# Using GAZPACHO to Create Forecast Snowfall Bias/Error Maps Stratified by Flow Regime

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The GAZPACHO (Gridded Automated Zonal Precipitation and Complete Hi-Res Output) verification program was used to create maps of observed snowfall, zone-average snowfall and forecast error maps for 56 snowfall events in the National Weather Service Albany, NY County Warning Area (ALY CWA) (eastern New York and western New England) from the 2013-2017 winter seasons. The criteria for an event was when at least advisory level snow fell or advisory level snow was forecast (around 4 inches or greater somewhere in the ALY CWA).

Flow regime stratification was done by first creating categories based on wind direction and speed. The wind direction was broken into four quadrants, corresponding to 0-90°, 90-180°, 180-270°, and 270-360°. The three wind speed categories chosen were 0-19 kt, 20-39 kt, and 40 kt or greater. Twelve categories were defined based on the various direction and speed combinations. Winds at 925 and 850 mb were then investigated using Albany, NY (ALY) observed sounding data for each snowfall event. The wind direction and speed (at 0000 or 1200 UTC) closest to the midpoint time of each event was used.

Events were then stratified into each wind category based on the ALY 925 and 850 mb wind data. Forecast bias and mean absolute error (MAE) maps were computed for each of the twelve wind categories from the 56 total snowfall events. Since there were 12 wind categories and 55 total snowfall events, some of the categories only contained a few events. However, there were

several wind categories with five or more events.

Results from a few of the wind categories using 925 mb winds will be presented, with some discernible patterns noted in the forecast bias and MAE maps. It is hypothesized that some of the larger forecast biases can be attributed to terrain influences based on the over/under forecast of snowfall in favored upslope/downslope areas in the ALY CWA.