NWS Mobile, Alabama
Wet Microburst
Pre-Storm Evaluation Technique
Performance Results during the Summer of 2006

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ABSTRACT

Since 1998, the NWS in Mobile, AL has routinely assessed the daily risk of wet microburst occurrence. To more formally address the prediction issue this phenomena, a detailed examination of early Summer afternoon Eglin Air Force Base sounding data (1998-2004) was undertaken. Uniquely, the soundings sampled the troposphere during a period (1700-2100 UTC) of weak vertical wind shear (0-2 km, $\leq .003\ s^{-1}$), peak boundary layer mixing and thermodynamic instability prior to the deep convective release. Mean soundings were generated to operationally distinguish between wet microburst event and non-event days [see Medlin and Cullen (2006), *NWA Digest*, **Vol 30**, pp 61-67].

A performance assessment of a local wet microburst evaluation technique is presented. Eighty-three forecasts were made in the 25 May-5 September 2006 period. For each day, points for each predictor (mixed-layer convective available potential energy, surface-freezing level lapse rate, surface-900 mb mean mixing ratio and precipitable water) were awarded as [68% (+/- 1σ); 95% (+/- 2σ); and 99% (+/- 3σ); following the Empirical Rule in an assumed normal distribution] on a 0-5 point scale. The predictors were then linearly averaged to derive upon the daily risk. Based on the number of Severe Thunderstorm Warnings (SVRs), which were used a proxy for verification, the correlation coefficient (r^2) between the number of SVRs and the computed daily relative risk assigned by the evaluation technique point scale was significant at the 99% level (.4004 using ***n-2*** = 81 *degrees of freedom*). r^2 values were also computed between the number of SVRs and the four main predictors themselves. With the exception of the surface-900 mb mean mixing ratio, each were found to be statistically correlated at the 95% or higher level.

Probability of Detection, False Alarm Ratio and the Critical Success Indices were computed for each risk category (i.e., Unlikely, Low, Moderate, High and Likely). Major findings include: **(1)** the Unlikely forecast was perfect; **(2)** only (2/13) Low Risk Category forecasts were missed (i.e., verified with at least one SVR issued); **(3)** (11/13) High Risk Category forecasts events were verified; **(4)** the upper half of the Moderate Risk Category verified roughly twice as many days (i.e., at least one SVR being issued), compared to (2/12) for the lower half.

Remaining tasks include: **(1)** closer examination of technique failures when precipitable water values are high (and correspondingly sfc-900 mb mean mixing ratio values), but yet, surface-freezing level lapse rates are more stable (accounted for too many false alarms in Moderate Risk Category); **(2)** detailed examination of case-by-case '*non-event bursts*' for High Risk Category; **(3)** use 2005-2006 data cases to update the 1998-2003 research results; (4) perform detailed ML- and MUCAPE validation studies while paying particular attention to distribution of moisture with height within the lower troposphere.