Central Plains to New England Winter Storm
13 January – 18 January, 2017
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Meteorological Overview:

The middle of January 2017 brought a major winter storm to the nation with impacts stretching from the western United States to New England (Fig. 1). While appreciable snow fell across the higher elevations of Colorado and New Mexico, this storm was memorable for its widespread significant freezing rain accumulations with greater than 0.25 inch ice reported from the southern and central High Plains into the Upper Midwest between 13 January and 17 January. Light to moderate snow along with locally significant icing affected northern New York into New England on 18 January.

The ice storm began on 13 January over parts of northern Oklahoma and southern Kansas into southern and central Missouri in the form of freezing rain. Subfreezing temperatures were already in place as far south as the Texas Panhandle into the Ohio valley, after the passage of a slow moving cold front which stretched from the lower Mississippi Valley into central Texas. As a minus 3 standardized 500 hPa height anomaly translated southward off of the California coast and entered the northern Baja Peninsula (Fig. 2), broad southwesterly overrunning flow focused over the southern and central Plains. From 13 to 14 January, precipitation was widely scattered across the Plains with some greater focus in the vicinity of an 850 hPa band of frontogenesis which stretched from northern Oklahoma into Missouri.

Stronger forcing for ascent arrived as the closed mid-level low slowly approached the southern Plains between 14 and 16 January (Fig. 2), while acquiring a negative tilt during 15 January, which allowed for increased upper level diffluence out ahead of the upper level trough axis. Increased upper level divergence was also present within the entrance region of a 250 hPa jet core over Nebraska and exit region of a speed maximum translating across the southern Plains around the base of the upper level trough axis. Weak elevated instability of up to 500 J/kg was also present from the northern Texas panhandle into the Oklahoma/Kansas border which added a convective element to the precipitation coverage. The combination of these mesoscale and synoptic scale elements helped to generate some of the higher ice accumulations reported from this storm, exceeding 0.50 inches from the northeastern Texas panhandle into northwestern Oklahoma. During the morning of 16 January, a TROWAL (trough of warm air aloft) became evident as the surface cyclone occluded, with radar reflectivity exhibiting a classic curved arc; this was co-located within a deformation axis, with higher reflectivity values extending from western Kansas into southeastern Nebraska. Locations beneath portions of the TROWAL are where widespread 0.50 inch and greater reports of ice accretion were found.

The 500 hPa low weakened between 16 and 17 January as it tracked from the Oklahoma panhandle into the Great Lakes. Freezing rain, followed by a combination of snow and freezing rain moved into the upper Midwest, but the radar reflectivity presentation was less organized when compared to earlier in the storm's history given weakening upper level forcing.

Energy from the storm system transferred to a newly developed surface low south of Long Island on the morning of 18 January. The surface low quickly tracked eastward during the day but not before 3 to 6 inches of snow fell over sections of interior New England.

Impacts:

The largest impacts from this storm were in the southern and central High Plains due to freezing rain accumulations. The weight of widespread 0.25 to 0.50 inch ice buildup caused broken tree limbs, power poles and downed power lines resulting in power outages for tens of thousands of customers in the northern Texas panhandle into northwestern Oklahoma. Across Kansas, some locations were without electricity for a week due to damage caused by freezing rain accumulations. There were numerous traffic accidents reported throughout the Plains, with many accidents likely unreported. Portions of I-80 in Nebraska were closed due to accidents involving semi trucks early on 15 January. There was also loss of life in Missouri and Oklahoma due to traffic accidents with three fatalities reported from three separate incidents. The storm directly resulted in $64 million in property damage, primarily the result of significant ice accumulations. As badly as the ice affected travel and resulted in damaged property, conditions might have been worse if winds were stronger during the event or if the storm had not overlapped with the Martin Luther King Jr. holiday on 16 January, likely resulting in lighter travel.

