

## **Plains to Mid Atlantic Winter Storm**

**2-3 March, 2014**

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### **Meteorological Overview:**

Late on 1 March a broad northern stream upper trough stretched across the northern United States. Embedded within this trough, a shortwave trough moved across the upper Great Lakes region and southeastern Canada. A cold front extending from the Great Lakes to the southern Plains shifted further south and east, reaching the Northeast, Ohio valley and southern Plains early on 2 March. As an axis of strong low level frontogenesis (*Fig. 1a*) interacted with a pool of deeper moisture (*Fig. 1b*), light to moderate precipitation developed north of this surface front and spread across the lower Missouri and mid-Mississippi valleys.

While this leading area of precipitation shifted east, light precipitation developed back to the west across the central and southern high Plains as a southern stream shortwave moved across the central and southern Rockies. As the low level winds backed to the south ahead of this shortwave, moisture from the Gulf of Mexico helped to replenish the moisture north of the surface front. As the front continued to advance to the south and east across the central and eastern United States, a weak surface low developed along the front (*Fig. 2*). This further enhanced the warm air advection east of the low track, while promoting the cold air advection to its southwest. In response to the enhanced warm air advection, precipitation began to develop early to midday on 2 March across northeast Texas and eastern Oklahoma into Arkansas, southern Missouri and the lower Ohio valley. As this moisture interacted with an area of strong low level frontogenesis (*Fig. 3a*) and upper divergence along the right-entrance region of upper jet maxima (*Fig. 3b*), moderate to locally heavy precipitation developed across this area and moved eastward through the lower Ohio and Tennessee valleys, reaching the central Appalachians and Mid-Atlantic region late on 2 March into early 3 March.

Widespread total snow accumulations of 3 inches, with local amounts of up to 10 inches, were reported from southern Kansas and northern Oklahoma to the Delmarva Peninsula and southern New Jersey (*Fig. 4*). Along and to the south of the heavier snow accumulations, a wintry mix was reported. Sleet amounts as high as 4 to 6 inches were reported across portions of southern Missouri and Tennessee. Freezing rains, with accumulations of 0.25 inch or more, were reported across portions of Northeast Texas, the lower Ohio and Tennessee valleys and the southern Delmarva Peninsula.

### **Impacts:**

A commercial jet taxiing to a maintenance hangar slid off of a taxiway at Dallas-Fort Worth International Airport. Numerous power outages and traffic incidents were reported due to the storm. In Tennessee alone, more than 61,000 customers were reported without power by midday on 3 March. Motorists were stranded overnight along icy Arkansas interstates, with many running out of fuel. In Virginia more than 800 vehicle crashes were reported across the state, including one fatality southeast of Richmond. Many schools and government agencies were closed on 3 March, including the Federal government in the Washington, DC area. More than 2800 flights were cancelled, mostly involving flights arriving and departing from Washington, DC, Philadelphia and New York airports.

