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CENTRAL REGION TECHNICAL ATTACHMENT 86-26

HEAVY SNOW FORECASTING AIDS

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This paper summarizes various heavy snow forecasting parameters found in Central Region Technical Attachments the past few years. It is intended as a quick reference when forecasters are pressed to predict heavy snow or delineate rain/freezing rain/snow areas.

TEMPERATURE

500 mb	$-23^{\circ}C$ to $-25^{\circ}C$
700 mb	$-6^{\circ}C$ to $-8^{\circ}C$
850 mb	$0^{\circ}C$ to $-10^{\circ}C$

The above temperature regime produces a 1000-500 mb thickness of 5400 m. At 850 mb, the $-5^{\circ}C$ isotherm bisects the heavy snow band.

THICKNESS (for low elevations above sea level)

Rain/snow lines are:

500-1000 mb	5400 m
500-700 mb	2560 m
500-850 mb	4100 m
700-1000 mb	2840 m
850-1000 mb	1300 m
850-700 mb	1540 m

With an 850-700 mb thickness of 1540-1555 m and 1000-850 mb thickness less than 1300 m plus a surface temperature less than $32^{\circ}F$, forecast moderate/heavy freezing precipitation.

The heaviest snow occurs along the 1000-500 mb thickness ridge between 5310-5370 m.

The axis of heavy snow is 75-100 nm to the left of the 2840 m thickness provided the 850 mb low is within 50 nm of the 2840 m line. The heavy snow band is usually 150 nm wide.

The farther south the 850 mb low is from the 2840 m line, the closer the heavy snow axis will be to the 2840 m line. The width decreases to less than 75 nm as well. In most cases, however, the heavy snow width is the same (150 nm) regardless of the position of the 850 mb low.

Distance of 850 mb low from 2840 m line (nm)	Distance of axis of heavy snow from 2840 m line (nm)	Width of 4" snow band
150N	along path of low	150 nm
50-150N	100-200N	150 nm
50N-50S	75-100N	150 nm
50-150S	50-75N	100 nm
more than 150S	50N	0-75 nm

LOWS

The heavy snow axis is 2.5-4.0 degrees of latitude to the left of the sea level low and along the path of the 700 mb or 500 mb low.

VORTICITY

Sea level geostrophic relative vorticity units: 10^{-5} sec^{-1}	500 mb Relative Vorticity units: 10^{-5} sec^{-1} (from ERL model)					
	4	6	8	10	12	14
10	3	4	5	6	7	8
14	4	5	6	7	8	9
18	4	6	7	8	9	10
22	5	6	8	9	9	10
26	5	7	8	9	10	11
30	6	8	9	10	11	12

Snow storm total in inches relative to 500 mb and sea level relative vorticities for a 50 by 100 nm area.

To calculate the sea level geostrophic vorticity, average the pressure at four points 185 nm north, south, east, and west of the surface low. Then subtract the pressure of the low from this average and multiply the result by the following numbers corresponding to the appropriate latitude:

30N	3.5
35N	3.0
40N	2.8
45N	2.5

The heaviest snow is along and 150 nm to the left of the track of the 500 mb vorticity center.

When the vorticity center has bottomed out in the longwave trough, the vorticity center will track toward the apex of the downstream ridge.

When the surface low is to the right of the 500 mb height fall center track, the heavy snow will lie parallel to and to the left of the 500 mb height fall center track.

T1, T3, and T5 values from the FRHT's may prove useful and should be considered. Also, QPF's from the RGL model should be helpful.

REFERENCES

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