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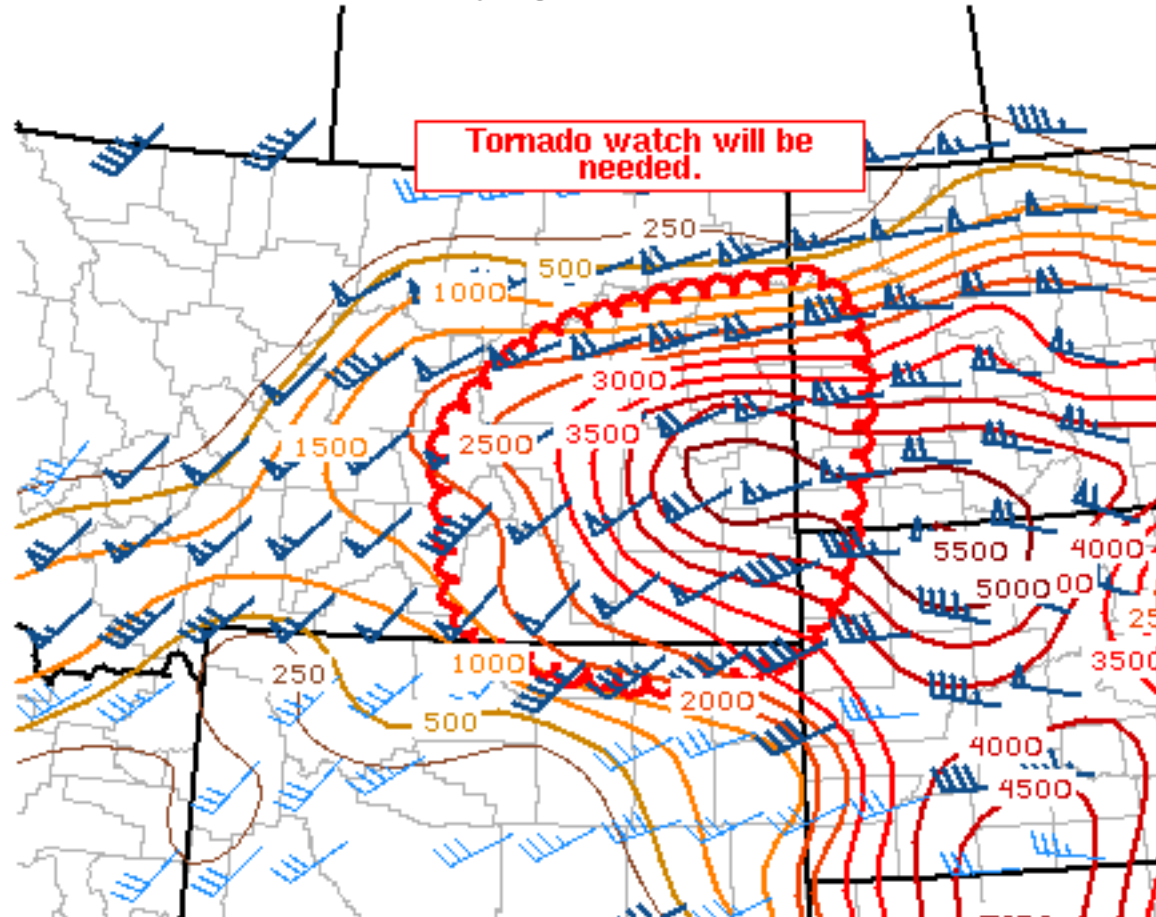
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Mesoscale Discussion 923

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180628/2000 MLCAPE j/kg and Effective Bulk Shear kt



SPC MCD #0923

Mesoscale Discussion 0923

NWS Storm Prediction Center Norman OK

0335 PM CDT Thu Jun 28 2018

Areas affected...Eastern Mont aha...Western North Dakota...and far Northeastern South Dakota

Concerning...Severe potential...Tornado Watch likely

Valid 282035Z - 282300Z

Probability of Watch Issuance...95 percent

SUMMARY...Supercell thunderstorms are expected to form later this afternoon and into the evening. Very large hail, significant damaging winds, and a few tornadoes are possible this evening. A tornado watch will likely be issued in the next couple of hours.

DISCUSSION...Latest HRRR guidance and timing of the upper-wave on 6.2 micron water vapor imagery suggest convective initiation is likely between 22Z and 23Z this evening in eastern Montana. Strong

surface heating and low-level moisture advection has increased surface temperatures into the mid to upper 80s and dewpoints into the low 70s. This warm, moist boundary layer combined with very steep mid-level lapse rates (over 9 C/km per UNR 19Z sounding and RAP mesoanalysis) has led to extreme instability across the area (Over 4000 J/kg MLCAPE). The GGW 19Z sounding showed a 50 knot wind speed at 500 mb which is above the 90th percentile for late June. This leads to 50 to 60 knots of effective shear, which combined with the extreme instability will support supercells as the primary storm mode initially. The extreme values of instability, deep-layer shear, and mid-level lapse rates will support very large hail, especially for the first few hours after storm development.

Low-level east-southeasterly flow, veering to west-southwesterly flow at 3 km will also favor rotating low-level mesocyclones. While the speed shear in the lowest 1 km will initially be a limiting factor for tornadic production, 850 mb winds will strengthen significantly after 00Z. Current thinking is that storm mode may become less discrete around the time of the improving low-level shear profile which could limit the tornado threat. However, the last few HRRR runs have hinted that a discrete storm mode may persist long enough into the evening to support the tornado threat.

..Bentley/Hart.. 06/28/2018

...Please see www.spc.noaa.gov for graphic product...

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