Lower Mississippi Valley to the Northeast States Winter Storm – January 16-18, 2013
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Overview: From January 16-18, 2013 as a deep upper low moved across the southern U.S., snow spread from Louisiana to southern Virginia (Fig. 1a). Long Island and southeastern New England also received some light snow as the system moved offshore (Fig. 1b). This event came on the heels of a wintery precipitation event that spread from the southern Plains to New England. This occurred as moisture and a series of shortwave troughs propagated northeastward along the leading edge of a large scale trough that extended from the northern Plains back into the Southwest.

On the evening of 15 January, a cutoff upper low developed in the base of the trough as it swung east from the Southwest across the southern Rockies into the adjacent high plains. By the morning of 16 January, a deep closed low had developed and moved over central Texas, rotating into the eastern parts of the state by that evening (Fig. 2a). Snow fell across portions of the lower Mississippi into the Tennessee valleys as moisture was lifted from the Gulf of Mexico. The trough began to assume a slight negative tilt as it swung progressively from the lower Mississippi valley to the southern Appalachians on 17 January. A frontal boundary that represented the leading edge of the Arctic air mass that had moved into place earlier in the week, lingered across the Carolinas into the central Gulf of Mexico. A surface low positioned along the boundary began to strengthen over northern Georgia before tracking east-northeastward into the Carolinas. In addition to strong upper divergence afforded by favorable upper jet dynamics (Fig. 3), strong low-level frontogenesis coinciding with an area of negative geostrophic equivalent potential vorticity (EPVg) was noted across western North Carolina into far southern West Virginia (Fig. 4). Interacting with moisture that continued to stream north from the Gulf of Mexico, these ingredients are thought to have contributed to the heaviest snow accumulations that occurred during this event. This precipitation was relatively short-lived however, with the back edge of the precipitation shield progressing steadily across North Carolina and southern Virginia; moving off of the middle Atlantic coast during the early morning of hours of 18 January behind the departing low. As the system moved offshore, the northern edge of the precipitation shield brushed Long Island and southern New England during the overnight hours.

Impacts: Up to 4-in of snow fell across portions of central and northern Mississippi and northern Alabama, an area unaccustomed to frequent snows, and resulted in several new daily snowfall records. Snow accumulations of up to 6-in were reported over far eastern Kentucky and Tennessee. The heaviest amounts of the event fell just to the east across far northwestern North Carolina, southwestern Virginia and far southern West Virginia, where accumulations of 12 to 15-in were reported – breaking numerous daily snowfall records, in addition to resulting in numerous power outages across the region.

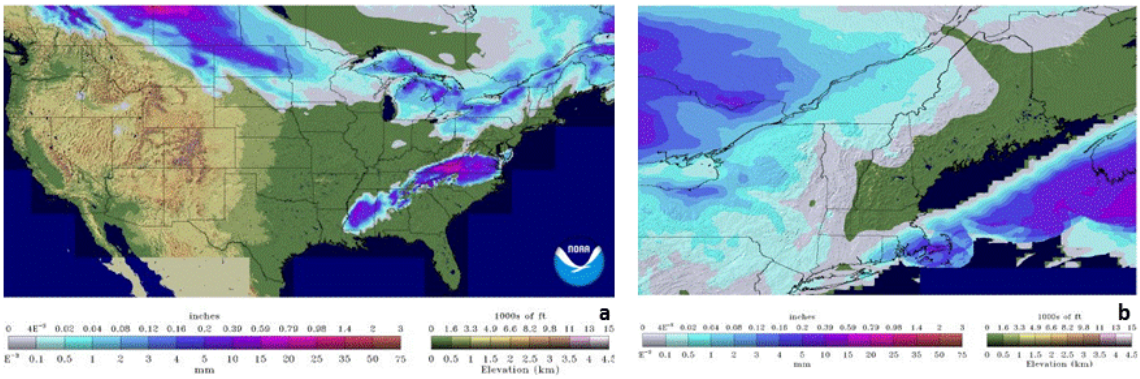

Figure 1: Scaled snow precipitation from 06 UTC on (a) 18 Jan 2013 and (b) 19 Jan 2013 (NOHRSC).

