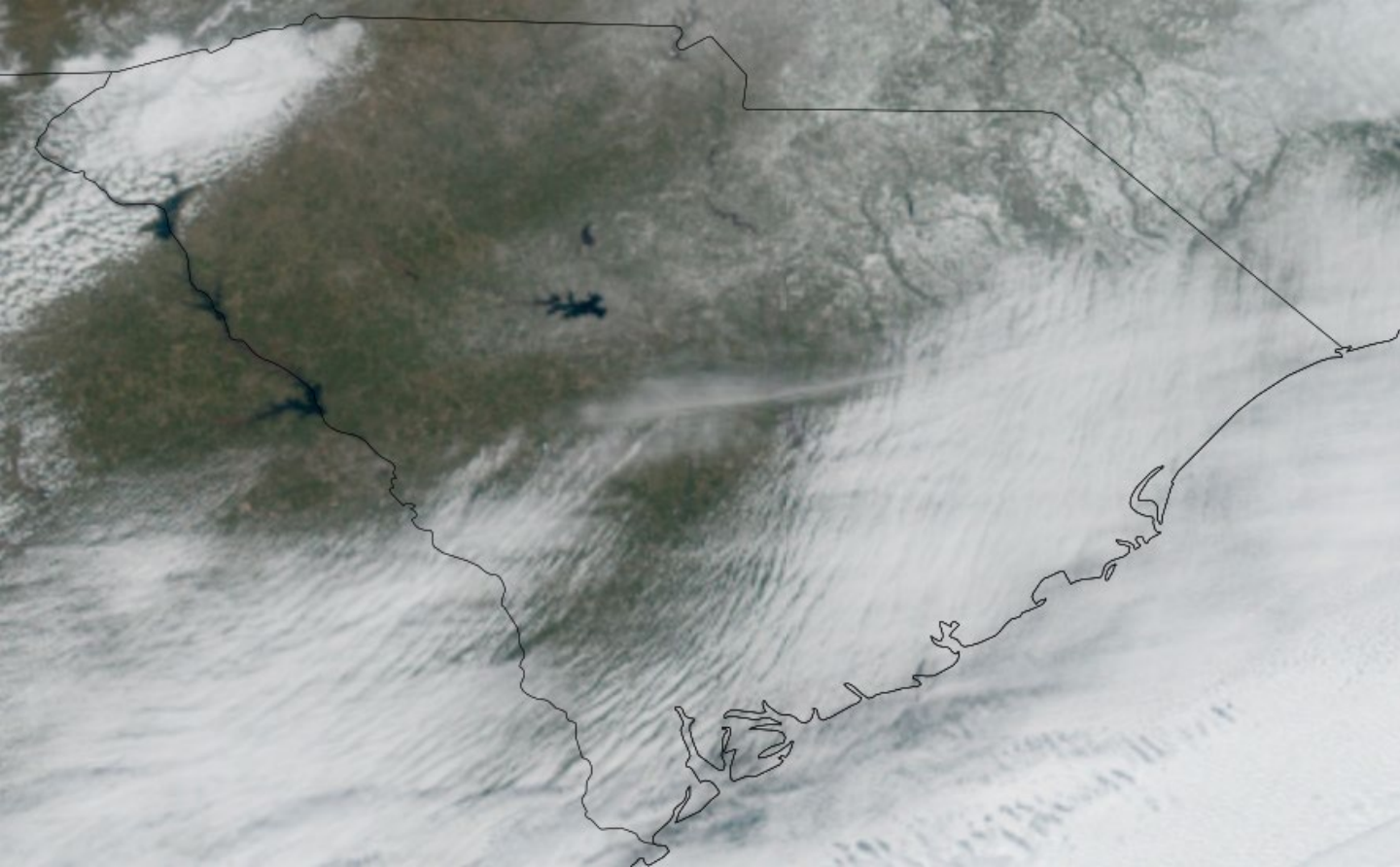




# Open File Report: Winter Storm of January 21, 2022





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This report serves as a preliminary dissemination of information on the impacts of the January 16, 2022, winter storm on the state of South Carolina.

