

Southern Plains to Southern Mid-Atlantic Winter Storm 7-10 December, 2018

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Meteorological Overview:

A vigorous mid/upper-level shortwave of Pacific origin moved onshore in the Southwest U.S. early on 7 December. The system then moved from the Southwest into the southern Plains early on 8 December, where the shortwave interacted with an arctic frontal boundary, generating a wave of low pressure at the surface along the Texas Gulf Coast by late that day. As the surface low deepened and the shortwave approached, an area of snow developed in a region of strong frontogenetic forcing across the Texas Panhandle. Snow continued through the day on 8 December and into early 9 December with moderate to occasionally heavy snow reported at times, with total accumulations of 5 to 10 inches reported. Snow across Texas came to an end by the afternoon of 9 December as the low moved east along the Gulf Coast. The system produced a larger band of relatively light snow along the northern edge of a broad area of isentropic lifting from Oklahoma east to the Tennessee Valley, where accumulations of 1 to 3 inches were reported.

A much more significant event began to unfold farther east from the southern Appalachians to the southern Mid-Atlantic region on 9 December. Significant deepening of the 850/700 hPa low pressure center across the Southeast U.S. resulted in a rapid increase in moisture inflow ahead of the system into the southern Appalachians and southern Mid-Atlantic regions. In an area of intensifying low/mid-level frontogenesis north of the low track, a band of moderate to heavy snowfall developed from the southern Appalachians to the southern Mid-Atlantic region late on 8 December into 9 December. Orographic enhancement from 850 hPa south-southeasterly flow up to 40 kt into the southern Appalachians resulted in particularly high snowfall totals, with the highest total of 34 in. reported near Busick, NC. Elsewhere, snowfall totals of 1-2 feet were common across the foothills in North Carolina and Virginia east toward the Tidewater Region. The primary low pressure system moved east into the Atlantic Ocean by the morning of 10 December, but the arrival of an additional energetic mid/upper-level shortwave across the Southeast U.S. brought a period of continued light snowfall, which finally came to an end during the afternoon.

Impacts:

Snow covered and icy roads severely hampered travel across the Texas Panhandle, with some road closures reported. Lubbock, TX measured 10.0 inches of snowfall on 8 December - the 6th snowiest day on record for that location. Farther east, the impacts of the system were much more significant across the southern Appalachians and southern Mid-Atlantic, where crippling amounts of snow fell. Roanoke and Danville, Virginia received their second snowiest days (the snowiest December days) on record, with 15.0 and 15.2 inches measured, respectively, on 9 December. Widespread snowfall amounts of 8-16 inches (with locally much higher amounts) from western North Carolina to southern Virginia resulted in widespread downed trees and

power lines, with hundreds of thousands of power outages reported. Despite lying outside the area of heaviest snowfall associated with this event, thousands of flights were cancelled at Charlotte, NC, which received 2.7 inches of snow. States of emergency were declared in North Carolina and Virginia due to the severe impacts of the storm. In total, the storm affected over 29 million people with winter weather from 7-10 December, with over 1.7 million people receiving at least 12 inches of snow (Regional Snowfall Index, RSI).