

## **Eastern U.S. Heavy Rain and Snow**

**November 28-29, 2011**

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**Meteorological Overview:** A slow-moving low pressure system brought widespread heavy rain from the interior section of the Southeast northward through the Ohio Valley. The storm also brought a rare November snowfall in the central Mississippi Valley. Prior to the event on Nov. 26, a north-south oriented cold front together with a high amplitude upper-level trough was pushing eastward across the Mississippi Valley (Fig. 1a). With a strong high pressure system anchored near the Carolina coast, the eastward progress of the front was rather slow. The front was associated with a wide swath of rain from the onset. As time progressed, energy became more consolidated near the base of the upper-level trough as cyclogenesis commenced in the evening of Nov. 27, 2011 over the southeastern U.S (Fig. 1b). At this stage, the swath of rain remained rather wide and became increasingly post-frontal. The cyclone quickly became occluded as the upper-level cut-off low deepened, while moving generally northward into the Tennessee Valley during the day on Nov. 28 (Fig. 1c). By early on Nov. 29, the core of the cold air associated with the upper-level low began changing the rain to snow in central Mississippi Valley on the back side of the surface cyclone. After the snow had tapered off and ended in the morning of Nov. 29, a few inches of snow had accumulated in parts of northeastern Arkansas and southeastern Missouri (Fig. 2), with the highest amount of 8 inches reported at Paragould, Arkansas. After delivering a rare snowfall in the central Mississippi Valley, the storm continued to head north into the Ohio Valley on Nov. 29. Meanwhile, rain associated with the cold front accelerated across the Appalachians and the mid-Atlantic States (Fig. 1d). The more rapid progression of the front kept the rainfall amount relatively low along the Eastern Seaboard. The highest rainfall amounts were observed farther to the west in eastern Tennessee and southern Appalachians (Fig. 3) where more than 5 inches of rain fell.

As the occluded cyclone continued moving northward, colder air filtering in from the northwest during the afternoon of Nov. 29 caused the rain across Lower Michigan and northern Indiana to change over to snow. In addition, a mesoscale band of snow organized on the back side of the cyclone during the night on Nov. 29 (Fig. 1d), bringing a brief period of heavy snow from across northern Indiana into the central portion of Lower Michigan where over six inches of snow were reported (Fig. 2). The highest reported amounts were around 10 inches near Peru, Indiana and Lansing, Michigan.

**Impacts:** This storm delivered a rare November snowfall to the central Mississippi Valley. Schools in southern Tennessee were closed on Nov. 29. Farther to the south and east, heavy rain prompted flood warnings. In northern Indiana and Lower Michigan, the snow caused traffic accidents, power outages, and the collapse of a gas station awning. The combination of snow and antecedent heavy rain also caused rivers to rise in northern Indiana. There were no known casualties and injuries directly related to the storm.