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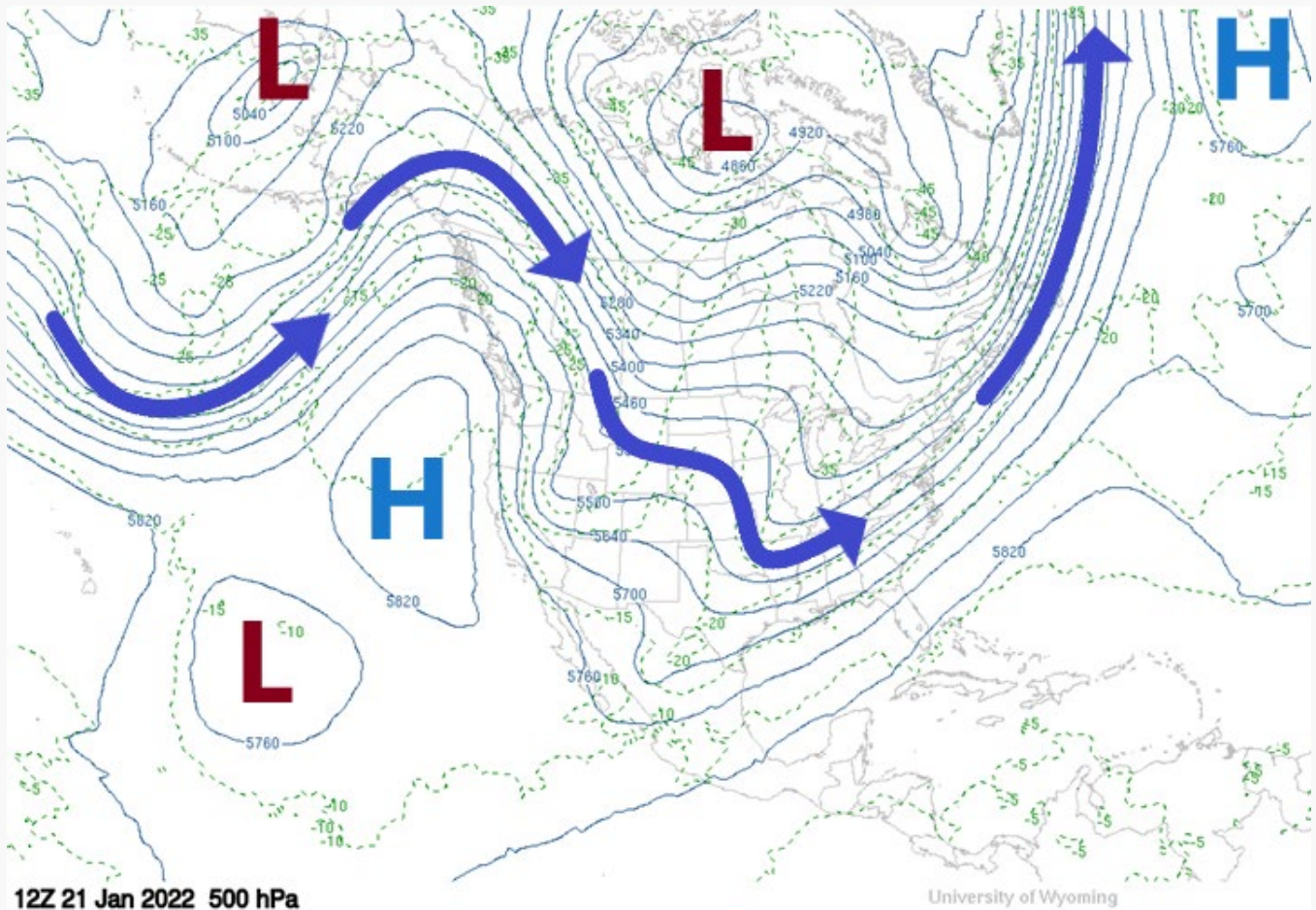
Cover Picture Credits:

Top: A true-color visible satellite picture from the GOES-East satellite from January 22, 2022, at 12:56 p.m. EST, showing snow cover from the previous day’s storm covering much of the Midlands and eastern Upstate regions, as well as the northern Pee Dee. Lingering clouds covered most of the rest of the Coastal Plain and the northwestern part of the Upstate.

Bottom: SCDOT photos showing their crews operating during the January 21 winter storm. On the left is a SCDOT truck spreading brine on S. C. Highway 905 in Conway. On the right is a SCDOT spreading brine on I-20 in Kershaw County.



The January 21, 2022, winter storm in South Carolina was the second in a series of winter weather events across South Carolina. The weather pattern across North America shifted from one favoring the warmth that occurred across the state during late 2021 to a colder one early in January 2022. The new weather pattern, characterized by an upper-level trough over the eastern part of the continent and an upper-level ridge over the west, lasted through the rest of January, resulting in more active and stormier weather in South Carolina.



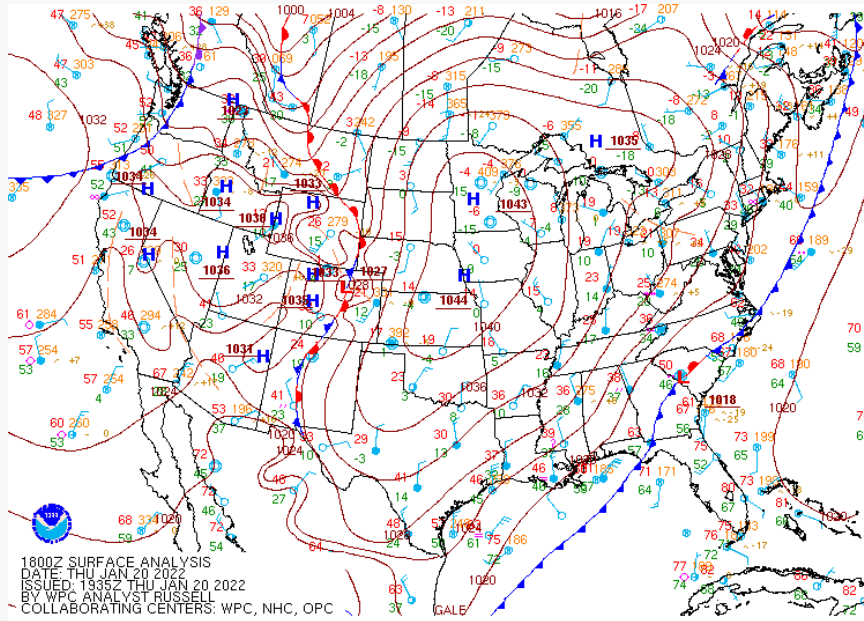
*A 500-hPa (500-millibar) upper air chart from 1200 UTC (7 a.m. EST) on January 21, 2022, annotated with high and low height centers along with arrows depicting the wind in the main jet at this level (typically around 18,500 feet over South Carolina).*

