

**Southeast U.S. and East Coast Winter Storm
January 7-8, 2017
by: Kwan-yin Kong, WPC meteorologist**

Meteorological Overview

The upper-level trough responsible for this winter weather event can be tracked back to an upper-level low which had been nearly stationary over the Pacific Northwest during the first week of January 2017 after moving southeastward from Alaska during the last week of 2016. As the upper-level trough rotated cyclonically across the U.S. mainland, it began to interact with a baroclinic zone along/near the Gulf Coast (Fig. 1), resulting in a quick but significant round of ice and snow spreading northeastward from the interior Deep South, across the interior Southeast, southern Appalachian, mid-Atlantic, and then along the New England coast during the first weekend of 2017 (Fig. 2).

A couple of important synoptic-scale ingredients were noted prior to this event. First of all, an arctic air mass was already in place over a large portion of the country on 5 January, 2017. As a surface high pressure ridge over the central High Plains built further towards the south and east, frontogenesis was promoted and enhanced along the Gulf Coast. Warm and moist air from the

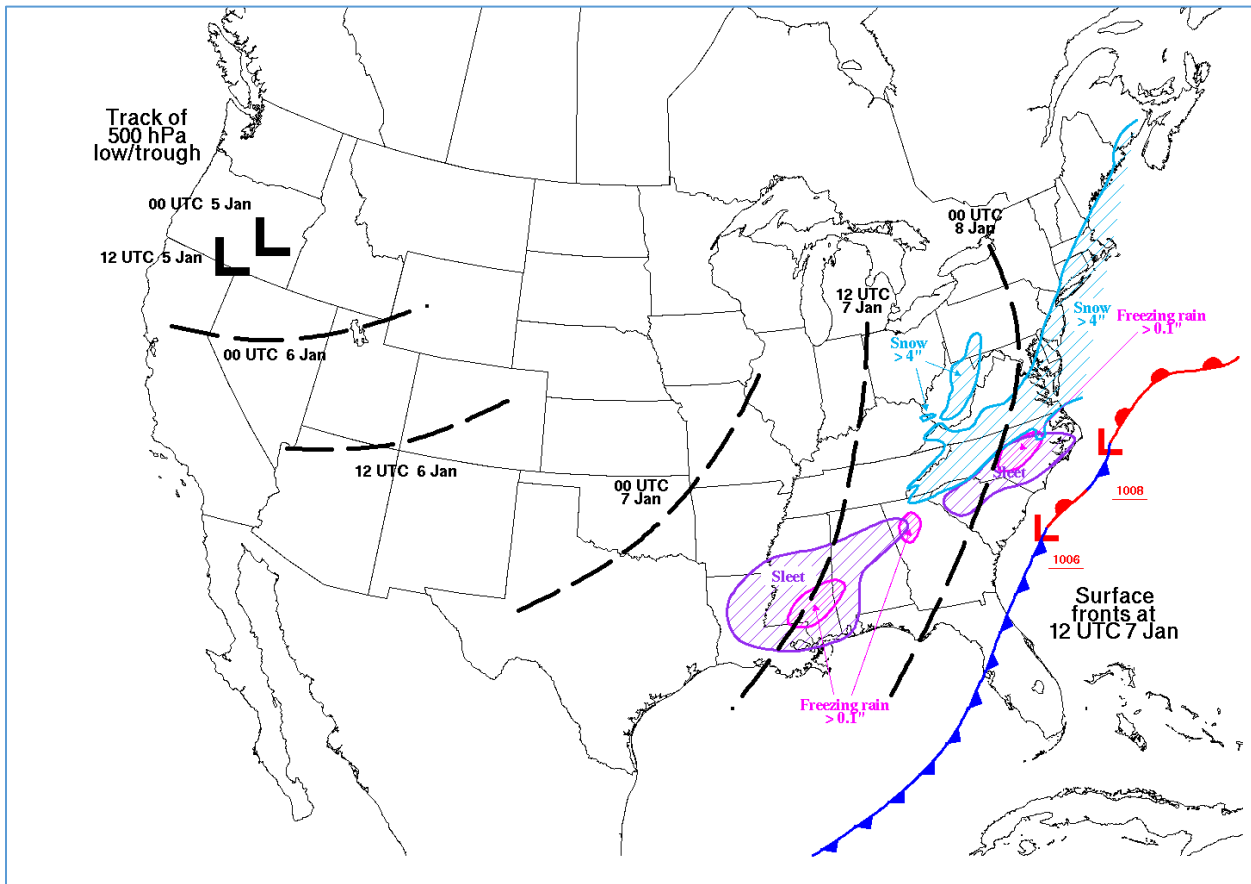


Figure 1 Overview figure showing the progression of the 500 hPa low/trough and the surface frontal position at 12 UTC Jan. 7, 2017 together with the approximate areas of significant snow, sleet, and freezing rain related to the event.

