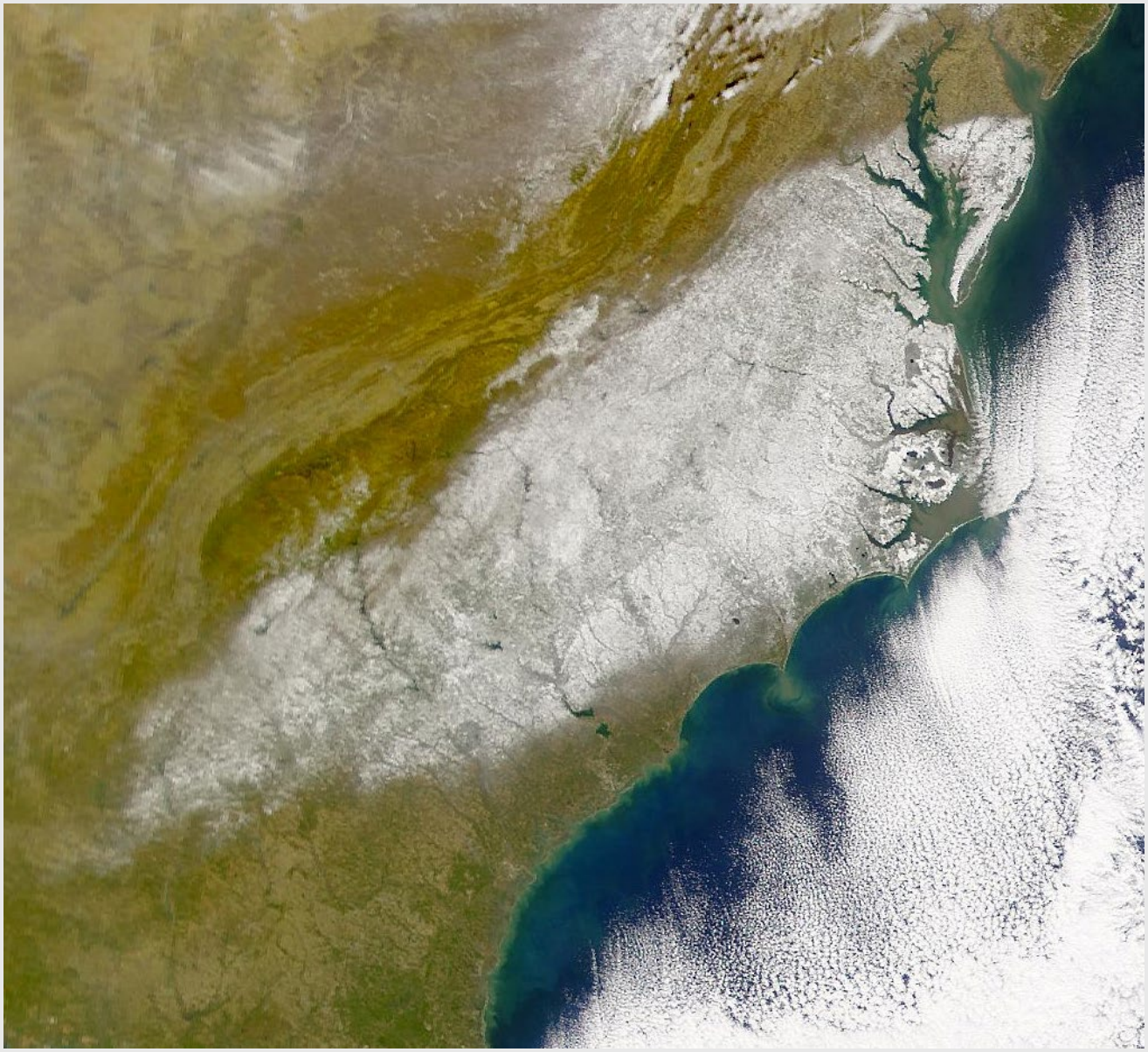
State Climatology Office

Open File Report

The Snow and Ice Event of January 2-3, 2002



A visible satellite image from the SeaWiFS satellite from January 4, 2002, showing snow and ice cover left behind over an area from Georgia to New Jersey by the winter storm of January 2-3, 2002.

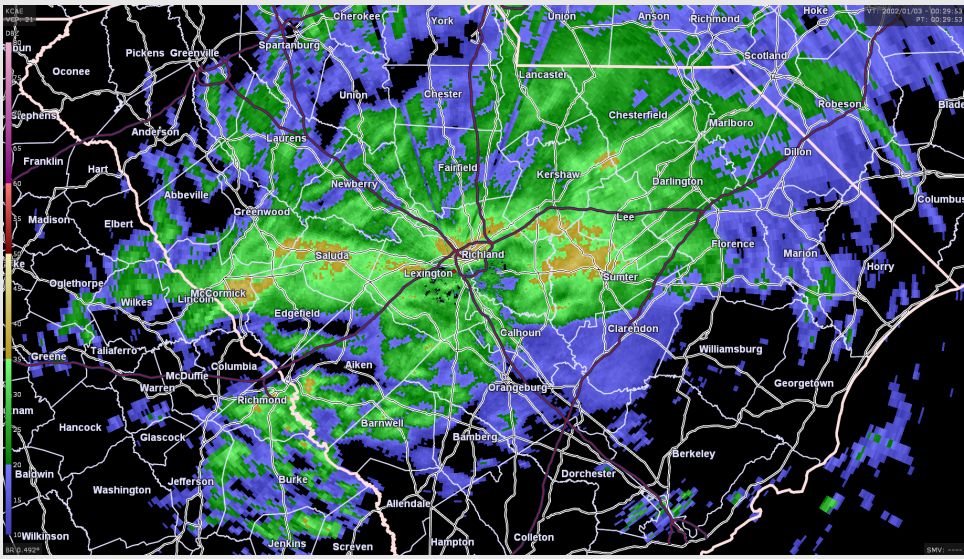
Original report issued in February 2002

Updated and graphics added by Frank Strait on January 12, 2023

Meteorological Synopsis

The winter storm of January 2-3, 2002, brought widespread snow and ice accumulations to South Carolina. Only the southernmost part of the state saw no significant snow and ice. Precipitation began in the state during the afternoon of January 2 and ended during the evening of January 3. Mostly or all snow fell along and north of I-20. The heaviest snow in the state was found in a band across the southern Upstate, northern Midlands, Catawba River Area, and northern Pee Dee regions, with a highest reported snowfall of nine inches near Kershaw in Lancaster County. The National Weather Service received unofficial reports of over ten inches in northern Chesterfield County. Ice accretions of up to 0.75 inches also occurred with the thickest ice in Horry and Georgetown Counties.