The cold and stormy weather pattern, the result of the negative phase of the Pacific-North American Pattern, was forecast by most available guidance to continue into early February. As a result, even before the first storm in this series affected South Carolina on January 16, forecasters were concerned about additional winter storms having an impact on South Carolina over the following few weeks.

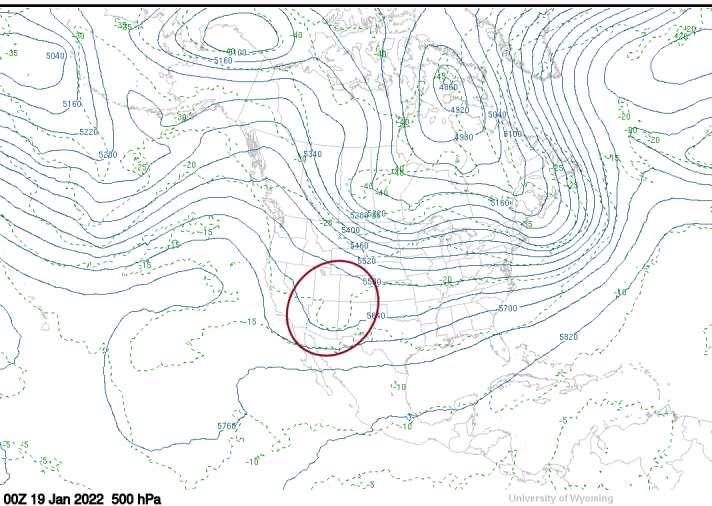


The stage was set for this storm by a cold front which moved through South Carolina on January 20. The front led an arctic air mass southeastward through the central and eastern United States. The front's precipitation fell in the form of rain on January 20. The front then became stationary off the southeastern U. S. coastline that night.

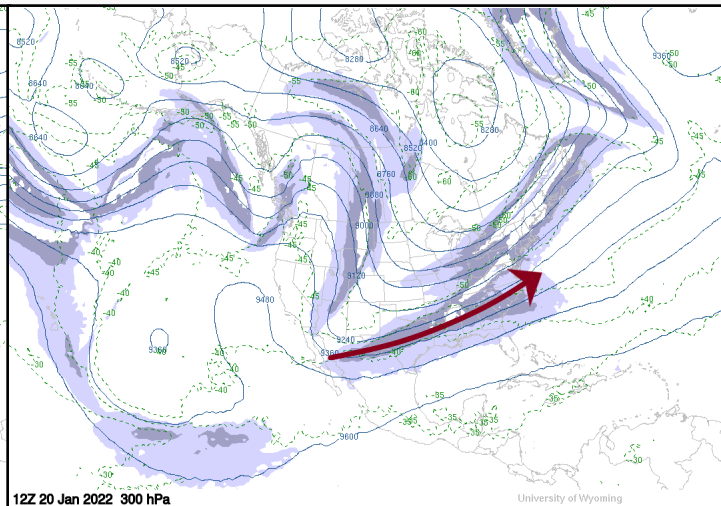
Meanwhile, an upper-level low which had been slowly wandering eastward through the eastern Pacific and southwestern U. S. became embedded in a subtropical jet over Mexico and the southeastern U. S., which then carried the feature toward South Carolina.



*Surface analysis from the Weather Prediction Center (WPC) for 1800 UTC on January 20, 2022, showing a cold front crossing South Carolina.*



*500-hPa (millibar) analysis for 0000 UTC on January 19, 2022 (7 p.m. January 18 EST) with the shortwave trough which triggered South Carolina's January 21 winter storm highlighted.*

