

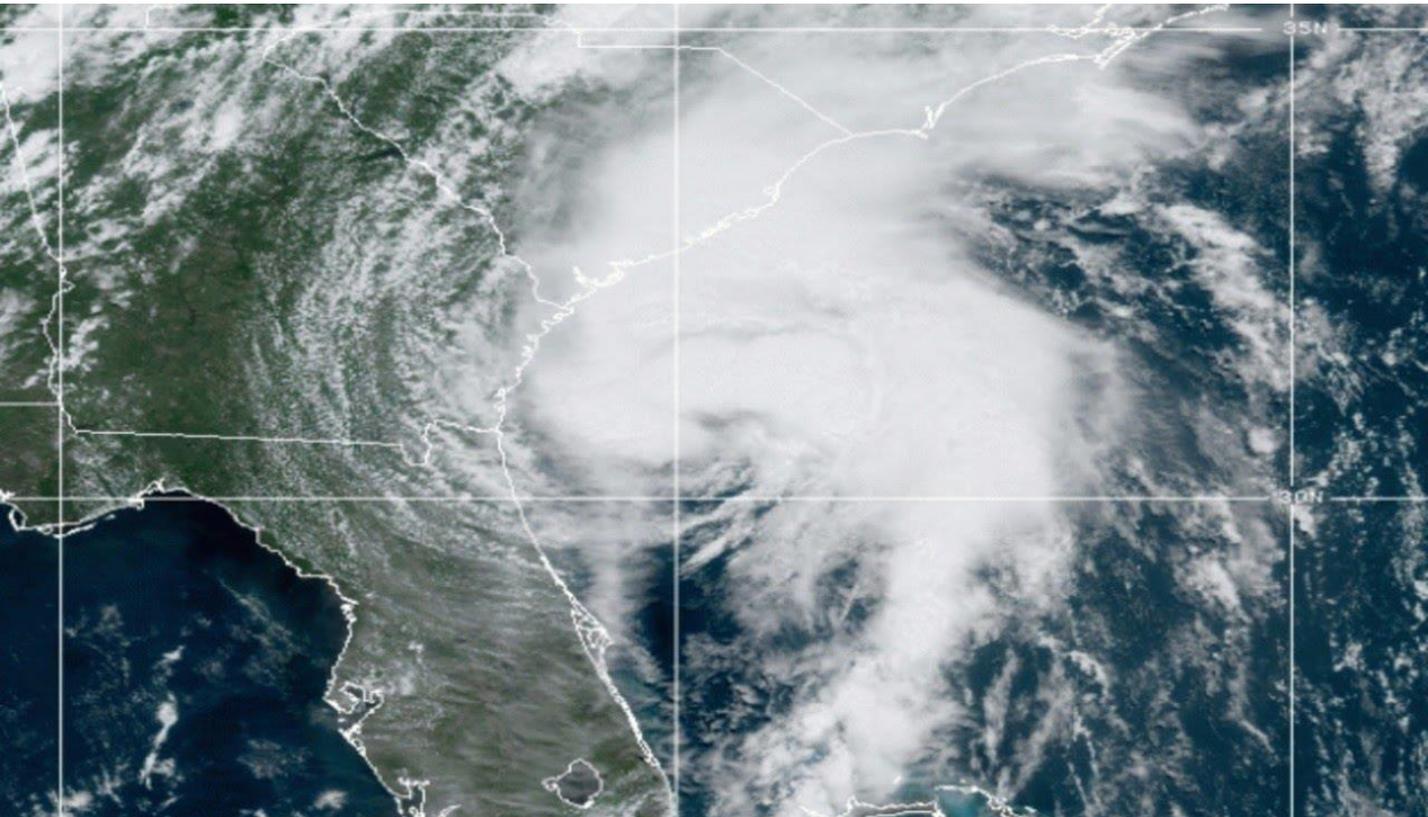


# Hurricane Isaias – Open File Report

South Carolina State Climatology Office

Report Date: August 20, 2020

Website: <http://www.dnr.sc.gov/climate/sco>



**PRELIMINARY**

**Storm History and Impacts Report**

**August 3 – 4, 2020**

Synoptic Analysis ..... 3  
Rainfall Totals ..... 8  
Wind Gusts and Tornado Data ..... 9  
Storm Surge ..... 10

**THIS REPORT SERVES AS A PRELIMINARY DISSEMINATION OF INFORMATION ON THE IMPACTS OF HURRICANE ISAIAS ON THE STATE OF SOUTH CAROLINA.**

**FOR MORE DETAILED DATA, PLEASE CONTACT:**

Dr. Hope Mizzell  
State Climatologist  
[MizzellH@dnr.sc.gov](mailto:MizzellH@dnr.sc.gov)

Mr. Mark Malsick  
Severe Weather Liaison  
[MalsickM@dnr.sc.gov](mailto:MalsickM@dnr.sc.gov)

Ms. Melissa Griffin  
Asst. State Climatologist  
[GriffinM@dnr.sc.gov](mailto:GriffinM@dnr.sc.gov)

Cover Picture Credit  
A satellite image from the GOES17 satellite of Hurricane Isaias on August 3, 2020, located off the Southeast. Additional figures and pictures used throughout this report were either created by SCO staff, retrieved from the National Weather Service Damage Assessment Tool and WeatherBell Inc., or provided to the office by Mr. Christopher Jackson.

# SYNOPTIC ANALYSIS

On July 28, 2020, the National Hurricane Center (NHC) initiated advisories on a broad area low surface pressure producing showers, thunderstorms, and 35-40 miles per hour winds 2,120 miles southeast of Charleston, South Carolina. NHC initially designated this feature Potential Tropical Cyclone Nine (PTC-9). This potential tropical cyclone strengthened in 24 hours to become Tropical Cyclone Isaias and eventually became a hurricane that made landfall near Ocean Isle Beach, North Carolina, during the evening of August 3<sup>rd</sup> as the ninth named tropical cyclone of the 2020 Atlantic hurricane season.