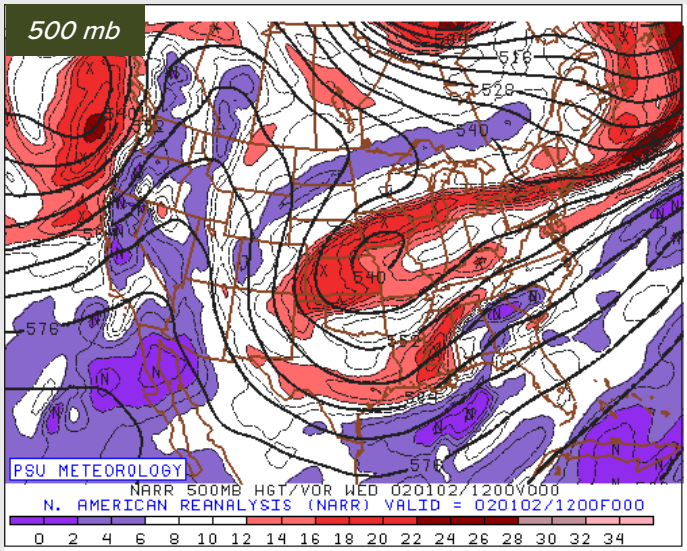
An arctic air mass covered most of the eastern two-thirds of the nation during the storm. Surface high pressure would remain centered over the Plains states through the event, resulting in northerly to northeasterly low-level flow in the atmosphere as the storm tracked through the Southeastern United States, producing a continuous feed of cold air into the storm.

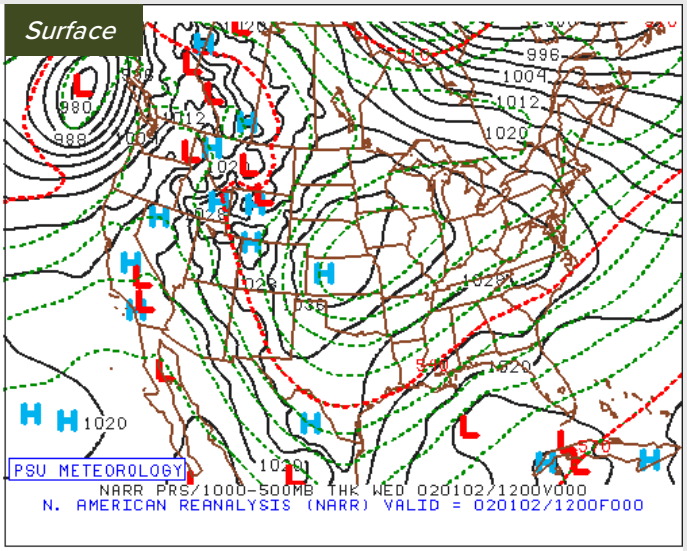


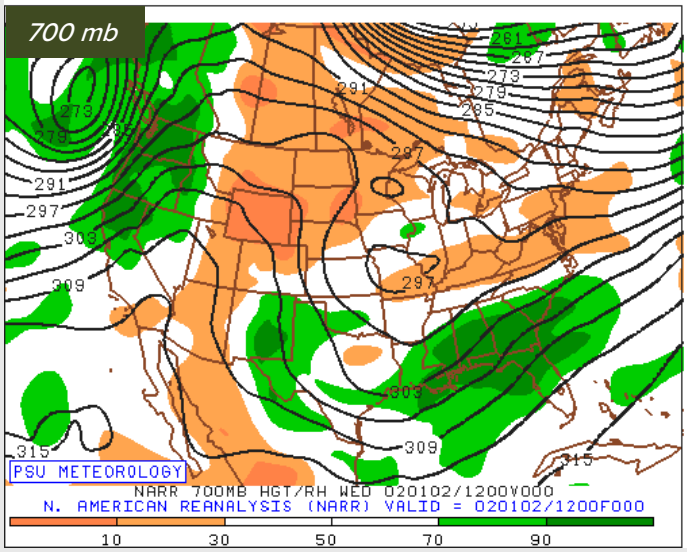
Weather radar reflectivity from Columbia, SC from 9:00 p.m. EST on January 2, 2002, showed a band of heavy precipitation across the Midlands and Central Savannah River Area.

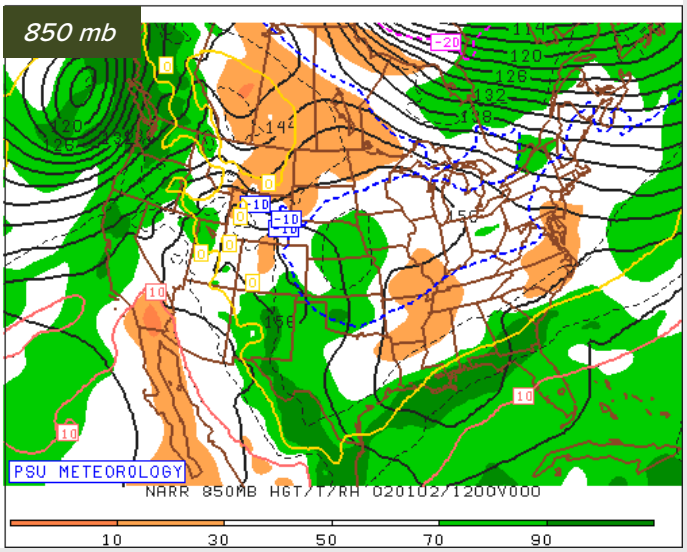
The surface low which brought the winter storm to South Carolina followed a classic Miller A storm track, forming in the northwestern Gulf of Mexico and tracking to northern Florida, then off the United States East Coast. What was unusual was for the storm to follow a path offshore of the Middle Atlantic region and New England; a track along the East Coast into Atlantic Canada is more typical during the negative phase of the North Atlantic Oscillation, particularly with the Pacific-North American pattern in a positive phase. See the Appendix section for more on the state of teleconnections during this storm.