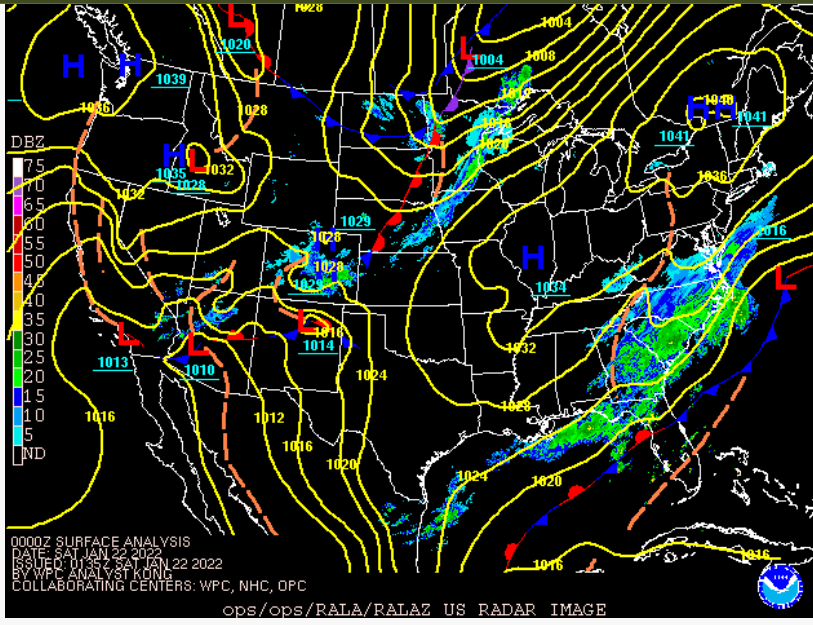


*300 hPa (millibar) analysis for 1200 UTC (7 a.m. EST) on January 20, 2022, with the subtropical jet streak which carried the shortwave trough across the southeastern states highlighted.*

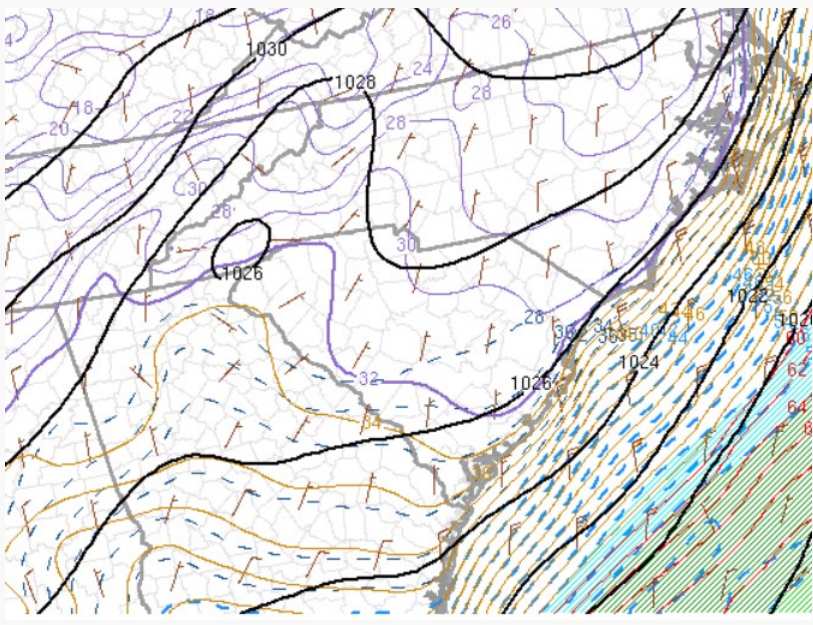


The upper low spawned a weak area of low pressure along the stationary front over Florida, which then tracked northeastward along the front over the Atlantic just off the Southeast Coast. The surface low spread moisture over the state during the afternoon and evening of January 21. As precipitation began that afternoon, statewide temperatures were largely above freezing at the surface, though in the 30s °F. Temperatures fell as precipitation spread over the state, primarily due to cooling by evaporation as the precipitation fell into very dry near-surface air. However, northerly winds around high pressure centered over Quebec, Canada were also sending colder air into the state.

Meanwhile, temperatures aloft were above freezing over much of South Carolina as precipitation began. With surface temperatures also above freezing, the event began as cold rain over much of the state. In the Upstate, where temperatures aloft were below freezing, precipitation was mostly or all snow. Areas farther east and south saw rain turn to sleet and freezing rain, then to snow, as temperatures fell at the surface and aloft. Surface temperatures were below freezing over most of the state by 7 p.m. EST.



*WPC surface weather map with radar composite overlay from 0000 UTC January 22, 2022 (7 p.m. January 21 EST), showing low pressure tracking along the North Carolina coast, the stationary front off the Southeast Coast, high pressure centered over Quebec, Canada and precipitation falling over nearly all of South Carolina.*

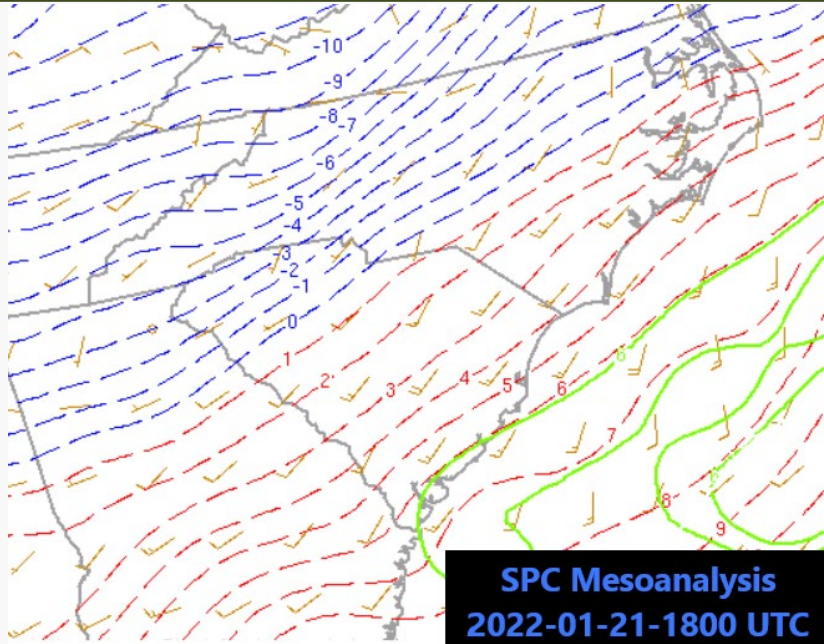


*Storm Prediction Center (SPC) Mesoanalysis of surface temperature and winds from 0000 UTC January 22, 2022 (7 p.m. January 21 EST). The bold purple line is the 32°F isotherm (the isotherm interval is 2°F).*