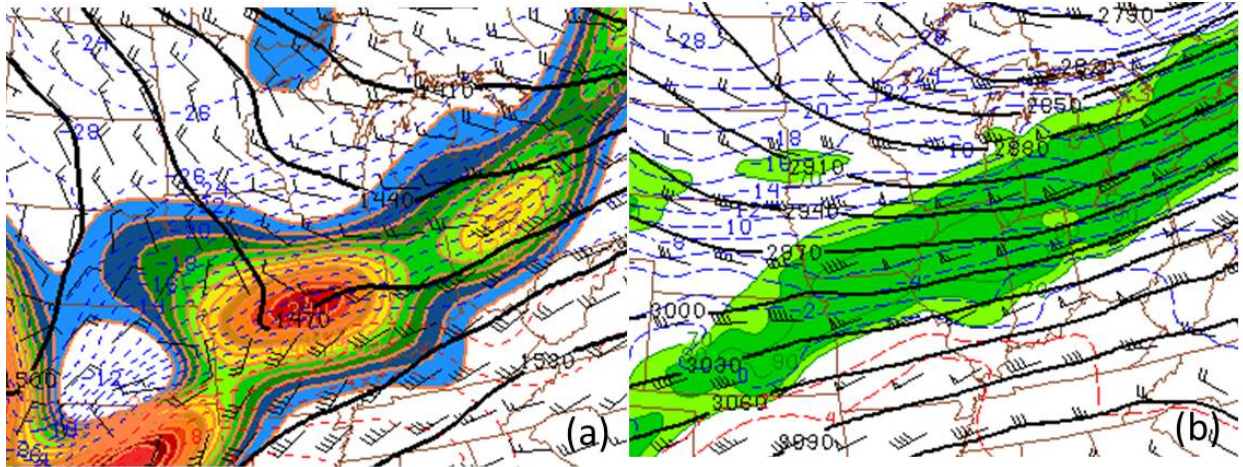


Fig 1: Upper air analyses for 6 UTC on 2 March 2014 (a) 850 hPa Petterssen frontogenesis (fill), height (black), temperature (blue) and wind; (b) 700 hPa height (black), temperature, wind and 700-500 hPa mean RH (fill) (SPC).

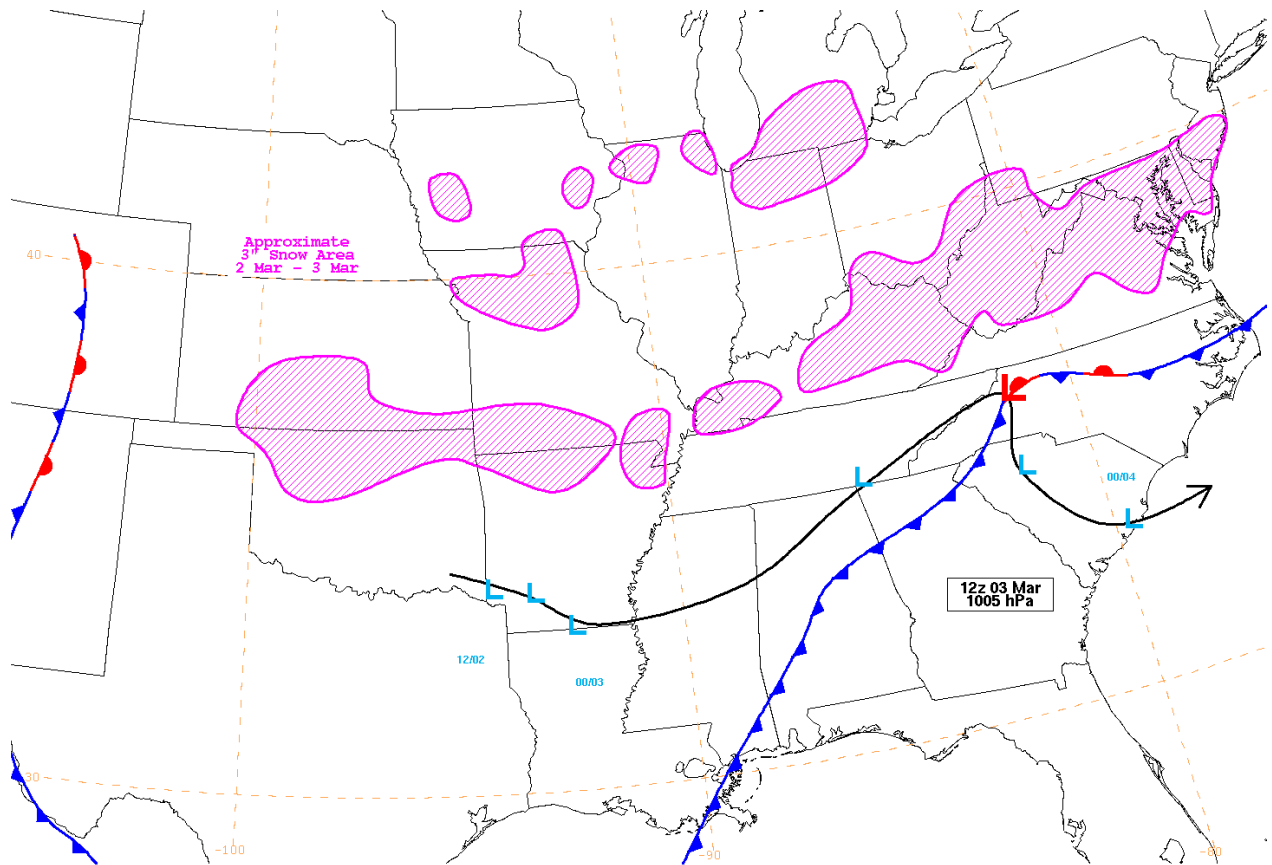


Fig 2: Surface low track (blue) and area of snow (magenta).