Gulf of Mexico then began to move northward toward the frontal boundary along the Gulf Coast. In the meantime, the aforementioned upper-level trough was rapidly approaching from the west (Fig. 3). Enhanced upper-level divergence associated with the right entrance region of the upper-level jet stream was moving into the Gulf Coast area (Fig. 6a). This dynamic setup led to deep tropospheric lifting over the frontal boundary, resulting in a well-established overrunning pattern across the southeastern U.S., as a low pressure wave forming over the Florida Panhandle. Sleet and freezing rain began to form over central Alabama in the morning on 6 January and quickly expanded toward the northeast, reaching interior North Carolina by the evening hours (Fig. 6b). Meanwhile, snow, locally heavy, was spreading across the southern Appalachians and continued northeastward into much of Virginia before sunrise on 7 January. The snow then reached the mid-Atlantic coast in the morning hours and into southeastern New England coast by the afternoon. The upper-level trough and its associated surface low pressure system remained at their developmental stages as the event unfolded across the Southeast and the mid-Atlantic late on 6 January into 7 January. More rapid cyclogenesis commenced later on 7 January when the center of the storm had already moved off the East Coast as the snow and sleet over North Carolina tapered off. As the storm intensified offshore, north to northeasterly winds strengthened to near gale force near the southeast New England coast as light to moderate snow continued into the night (Fig. 6). But as the storm continued to move rapidly into the Canadian Maritimes, snow over coastal New England began to taper off in the wee hours of the morning on 8 January, with the remaining snow over eastern Maine quickly ended early in the morning.

Impacts

This fast-moving winter weather event brought a swath of 6 to 12 inches of snow from the southern Appalachians northeastward across the mid-Atlantic coast into southern England, with locally over a foot near Williamsburg, Virginia (12.5 inches). Over eastern Delaware, 13.5 inches were reported in Ocean View. Farther south over central North Carolina, heavy sleet

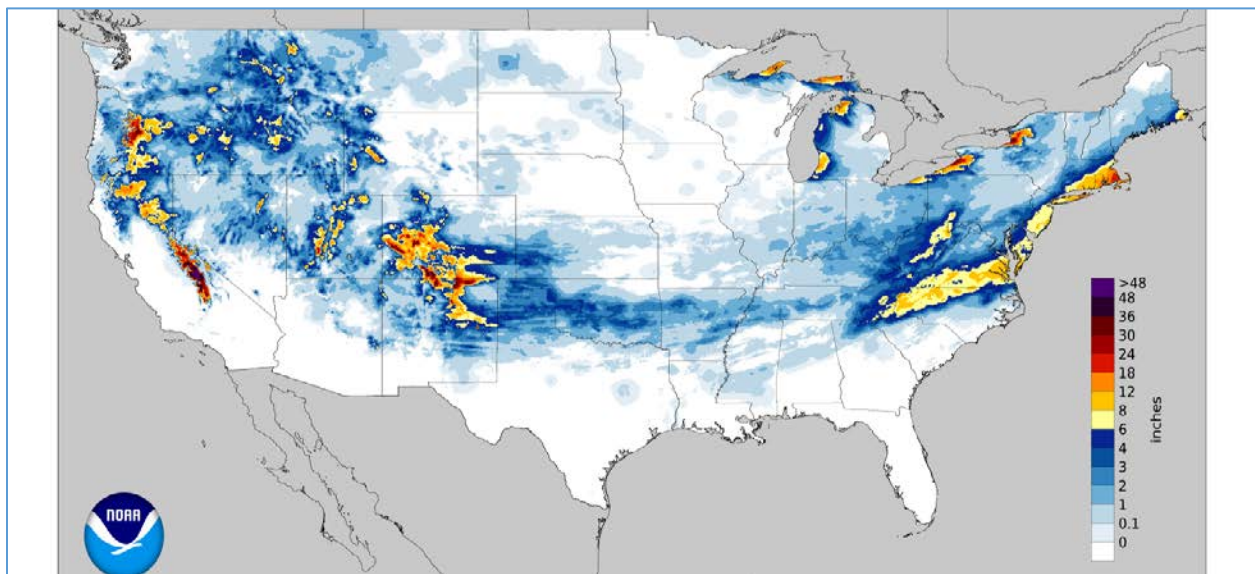


Figure 2 National Snowfall Analysis: 72-hour accumulation ending at 12 UTC 8 January, 2017

accumulated up to 2 inches to the southeast of Falls Lakes along with some freezing rain (Figs. 1 & 5). The impact of freezing rain and sleet continued to extend farther southwest across the interior central Gulf States even down along the Mississippi and Alabama coasts, with as much as an inch of sleet reported in the southern suburbs of Birmingham, Alabama (Figs. 1 & 4). Over interior Louisiana, sleet accumulations approaching 1 inch were reported along with freezing rain. Icy roadways resulted in major traffic issues. The Jackson International Airport had to be shut down due to icy runways. In addition, cold air pouring in behind the storm led to a hard freeze across the interior Gulf States, keeping the ice pack on the ground for a couple more days.