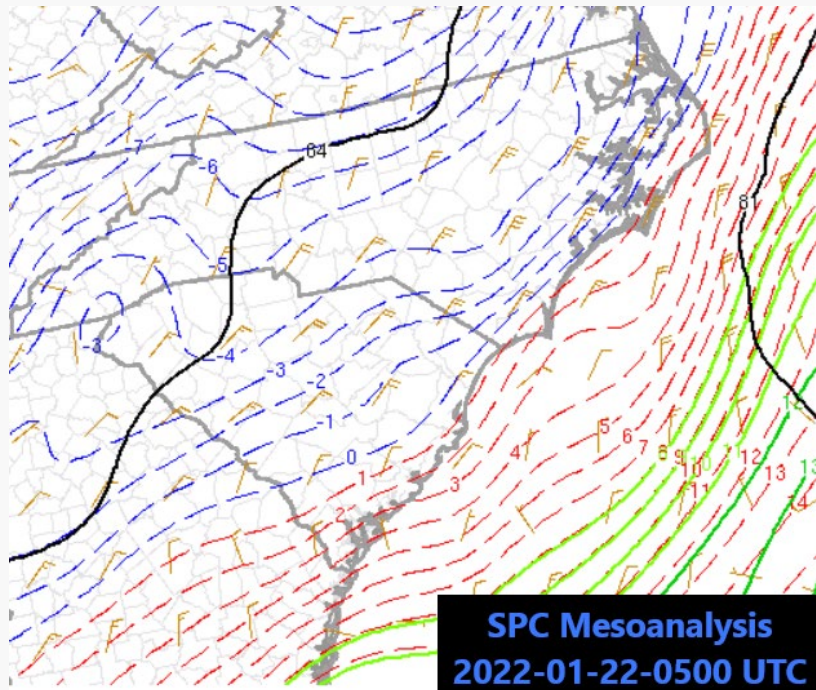


The cold rain was brief over most of the Pee Dee region, where surface temperatures quickly fell below freezing. Temperatures remained above freezing in a layer aloft through much of the afternoon, leading to several hours of freezing rain, which mixed with sleet at times. Freezing rain also occurred over parts of the Midlands, CSRA and Lowcountry, with the worst ice accretions of nearly 0.20 inches occurring in Berkeley County. Over other portions of the state which saw freezing rain, ice accretion was generally 0.10 inch or less. This was slightly less than forecast, likely due to the freezing rain mixing with sleet.

As temperatures continued to fall during the evening of January 21 at both the surface and aloft, the precipitation turned to snow in most areas that saw rain, freezing rain and sleet. The CSRA, Midlands, Pee Dee and northern Lowcountry all saw accumulations, but the heaviest snow fell in a band stretching across the northern Midlands and northern Pee Dee regions, peaking at 5.5 inches near Clio, Marlboro County. A trace of snow was reported as far south as Charleston. Precipitation ended from west to east between midnight and 4:00 a.m. EST.



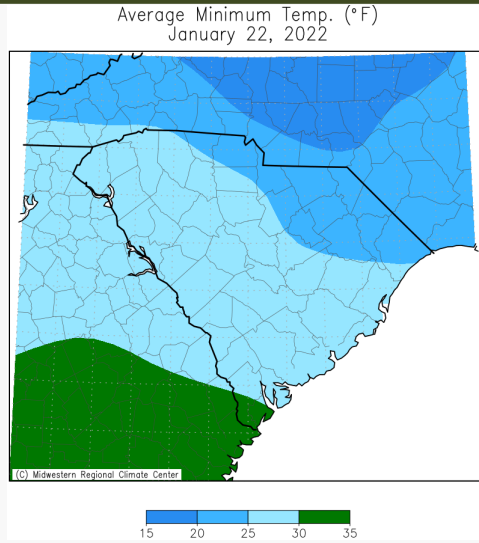
*SPC Mesoanalysis of 850 hPa (millibar) level temperature and winds from 1800 UTC (1 p.m. EST) January 21. Blue isotherms (in ° Celsius intervals) indicate areas at or below freezing.*



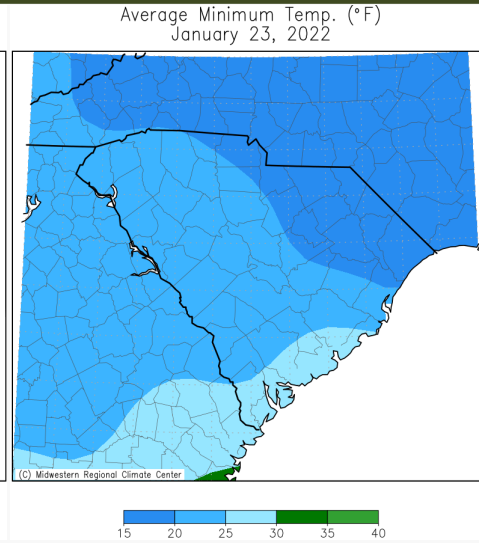
*SPC Mesoanalysis of 850 hPa (millibar) level temperature and winds from 0500 UTC (midnight EST) January 21. Blue isotherms (in ° Celsius intervals) indicate areas at or below freezing.*



