For Details, Contact:

Greg Stumpf

Greg Stumpf
NOAA/NSSL
Norman, OK 73069 USA
stumpf@enterprise.nssl.noaa.gov

Conference on European Tornadoes and Severe Storms

Severe Storm Climatologies using Doppler Radar Algorithms

Greg Stumpf

The National Severe Storms Laboratory has embarked on a project to provide climatologies of all severe and tornadic weather across the U.S. WSR-88D Doppler radar network. Due to the extremely large size of the potential data set, the development of these climatologies is based on output from NSSL's experimental automated severe weather detection algorithms.

The initial scope of the project was to develop a climatology of radar-detected storm-scale vortex signatures [as detected by NSSL's Mesocyclone Detection Algorithm (MDA) and Tornado Detection Algorithm (TDA)] for one WSR-88D radar site (Pittsburgh, PA) for one year (1996). The data set has since been expanded to include the Pittsburgh data for 1997 and 1998 as well.

The NSSL has also developed a system to transfer the MDA and TDA output files automatically from its 12 Warning Decision Support System (WDSS) operational test sites in real-time. The goal is to set the stage for future algorithm output acquistion for all the WSR-88Ds in a central repository to develop continuously-updating climatologies for all the radar sites. These climatologies will help to understand some of the seasonal variations, as well as small-scale spatial variations in severe weather for each radar site. This knowledge could serve to enhance capability to warn for severe weather. Socio-economic impacts could be broad, ranging from disaster mitigation in certain communities as well as provide information for the natural-hazard insurance industry.

Preliminary results from Pittsburgh have shown that there appear to be some patterns in the spatial distribution of radar vortex signatures (mesocyclones, tornadic vortex signature, and others) that

more

can be tied to the local geography. Examples include some variation over the Appalachain mountains, as well as near Lake Erie (a large U.S. Great Lake). More statistical analysis results will be presented at the conference including temporal frequency distributions, density distributions, and analyses on the data stratified by various vortex parameters (e.g., strength, size, etc.).

The methods being developed at NSSL may offer a cost- and time-saving option to develop severe weather climatologies at other locations worldwide (including Europe), especially those locations where knowledge of severe weather climatologies are not as well documented or at locations where severe weather verification is problematic.