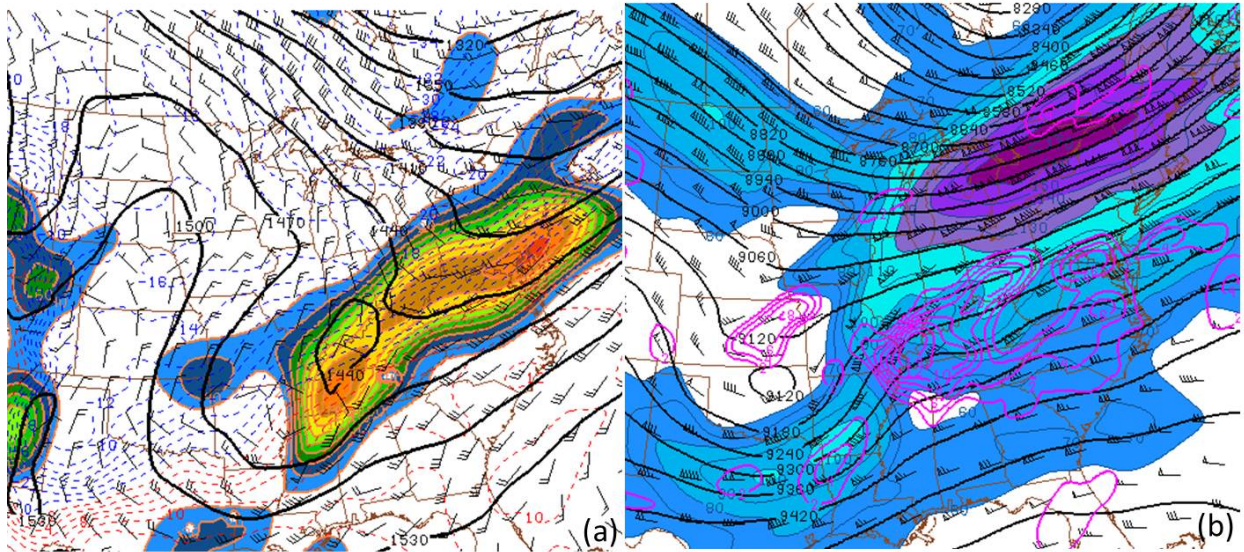


Fig 3: Upper air analyses for 6 UTC on 3 March 2014 (a) wind 850 hPa Petterssen frontogenesis (fill), height (black), temperature (blue) and wind ; (b) 300 height (black), divergence (magenta) and (SPC).

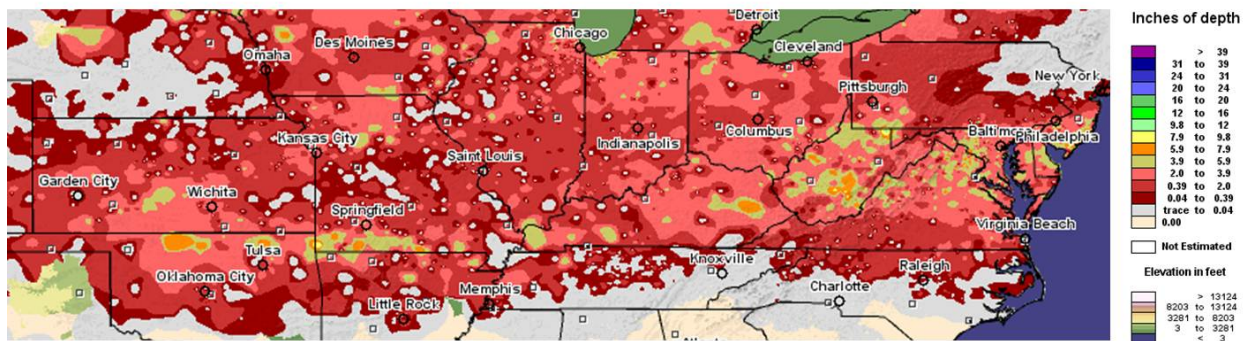


Fig 4: Total observed snowfall (interpolated) during 72h preceding 12 UTC on 4 March, 2014 (NOHRSC)