Meteorological Synopsis







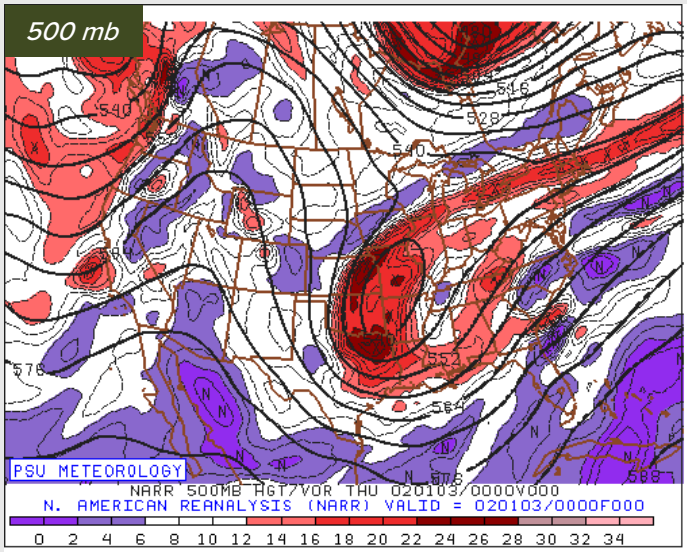


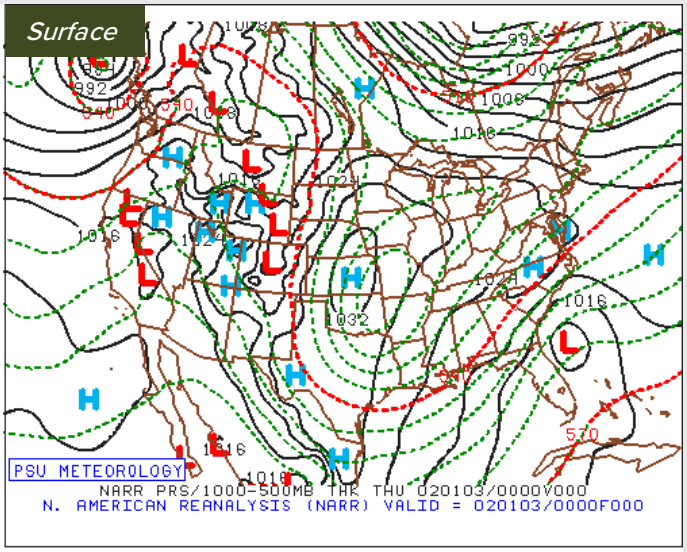
1200 UTC January 2, 2002 (7 a.m. January 2 EST):

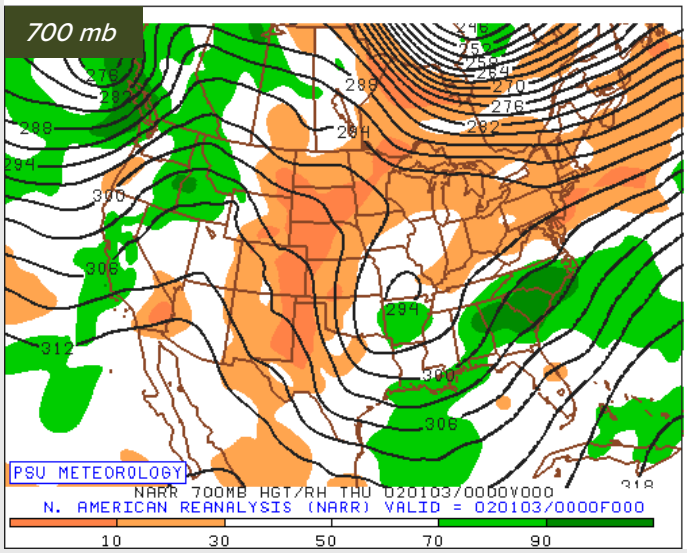
- The southern stream 500-millibar feature was tracking over the lower Mississippi Valley while the northern stream feature had moved to the central Plains region and Missouri; the two features were beginning to phase together.
- Surface low pressure was crossing the north-central Gulf of Mexico.
- At 700 and 850 millibars, moisture was spreading over South Carolina ahead of the approaching storm system. Temperatures remained below freezing at 850 millibars.

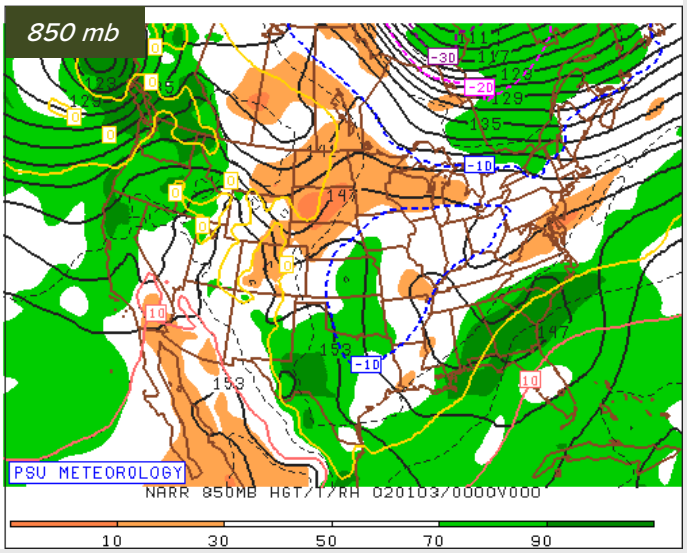
NARR imagery from the Penn State University eWall website