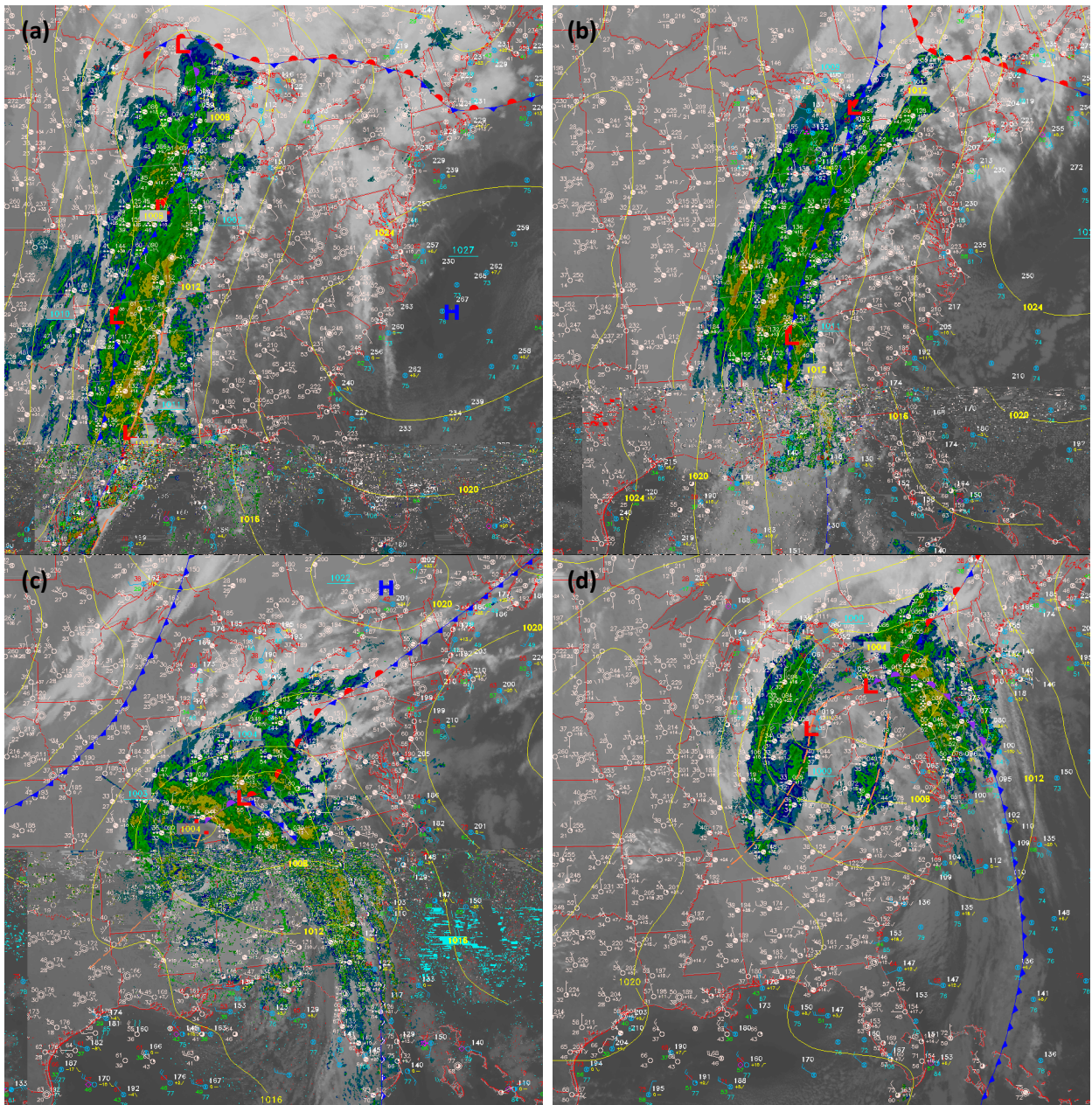


Fig. 1 HPC surface analyses overlaid on GOES infrared images and national radar composites at (a) 00Z Nov. 27, (b) 00Z Nov. 28, (c) 00Z Nov. 29, and (d) 00Z Nov. 30, 2011.

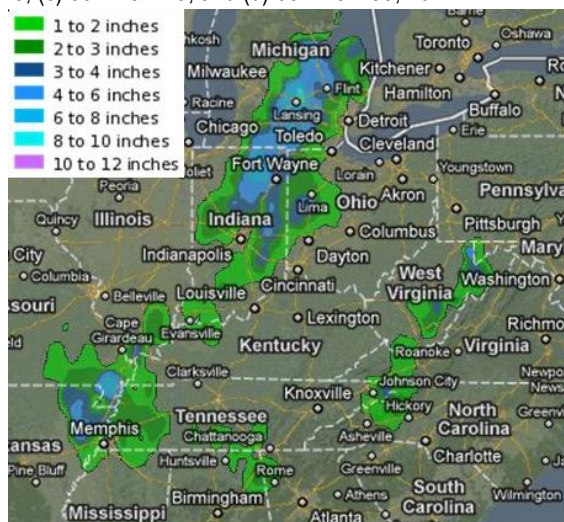


Fig. 2 Total observed snowfall accumulations associated with the storm.

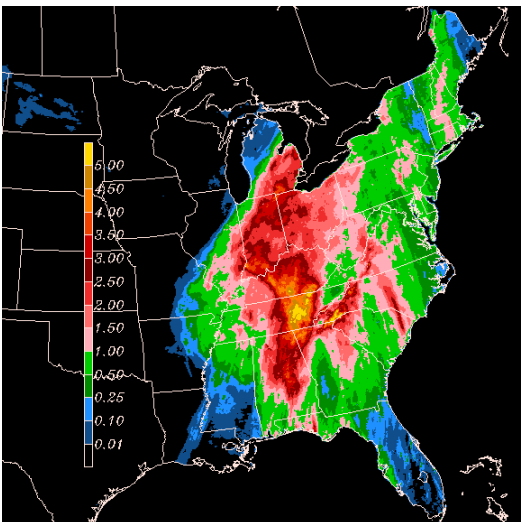


Fig. 3 Total observed rainfall (inches) associated with the storm (stage IV data).