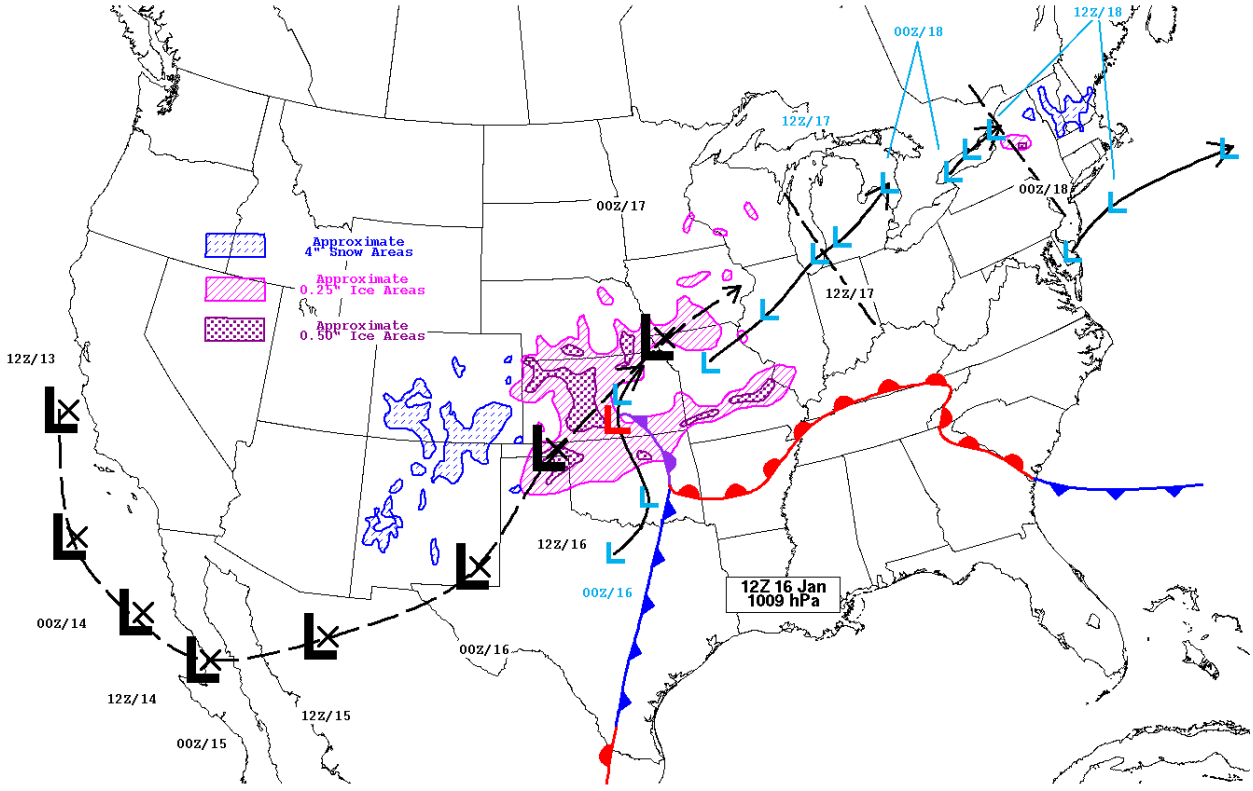

Fig. 1 - 500 hPa low centers and trough axes every twelve hours starting 1200 UTC 13 January (black symbols), surface low tracks every six hours (light blue), surface analysis as the ice storm neared peak intensity (1200 UTC 16 January), approximate areal coverage of locations receiving 0.25 inches ice (magenta shading), 0.50 inches ice (purple shading) and 4 or more inches of snow (blue shading) between 1200 UTC 13 January and 0000 UTC 19 January.