Meteorological Synopsis







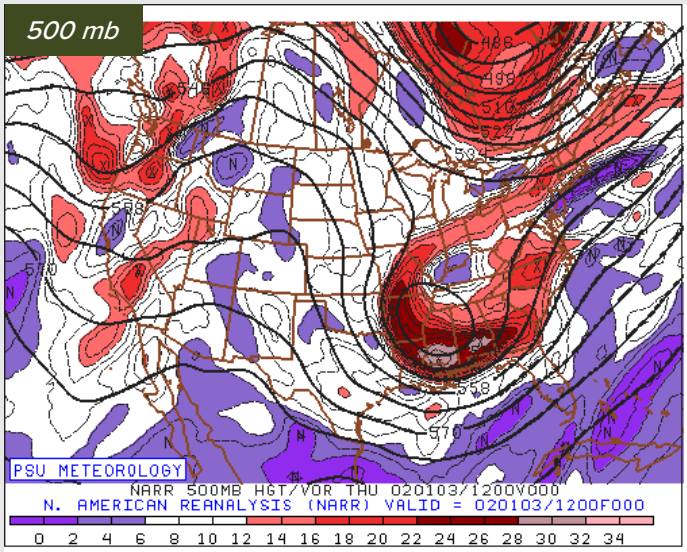


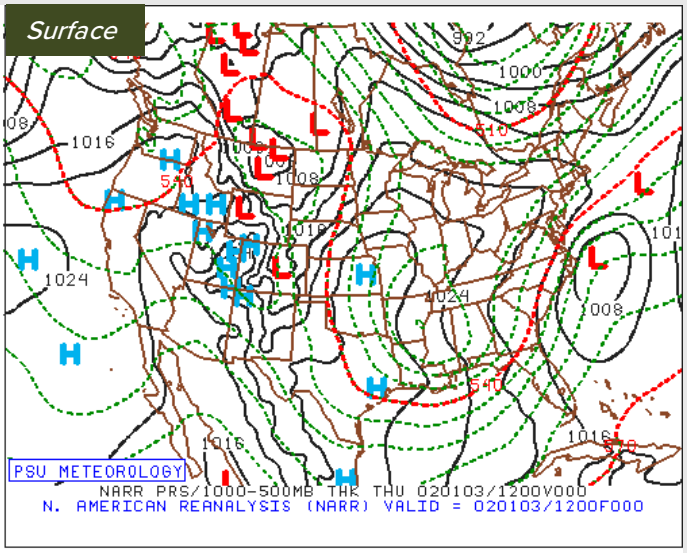
0000 UTC January 3, 2002 (7 p.m. January 2 EST):

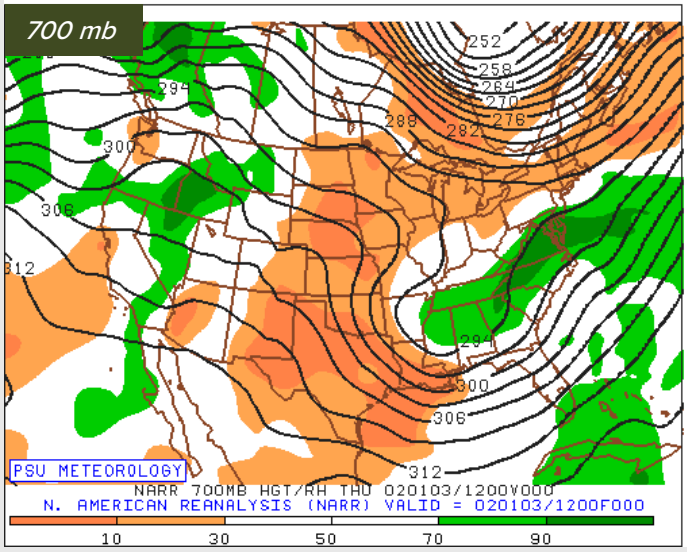
- The 500-millibar features were still phasing together over the southeastern part of the U. S.
- Surface low pressure centered east of Jacksonville, Florida, was strengthening while moving north-northeastward.
- At 850 and 700 millibars, moisture was plentiful over South Carolina as snow, sleet, or freezing rain fell over a large part of the state.

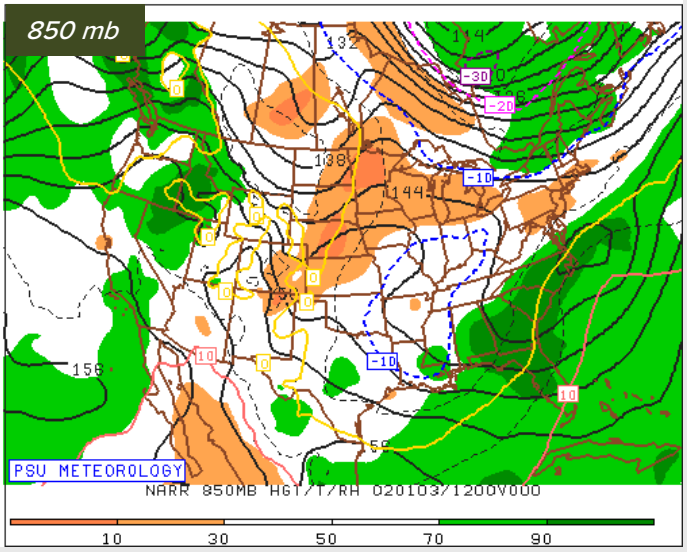
NARR imagery from the Penn State University eWall website