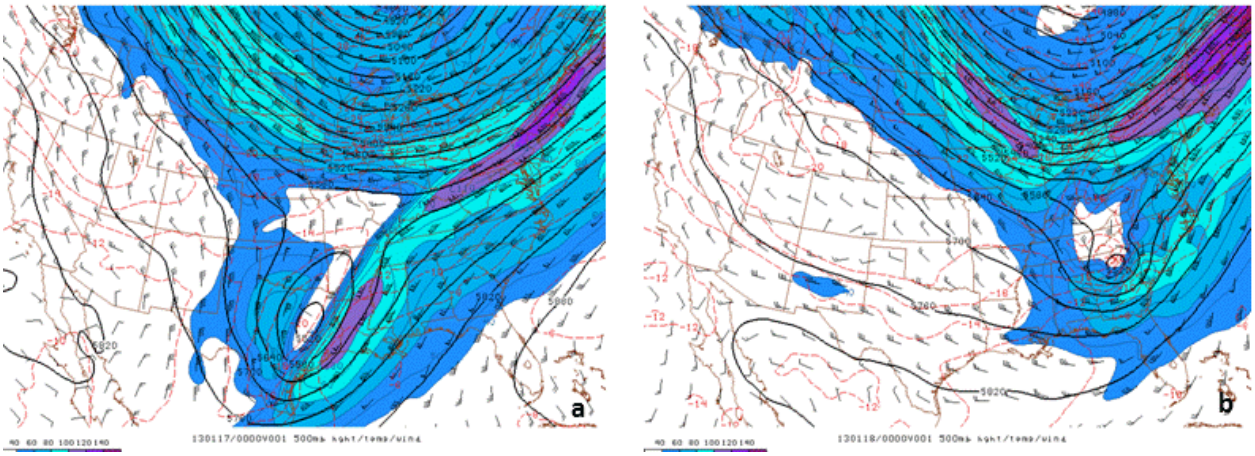

Figure 2: 500 hPa analysis, wind bards, wind speed (shaded) from 00 UTC on (a) 17 Jan 2013, (b) 18 Jan 2013 (SPC).