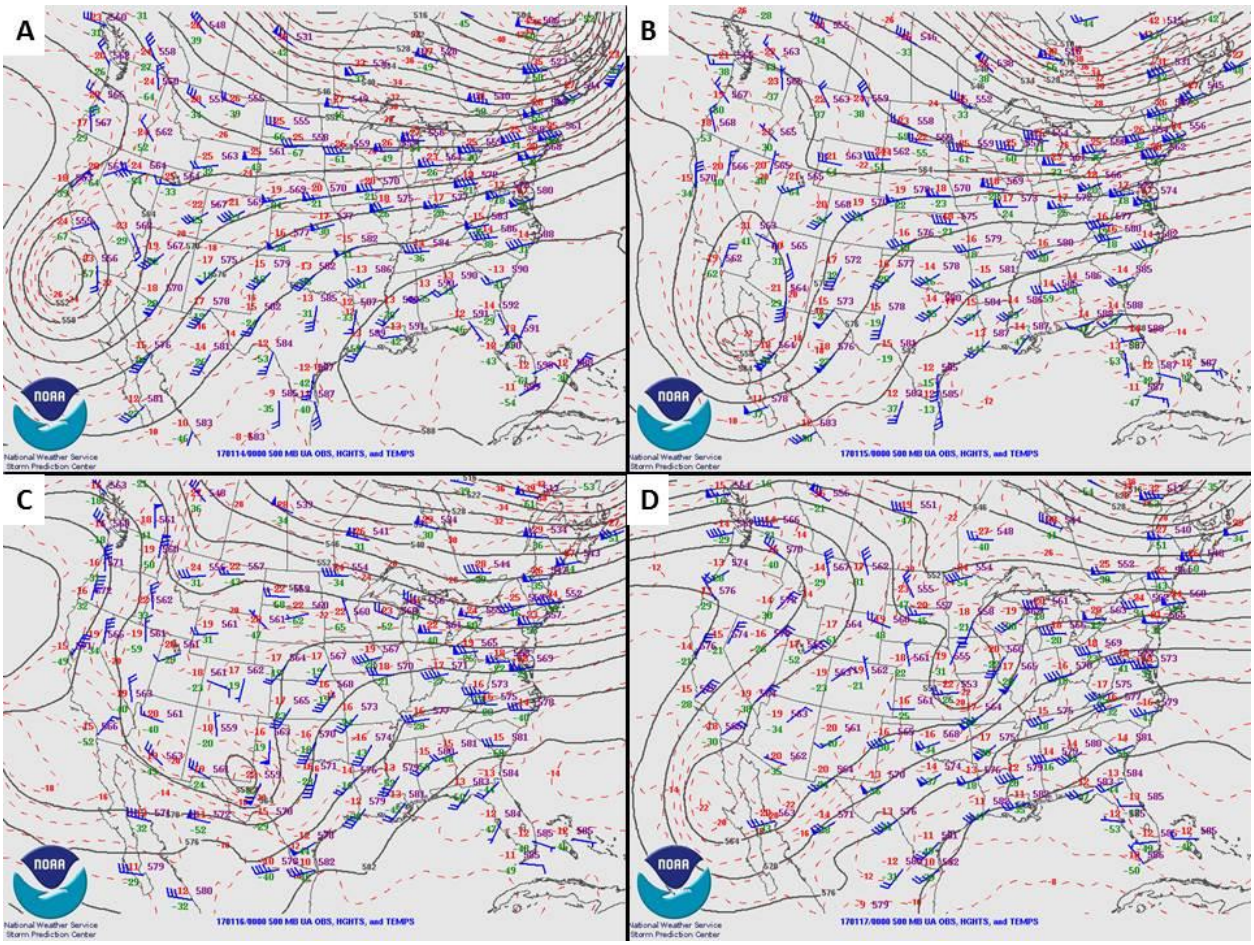

Fig. 2 –Objectively analyzed 500 hPa heights (dam), wind (kt), temperature (C) and dewpoint (C) in 24 hour time increments; valid 0000 UTC (A) 14 January, (B) 15 January, (C) 16 January, (D) 17 January. Images courtesy – Storm Prediction Center (http://www.spc.noaa.gov)