Meteorological Synopsis







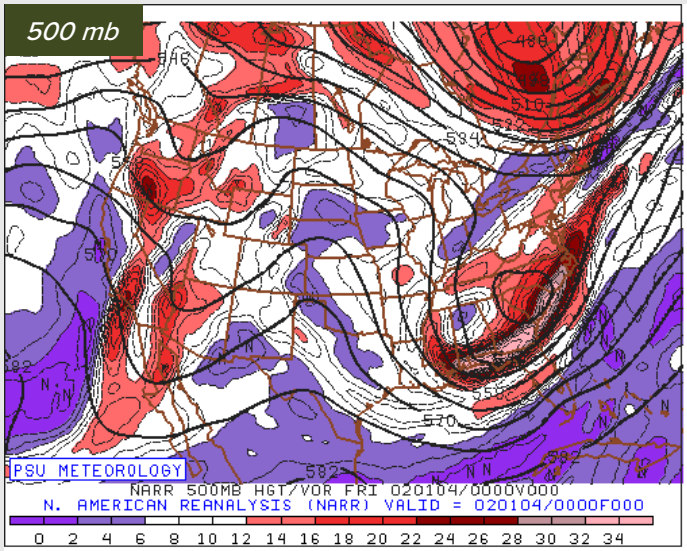


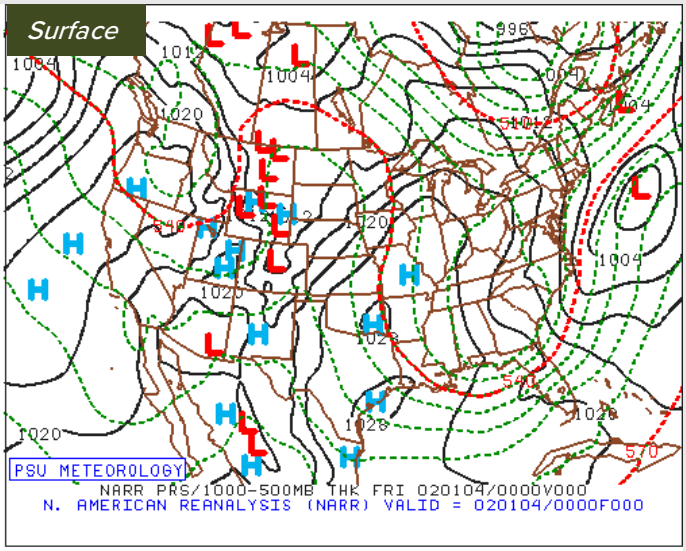
1200 UTC January 3, 2002 (7 a.m. January 3 EST):

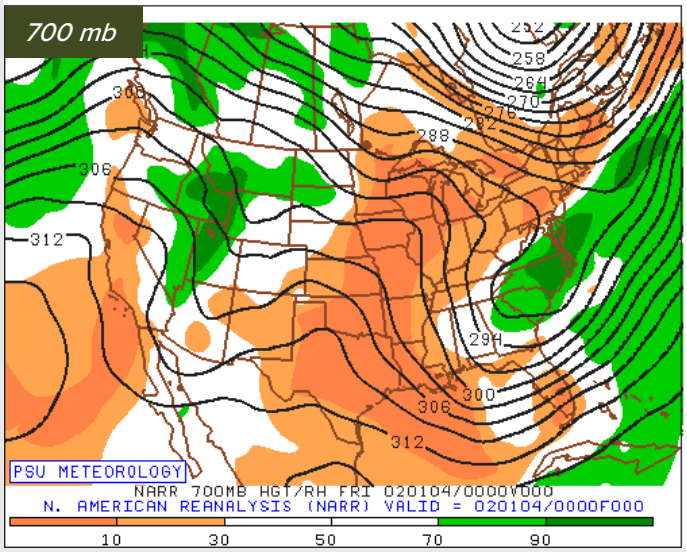
- At 500 millibars, the combined shortwave was pushing eastward through the lower Mississippi Valley.
- Surface low pressure centered east of North Carolina's Outer Banks was pulling away from the region.
- At 850 millibars and at 700 millibars, moisture was lingering over South Carolina, causing light to moderate precipitation to fall, mostly in the form of snow.

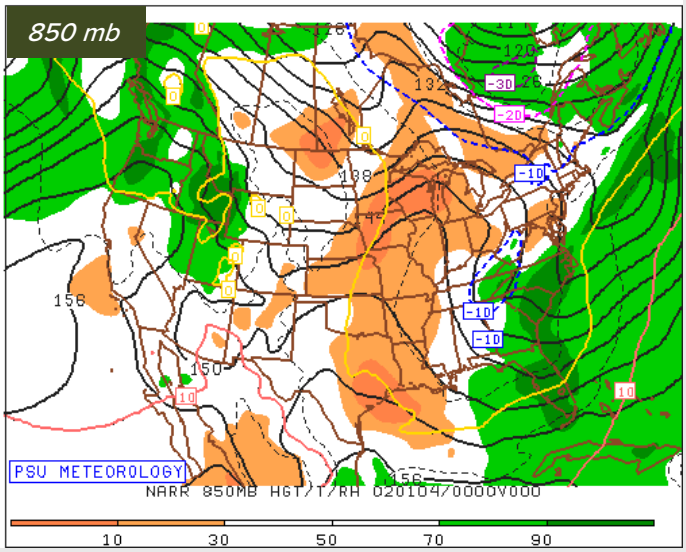
NARR imagery from the Penn State University eWall website

Meteorological Synopsis







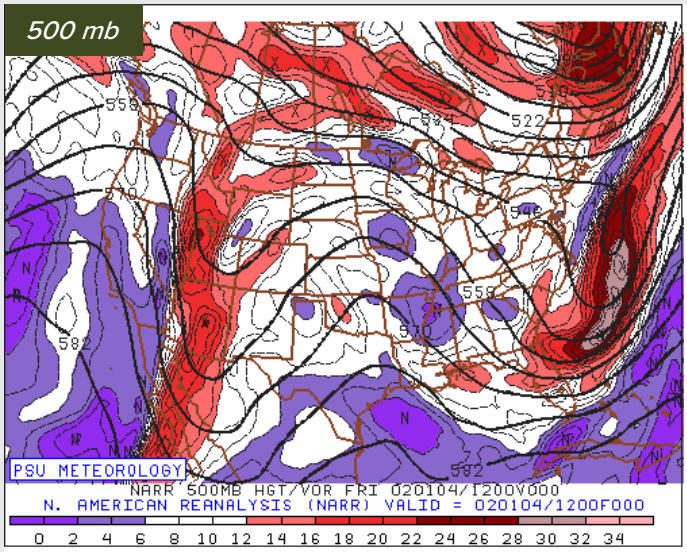


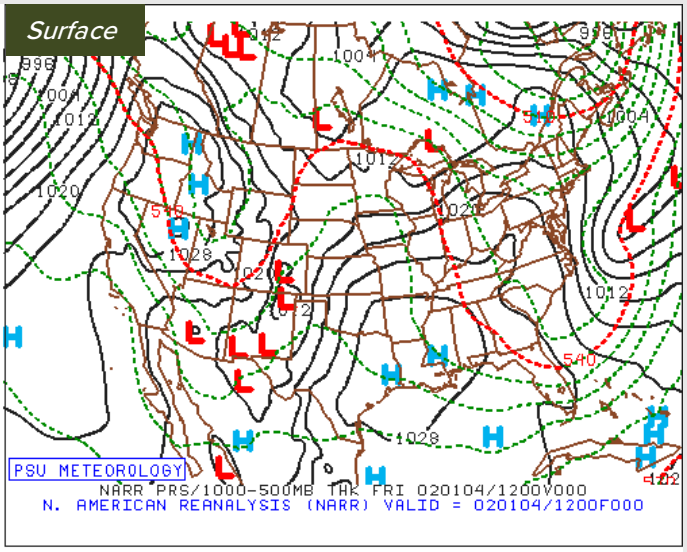
0000 UTC January 4, 2002 (7 p.m. January 3 EST):