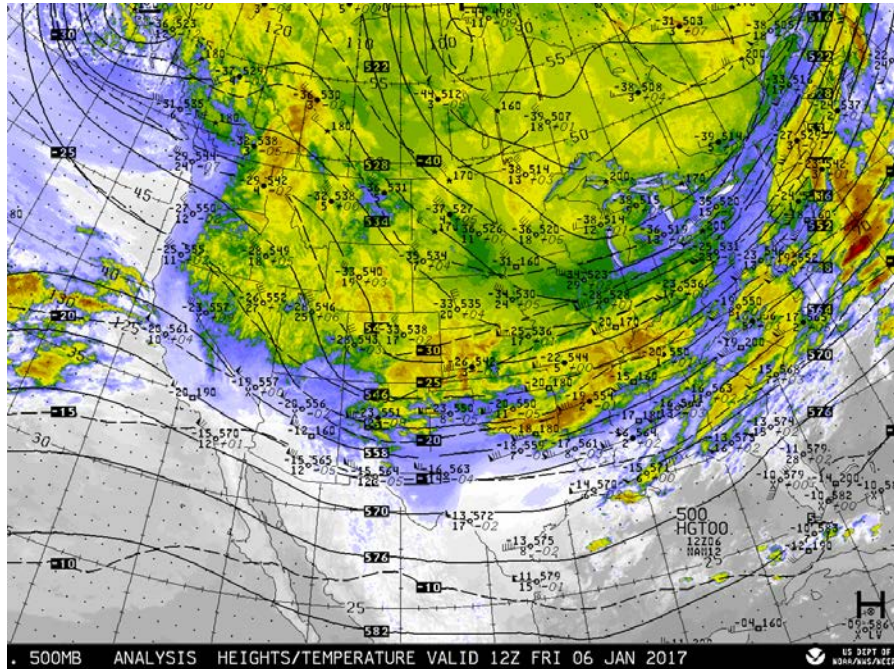


Figure 3 The pre-event 500 hPa analysis together with the GOES-13/15 infrared image at 12 UTC 6 January, 2017

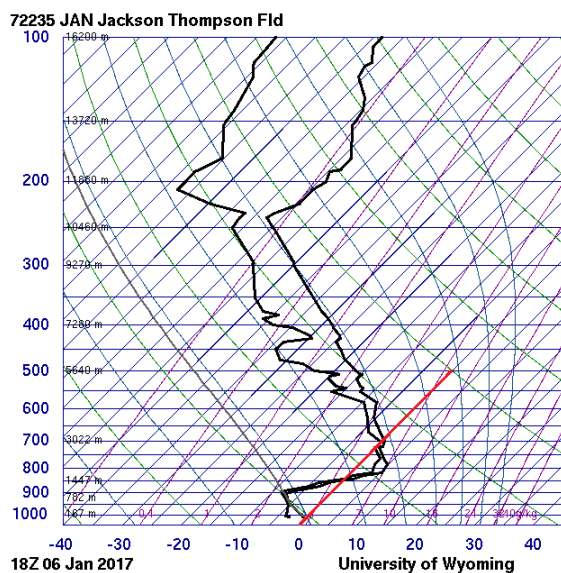


Figure 4 The sounding taken at Jackson, MS where mainly sleet was observed.

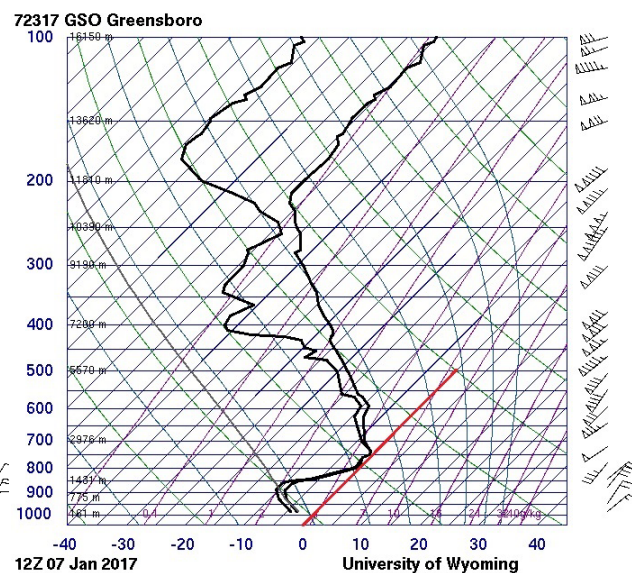


Figure 5 The sounding taken at Greensboro, NC where mainly snow was observed.