As with the January 16 winter storm, fresh arctic air arrived in the immediate wake of the storm. This resulted in low temperatures in the teens and 20s °F over most of the state for the morning of January 22. High temperatures were only in the high 30s and low 40s this day where snow accumulation occurred. However, light

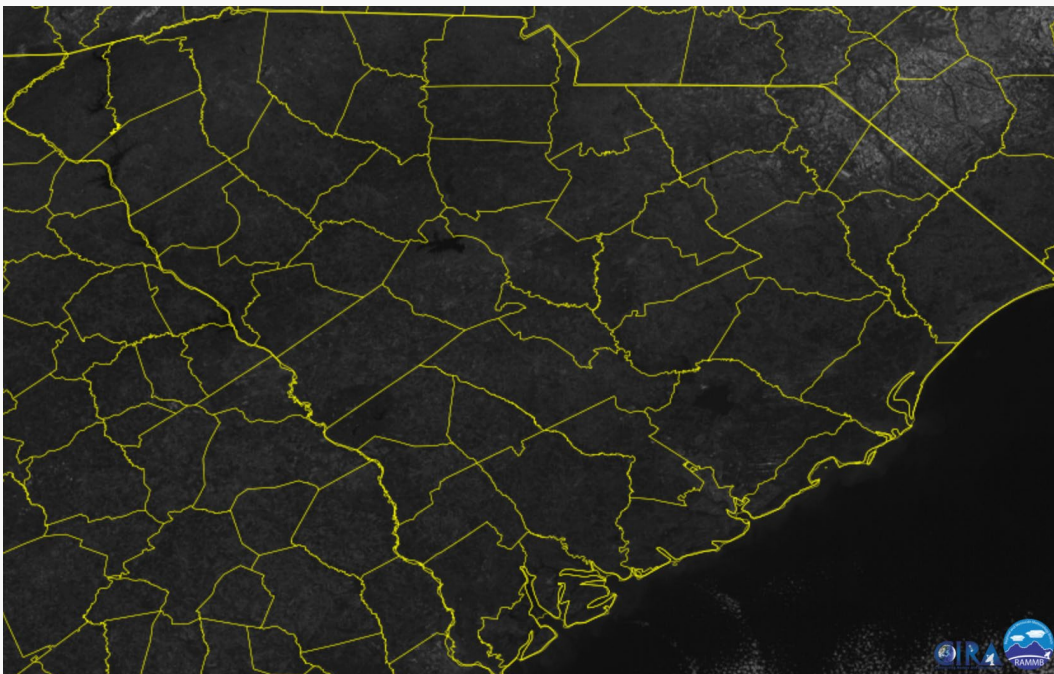


*Low temperatures (°F) the morning of January 22, 2022*



*Low temperatures (°F) the morning of January 23, 2022*

accumulations and unusually high snow-to-liquid ratio of the snow (resulting in low water content of the snowfall) led to the snow still melting away entirely that day, except where the heaviest accumulations occurred over the northern Pee Dee region. Temperatures fell well below freezing again that night, with lows in the teens and 20s Fahrenheit across the state the morning of Sunday, January 23. Highs in the 40s and 50s that afternoon melted the remainder of the snow.



*Visible satellite imagery (GOES-East CONUS sector Band 2) from January 23, 2021, 1606 UTC (11:06 a.m. EST) showing a clear sky with lingering snow cover evident primarily over Marlboro and Dillon Counties.*



In the days leading up to the January 21 winter storm, South Carolina was still in a State of Emergency declared by Governor Henry McMaster for the January 16 winter storm. The governor issued a new Executive Order on January 19, which essentially extended the previous State of Emergency declaration until January 29. The governor's order contained the following provisions:

- Activated the South Carolina National Guard to help with storm preparations and relief efforts
- Allowed state agency directors to suspend regulations that could hinder storm preparations and recovery
- Allowed the Department of Public Safety to suspend enforcement of some transportation regulations for vehicles involved in storm preparation and recovery in South Carolina or a surrounding state. The provisions of this section of the order remained in effect until February 13.
- Allowed other state agency directors to change state business procedures to assist with storm preparation and recovery
- Put restrictions on 'price gouging' into effect

The South Carolina Emergency Management Division partially activated the State Emergency Operations Center on January 14 at OPCON 2.

9,000 electric service customers in South Carolina lost service during the storm, mostly in the Pee Dee region. Service was restored to nearly all these customers the following day.

The South Carolina Department of Public Safety received a total of 1,095 calls for service. A total of 479 collisions were handled by the agency. There were no reports of any fatalities from any of these incidents.

In Charleston, the Arthur Ravenel Bridge was closed for several hours during afternoon of January 21 because of ice falling from the suspension cables. The bridge was reopened around 7:30 p.m.