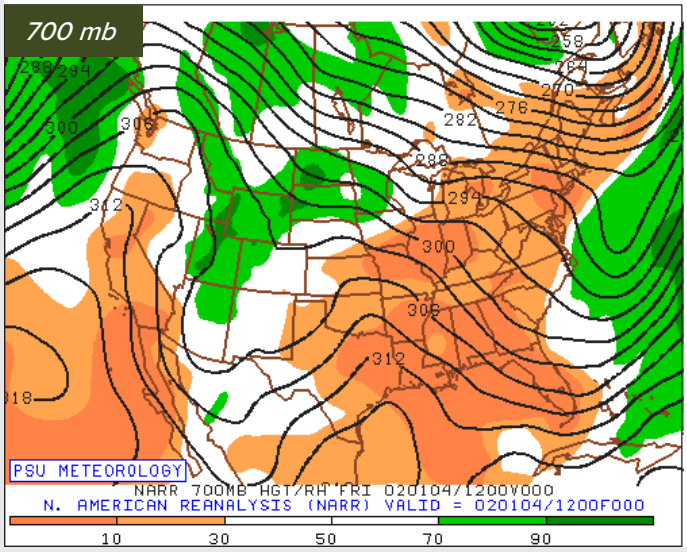
- At 500 millibars, the shortwave feature was moving eastward over the Carolinas and Georgia.
- The surface storm center had moved far away from South Carolina, centered east of the Delmarva Peninsula by this time.
- At 850 and 700 millibars, lingering moisture resulted in additional light snow in the frigid air mass over the state, with 850 millibar temperatures as low as -10°C.

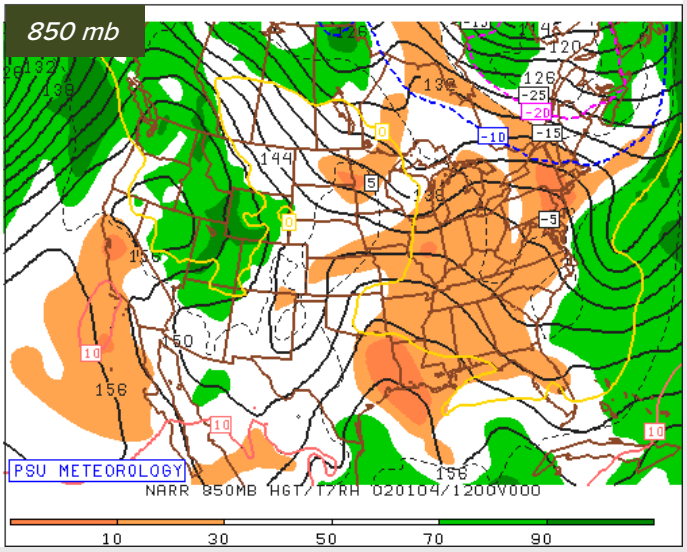
NARR imagery from the Penn State University eWall website

Meteorological Synopsis









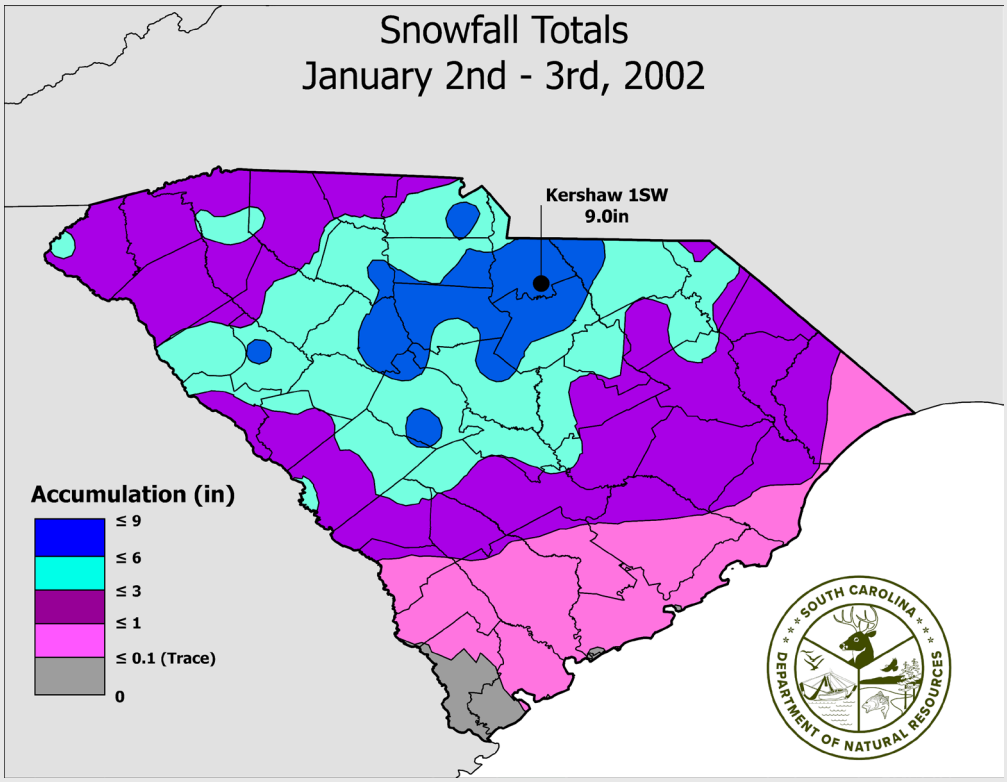
1200 UTC January 4, 2002 (7 a.m. January 4 EST):

- At 500 millibars, the shortwave had moved off the East Coast.
- The surface storm center was over the Atlantic, far away from South Carolina.
- At 700 and 850 millibars, dry air was covering South Carolina, and the storm had ended. The air mass was very cold, indicated by temperatures well below freezing at 850 millibars.