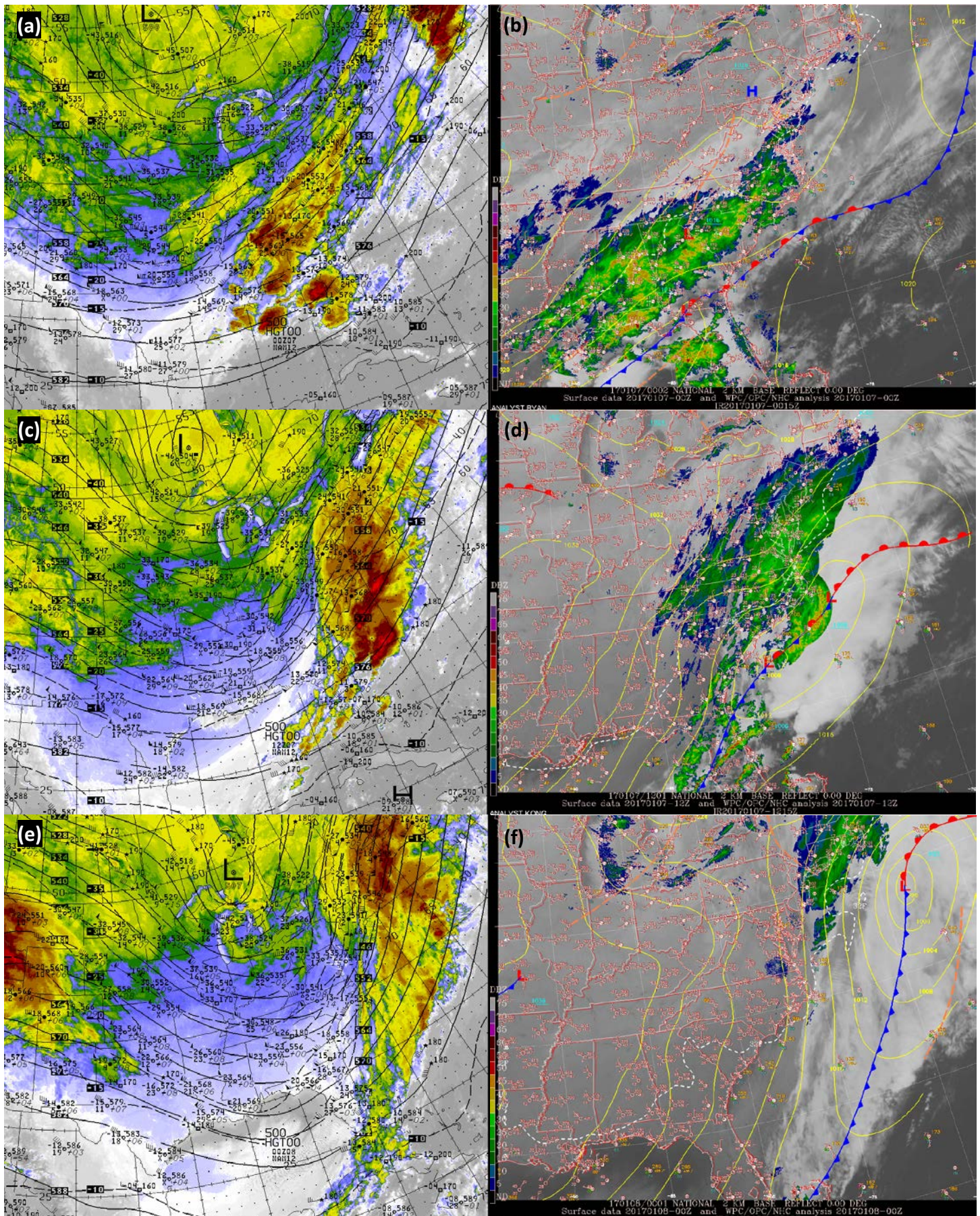


Figure 6 500 hPa analysis overlaid on GOES-13/15 infrared image composite (left column) and WPC surface analysis overlaid on GOES-13 infrared and radar composite (right column) (a, b) 00 UTC January 7; (c, d) 12 UTC January 7; and (e, f) 00 UTC January 8, 2017. The 0°C surface isotherms in dashed white are also plotted.