The storm was notable in the Midlands region for ending a lengthy snow drought. The previous snowfall of one inch or more was reported at Columbia Metropolitan Airport prior to January 21, 2022, was on February 12, 2014, a stretch of 2,899 days. The last measurable snow at that location was 0.1 inch recorded on January 7, 2017, resulting in a stretch of 1,839 days with no measurable snowfall.

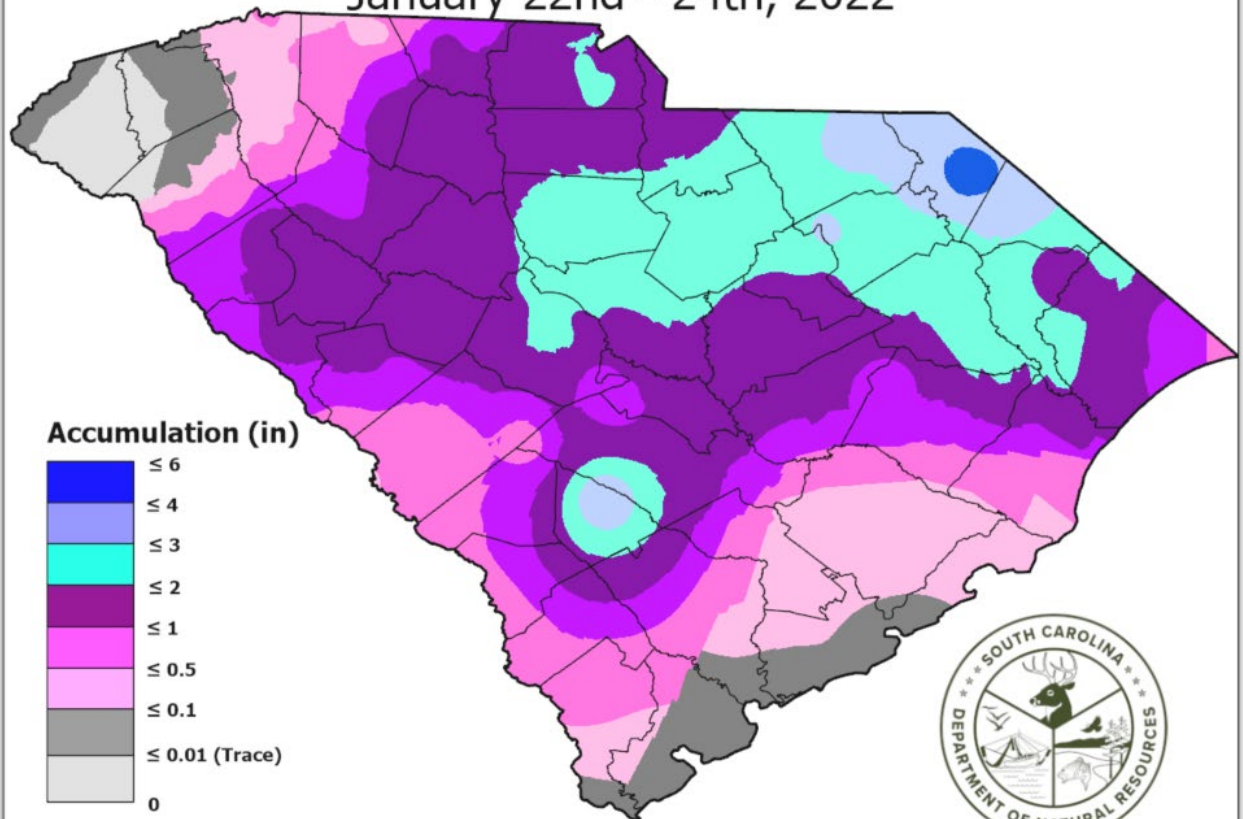




## Selected Snowfall Reports January 21-22, 2022

Location	Snow (Inches)	Station Type	Location	Snow (Inches)	Station Type
Clio 1.1 WNW	5.5	CoCoRaHS	Lugoff 0.8 NW	2.7	CoCoRaHS
Hartsville 0.9 W	4.8	CoCoRaHS	Camden 6.6 NE	2.7	CoCoRaHS
Bamberg	4.0	COOP	Winthrop University	2.5	COOP
Chesterfield 3E	3.6	COOP	Manning	2.5	COOP
Hartsville 3.6 WSW	3.5	CoCoRaHS	Winnsboro	2.2	NOAA
Dillon 3.8 NW	3.5	CoCoRaHS	Columbia Metro Airport	2.0	NOAA
Jefferson 0.2 NNW	3.0	CoCoRaHS	Saluda	1.5	COOP
Irmo 2.1 SW	3.0	CoCoRaHS	Clinton	1.5	COOP
Chapin 5.0 ESE	3.0	CoCoRaHS	Laurens	1.0	COOP
Blythewood 5.8 W	2.8	CoCoRaHS	Spartanburg 3.4 ENE	1.0	CoCoRaHS