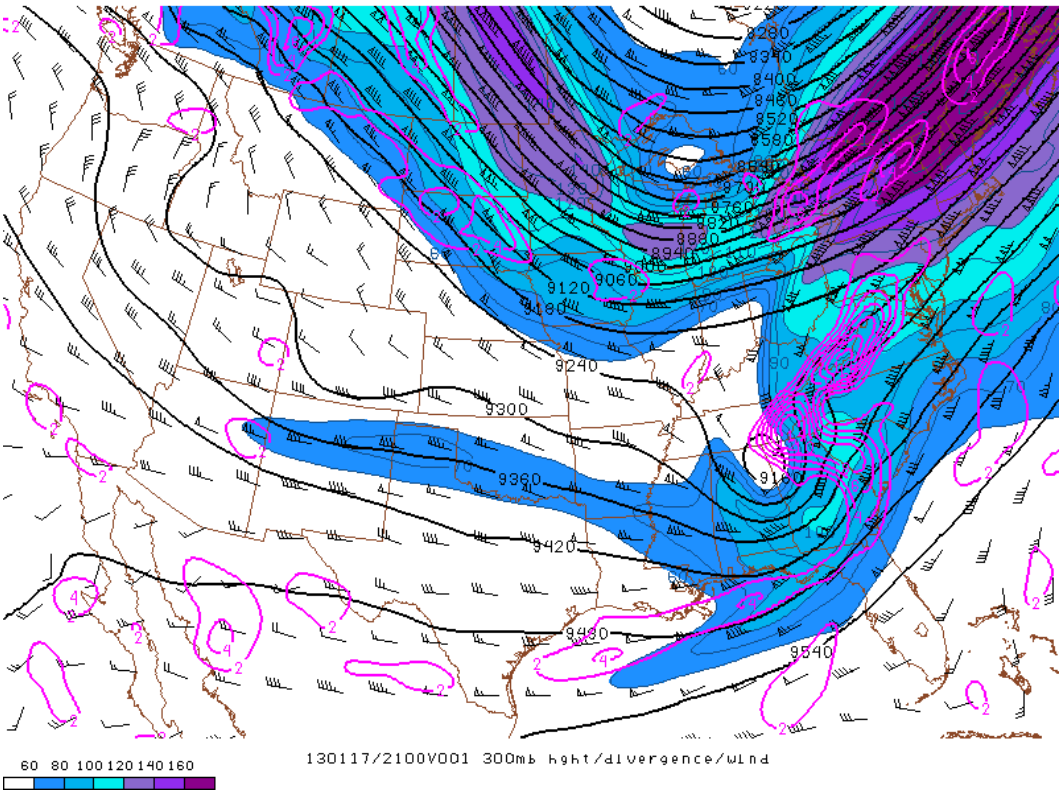

Figure 3: 250 hPa analysis, wind bards, wind speed (shaded), divergence from 21 UTC on 17 Jan 2013 (SPC).

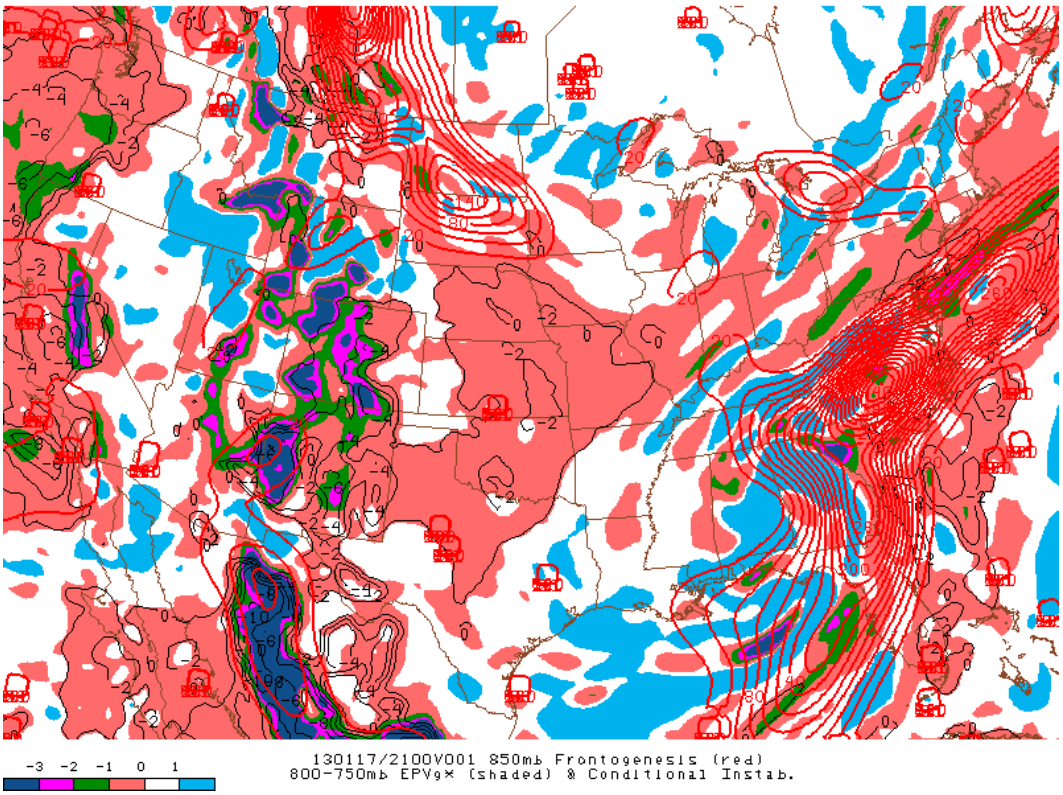

Figure 4: 850 hPa frontogenesis (red), 800-700 hPa EPVg* (shaded) and conditional instability on 21 UTC 17 Jan 2013 (SPC).

Selected Storm Total Snow Accumulations (in)	
Eupora, MS	4.0
Cullman, AL	4.0
Bristol, TN	6.0
Creston, NC	14.0
Beech Mountain, NC	11.2
Greensboro, NC	3.3
McClure, VA	13.5
Roanoke, VA	5.0
Narrows, VA	12.0
Princeton, WV	15.0
South Bluefield, WV	11.8
Nantucket, MA	4.0

Table 1: Selected snow totals (WPC Storm Summary).