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## 1. ABSTRACT

Work is now underway at the Operational Support Facility (OSF) and at many National Weather Service (NWS) field sites to fine-tune default adaptable parameters and to optimize algorithm performance for diverse climatological

and local environmental conditions. The OSF has provided recommendations to NWS field sites for modifying adaptable parameters in two algorithms, Mesocyclone (1995) and TVS (1996). Tuning and optimizing capabilities are especially important for sites not in Great Plains environments.

## 2. BACKGROUND

The Mesocyclone and Tornado Vortex Signature (TVS) Algorithms were originally designed to identify severe weather characteristics in Great Plains supercells. As a result of field reports and other investigations, the OSF and algorithm source scientists believe that algorithm adaptation data is too strict for optimal performance in other severe weather events such as bow echos, comma heads, gust fronts, squall lines, and mini-supercells. (Burgess *et. al.* 1995, Grant and Prentice 1996) These suspicions were confirmed by OSF researchers who analyzed Level II data collected from various sites around the country and calculated Mesocyclone and TVS Algorithm performance using different combinations of adaptable parameters. Unpublished, internal, adaptable parameter studies resulted in specific recommendations for operational sites to change one Mesocyclone Algorithm parameter and one TVS parameter to improve algorithm performance. The first recommendation, given in 1995, authorized and encouraged field sites to change the Mesocyclone Algorithm parameter, Threshold Pattern Vector (TPV) number, from the default value of 10 to values as low as 6. This change allows the Mesocyclone Algorithm to recognize smaller two-dimensional features. The second recommendation, given in 1996, lets sites lower the TVS parameter Threshold TVS Shear (TTS) from the default value 72 hr<sup>-1</sup> down to as low as 18 hr<sup>-1</sup>. This change allows the TVS Algorithm to detect circulations with smaller shear values.

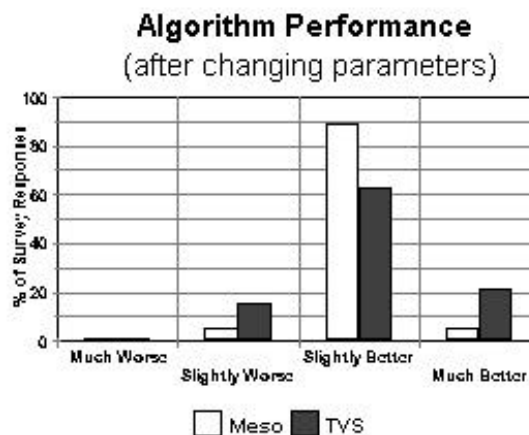
## 3. FIELD SURVEY

After the OSF recommended that field sites change Mesocyclone and TVS parameters, Application Branch personnel distributed a survey to determine which sites changed parameters, what new parameters were being used, and what were forecaster perceptions of algorithm performance after the changes had been made.

A total of 136 surveys were mailed out and 92 sites returned the form.

A total of 19 sites modified the Mesocyclone TPV parameter and 18 sites modified the TVS TTS parameter. Most of the WSR-88D focal points reported a lack of storm events to be able to comment on perceived algorithm changes. Some radar focal points were interested in studying the problem of algorithm optimization for themselves before applying OSF recommendations.

Survey responses suggested that forecasters in the Great Plains preferred to use default parameter values. Figure 1 shows survey results from other forecasters who felt they had enough data to comment and reported a change in algorithm performance after modifying the parameters.



**Figure 1.** Perceived algorithm performance after modifying Meso and TVS adaptable parameters.

Figures 2 and 3 show TPV and TTS parameter values that were modified from default settings and the resulting perceived algorithm performance change.

Forecast offices have confirmed expectations of an increased number of algorithm detections and some have

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