NARR imagery from the Penn State University eWall website

Meteorological Synopsis

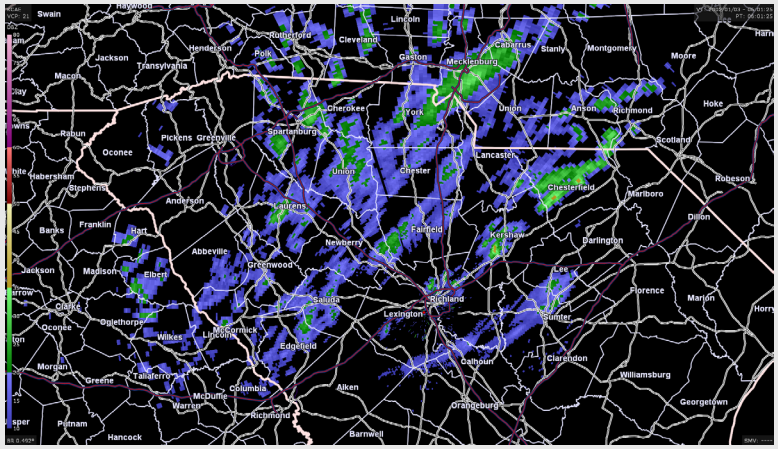
Snowfall Accumulations Reported January 2-3, 2002			
Station	Snowfall	Station	Snowfall
Kershaw 1 SW	9.0	Long Creek	4.0
Little Mountain	8.9	Wedgefield	3.5
Pageland	8.5	Laurens	3.5
Great Falls	8.0	Florence 8NE	3.5
Sandhill Research – Elgin	7.5	Cheraw	3.5
Winthrop University	7.5	Rimini 2SSW	3.5
Pelion 0.8 NW	7.3	Hunts Bridge	3.3
Batesburg	7.0	Batesburg	3.0
Blair 1 NE	7.0	Caesars Head	3.0
Greenwood	7.0	Gaffney 6E	3.0
Santuc	6.6	Spartanburg 3SSE	3.0
Parr	6.0	Pickens	3.0
Calhoun Falls	6.0	Clemson University	3.0
Chester 1 SE	5.5	Greenville	2.7
McColl 3 NNW	5.0	Manning	2.5
Catawba	5.0	Hartsville	2.5
Chappells 2 NNW	5.0	Ware Shoals 2	2.0
Cedar Creek 2E	4.5	Anderson	1.5
Chesterfield 3E	4.5	Myrtle Beach	1.0
Greenville-Spartanburg Int'l Airport	4.1	Ridgeville	1.0
Union 8S	4.0	Beaufort MCAS	Trace
Columbia - USC	4.0	Charleston International Airport	Trace



Effects on South Carolina

In addition to the heavy snowfall, significant ice accretions were reported along South Carolina's Coastal Plain, Central Savannah River Area (CSRA) and Midlands. In the Lowcountry, precipitation began as a mix of snow and sleet, quickly turning to freezing rain in the inland areas, with rain falling along the coast and over most of Jasper and Beaufort Counties. Ice accretions were generally 0.25-0.50 inches over Allendale, Dorchester, Berkeley and Hampton Counties, along with inland Dorchester County. As a result, power outages numbered in the thousands, and there were numerous traffic accidents in this area.

Ice accretions occurred in parts of the Pee Dee Region as well. More of the precipitation falling as snow and sleet led to less ice accretion, generally 0.10 to 0.25 inches, but this was enough to cause hazardous road conditions. Significant tree and power line damage occurred in parts of Horry and Georgetown Counties, causing widespread power outages. Businesses and schools were closed on January 3 and 4, along with the closure of state and county government offices. Travel was slow and treacherous across the state, with over 1,500 wrecks reported due to the event. Two deaths were reported in South Carolina from these incidents.

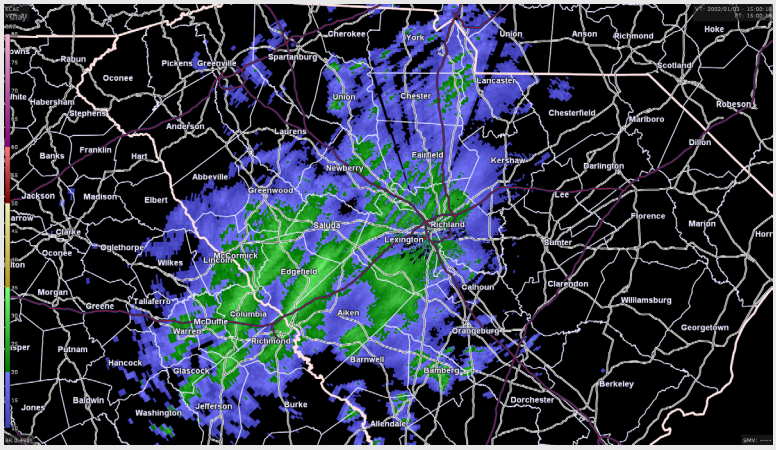


Weather radar reflectivity from Columbia, SC from 1:00 a.m. EST on January 3, 2002, showed areas of light to moderate precipitation across the eastern Upstate, Midlands and CSRA.

In the Midlands and CSRA, precipitation was heavy at times. The heaviest snow from the event fell across the northern part of these regions, while a significant ice storm affected the southern parts of these regions. Ice accumulations ranged from around 0.10 inches in Lee and Sumter Counties, where freezing rain was mixed with snow, to about 0.75 inches in Barnwell, Bamberg, and Clarendon Counties, where primarily freezing rain fell. The severe icing in the southern Midlands and CSRA led to hazardous travel and widespread tree and power line damage.

Effects on South Carolina

Along with the snowfall and ice accretions, extreme cold occurred in the wake of the event of January 5, 2002. The coldest low temperature reported was 4°F at cooperative observer site Cedar Creek 2E in Richland County. A few other locations in Spartanburg, Laurens, Cherokee, and Chester Counties reported single-digit low temperatures on January 4 and 5. Temperatures fell to the teens as far south as Walterboro in Colleton County. Strong winds compounded the cold over the Pee Dee Region. Winds gusted to around 40 mph along the Grand Strand, along with gusts of 45 mph measured at Florence Regional Airport and 51 mph at Darlington County Airport. The extreme cold led to one death from hypothermia reported on January 5 on Nance Street in Myrtle Beach.



