event, a light to moderate snowfall occurred throughout the entire area, however the snowfall was notably heavier over higher terrain in the Catskills and Helderbergs, west of the Hudson River. The distribution of snowfall for these cases is related to local research on the impacts of flow direction, temperature and stability on snowfall distribution. The research has shown that enhanced snowfall can occur east of the Hudson River in cases with a westerly component of lower-tropospheric wind flow, especially under certain wind and stability regimes, while an easterly wind component can enhance snowfall to the west of the river.

Verification of snowfall forecasts from the National Blend of Models (NBM) and the National Weather Service Forecast Office at Albany, NY is shown, to determine how well these forecasts were able to account for the impacts of terrain on snowfall. It is shown that output from the National Blend of Models and forecasts from the National Weather Service both accounted realistically for terrain, although in both cases the effect of terrain appeared to be underestimated. Examination of the 10th, 50th and 90th percentile snowfall forecasts from the NBM indicated that snowfall in upslope areas was best simulated by 90th percentile forecasts. Finally, an examination of which NBM percentile forecasts produced the best predictions revealed a very complex spatial pattern of results, implying that forecasters choosing just one of the high or low percentile predictions, instead of a median forecast, would improve the forecast in some areas, but degrade it in others.