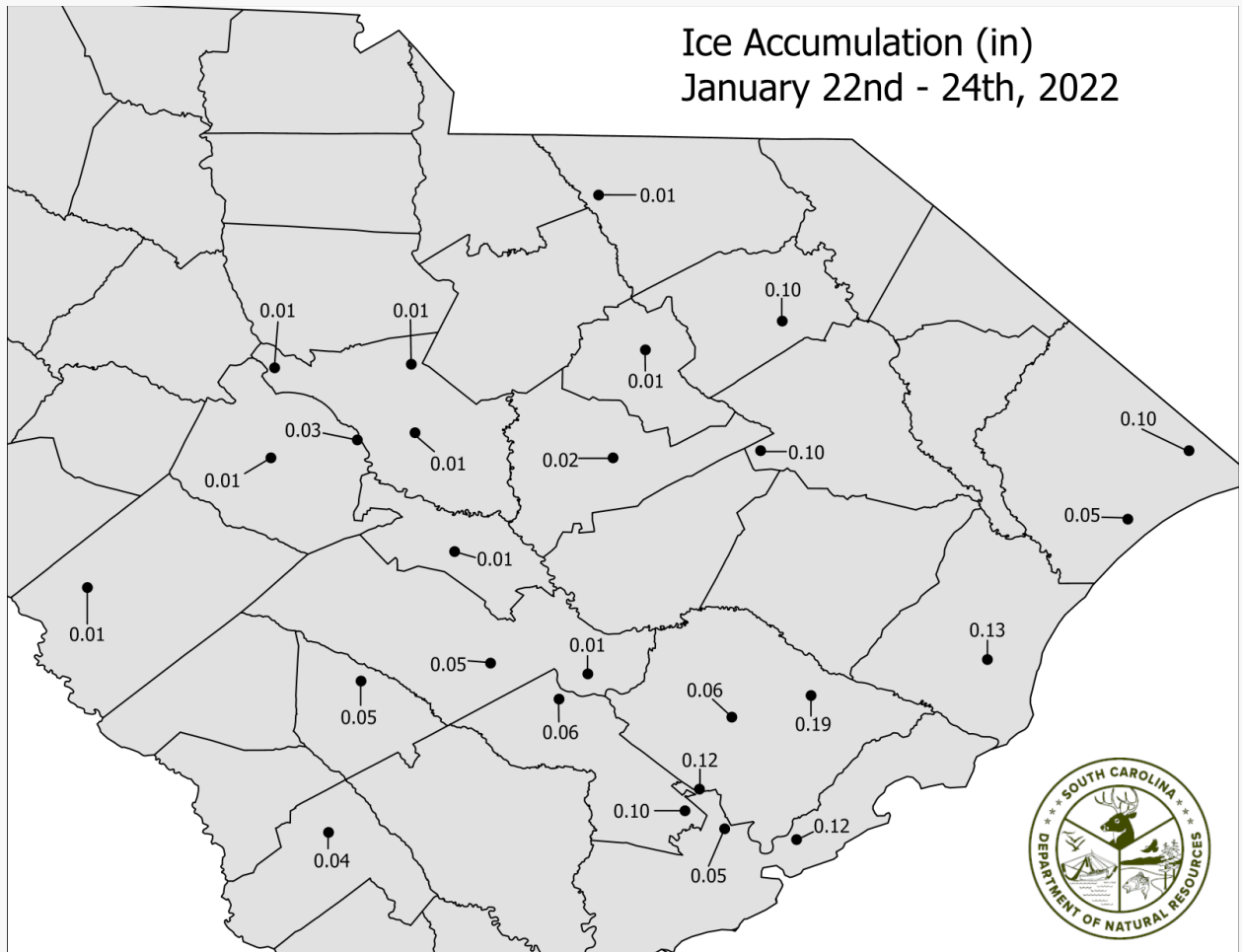
## Snowfall Totals January 22nd - 24th, 2022





## Selected Ice Accretion Reports January 21, 2022

Location	Ice (Inches)	Station Type	Location	Ice (Inches)	Station Type
6 WSW Jamestown	0.19	Public	4 SSW Georgetown	0.10	COOP
4 WNW Goose Creek	0.15	CoCoRaHS	Charleston Int'l Airport	0.08	NWS
Georgetown	0.12	Public	Moncks Corner	0.06	Public
1 ENE Summerville	0.10	Public	3 NW Harleyville	0.06	Spotter
6 SSE Summerville	0.10	Public	1 SSW Summerville	0.06	Public
9 S Moncks Corner	0.10	Public	Bowman	0.05	Public
8 S Huger	0.10	Public	Bamberg	0.05	Public
1 N Summerville	0.10	Public	4 ENE Forestbrook	0.05	Public
5 SE Blythewood	0.10	NWS Employee	3 SSW Shadowmoss	0.04	NWS Employee
Darlington	0.10	Spotter	1 WSW Hampton	0.04	CoCoRaHS





The South Carolina State Climate Office would like to thank the following entities which contributed data or photos for this report:

- The Greenville-Spartanburg, Columbia, Charleston and Wilmington National Weather Service Offices
- Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)
- NOAA Northeast Regional Climate Center's xmACIS website
- The Midwestern Regional Climate Center's cli-MATE website
- NOAA RAMMB Slider Website
- South Carolina Emergency Management Division
- South Carolina Department of Public Safety
- South Carolina Department of Transportation
- The University of Wyoming