Weather radar reflectivity from Columbia, SC from 10:00 a.m. EST on January 3, 2002, showed an area of light to moderate precipitation across the Catawba River Area, Midlands and CSRA.

On January 2, 2002, Governor Jim Hodges issued an executive order declaring a State of Emergency, activating the South Carolina Emergency Operations. The order activated the South Carolina National Guard to assist with recovery efforts from the storm. The order also directed the South Carolina Emergency Preparedness Division to manage the state's response to the storm. The State of Emergency ended on January 4, 2002.

For additional information

National Weather Service products issued during the storm and observations from civilian and military airports during the storm can be found at the Iowa State University's Iowa Environmental Mesonet website.

Petrolito, A. W. (2005, September). *The 2–3 January 2002 Winter Storm Across Central South Carolina and East Central Georgia: A Precipitation Type Case Study*. NOAA/National Weather Service. *https://www.weather.gov/media/erh/ta2005-02.pdf*

South Carolina Winter Weather Database: Winter Storm of January 2–3, 2002. (2021, November 1). The South Carolina Winter Weather Database. *https://scdnr.maps.arcgis.com/apps/opsdashboard/index.html#/617c9914b64f4ef1937e39f2c1c52a40?p1=144&event=144*

NASA. (n.d.). Snow storm blankets southeastern U.S. NASA. Retrieved July 7, 2022, from https://earthobservatory.nasa.gov/images/2080/snow-storm-blankets-southeastern-us

National Centers for Environmental Information (NCEI). (n.d.). Storm Data Publication. Retrieved July 12, 2022, from https://www.ncei.noaa.gov/pub/orders/IPS/IPS-49E9628B-88EF-4AF9-85E6-C4F69476C1C4.pdf

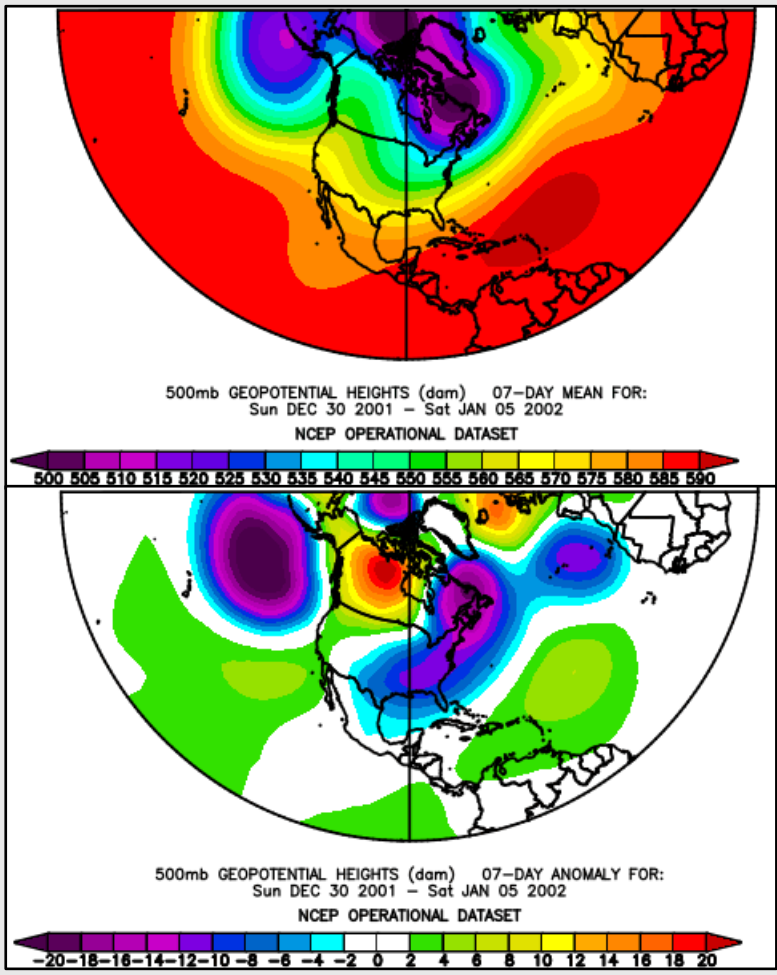
South Carolina State Library. (n.d.). South Carolina State Documents Repository. Executive Orders By Issue Date. Retrieved July 12, 2022, from https://dc.statelibrary.sc.gov/handle/10827/22/browse

Appendix: Teleconnection States

The upper-level weather pattern around New Year's Day of 2002 was nearly ideal for a winter storm to occur in South Carolina. An upper-level trough was over the eastern two-thirds of the nation, indicative of a negative North Atlantic Oscillation (NAO). The Pacific-North American Pattern (PNA) was strongly in a positive phase, indicated by an upper ridge over the western United States and a trough over the southeastern United States. The East Pacific Oscillation (EPO) was in its negative phase, as was the West Pacific Oscillation (WPO), both favorable for winter storms in South Carolina by driving air from the North Pole into the United States. The Arctic Oscillation (AO) was neutral to weakly negative at the time, which would indicate a slight tendency for polar air to intrude into the midlatitudes in North America.

The Madden-Julian Oscillation, which was weakly pushing from Phase 8 to Phase 1, also favored colder and stormier than average weather in South Carolina. El Niño-Southern Oscillation was in a neutral phase at the time, neither favorable nor unfavorable for a winter storm in South Carolina.

500-millibar mean heights (top) and mean height anomaly (bottom) for December 30, 2001, to January 5, 2004.



- Positive height anomalies near the North Pole outweigh negative areas, indicating a slightly negative AO.
- 500 millibar ridging and positive anomalies over and near Alaska indicate a negative EPO.
- An upper ridge over western North America and positive anomalies over western Canada indicate a positive PNA. Negative anomalies over the Southeastern U. S. also indicate a positive PNA.
- An upper ridge near and east of Greenland and positive height anomalies in that area, along with negative anomalies directly south, indicate a negative NAO.