

## Forecasting Damaging Winds

Severe and damaging wind is very difficult to forecast because they can be produced by any type of thunderstorm - even one that is dying.

Meteorologists look for signals in Doppler radar scans of mid and upper-levels of storms, signals in the environment surrounding the storms, and the behavior of storms.

Forecasters must also study the existing atmospheric environment and look for the amounts of dry air, moist air, strength of the updraft, storm motion and more.



What we do: NSSL's experimental Convection Allowing Models (CAMs) can predict maximum downdraft wind speeds every four hours out to 36 hours.

BAMEX (Bow Echo and MCV Experiment) was a field experiment involving scientists from NSSL, NCAR, the NWS, and OU that was designed to gather data to understand bow echoes and their resulting high damaging surface winds. The mobile project tried to understand and improve prediction of mesoscale and storm-scale processes that produce severe winds in bowing convective systems lasting at least four hours. The project used aircraft and mobile ground-based instruments to map the thermodynamic and environmental structure of thunderstorm complexes and mature mesoscale convective vortices.

Damaging winds associated with low-altitude mesovortices within bow echoes. An NSSL scientist studied low-altitude "mesovortices", (atmospheric spin on the scale of a few km to several hundred km) and learned that they may be one of the causes of damaging straight-line winds. These results helped motivate the objectives for the BAMEX program defined above.

The Haboob Algorithm runs on NSSL's Multi-Radar Multi-Sensor system at the Salt River Project (SRP), and automatically monitors the radar for thunderstorms reaching thresholds that could result in outflows producing strong surface winds and blowing dust. When thresholds are reached, SRP operational personnel receive an alert to prepare for the impact of wind loading on SRP power poles and substations.

Source: <https://www.nssl.noaa.gov/education/svrwx101/wind/forecasting/>

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