Isaias was subject to various synoptic, topographic, and oceanographic features that influenced the hurricane's track and intensity before landfall. The most obvious and areal consistent feature was the very warm sea surface temperatures (Figure 1.) Isaias consistently encountered 84-86° F. surface water. Sea surface temperatures along the South Carolina coast were 80-84° F.

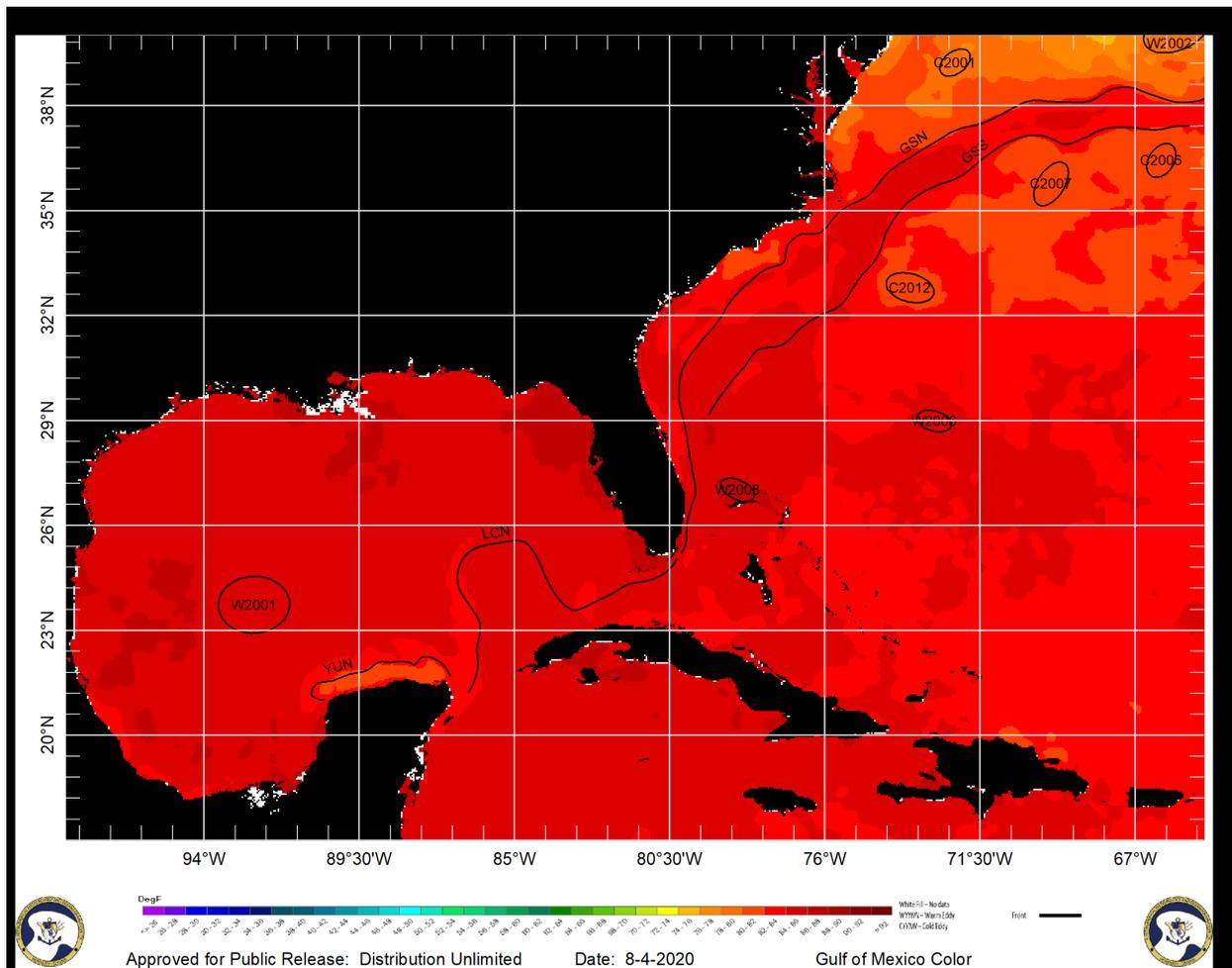


Figure 1. Sea surface temperature analysis August 4, 2020. Black lines off the United States East Coast indicate the extent of the Gulf Stream (Naval Oceanographic Office (NAVO)).

# SYNOPTIC ANALYSIS

Initially, the southern reaches of the subtropical ridge, or Bermuda High, extending westward across the central Atlantic to the southeast United States were the predominant steering mechanism for Isaias' initial west-north westward track into the Caribbean. Lacking a defined surface center of circulation, Isaias tracked west-northwest at 20-25 miles per hour, a speed that inhibited organization, and made the track forecasting problematic.

Becoming a tropical storm on July 29, 2020, over the eastern Caribbean, Isaias continued west-northwest passing over Hispaniola on July 30. Normally hurricanes and tropical storms steered over the Dominican Republic by the subtropical ridge are negatively affected by the low-level shear induced by passing over the island's rugged 6,500 - 10,000-foot Cordillera Central. Tropical Storm Isaias' intensity was relatively unaffected. Despite being a relatively weak 50-mile-per-hour tropical storm, Isaias did have a large wind field that extended well north and northwest of the island. This expansive wind field allowed Isaias' center of circulation to reform north of Hispaniola over warm water and the storm's intensity increased to 57 miles per hour.

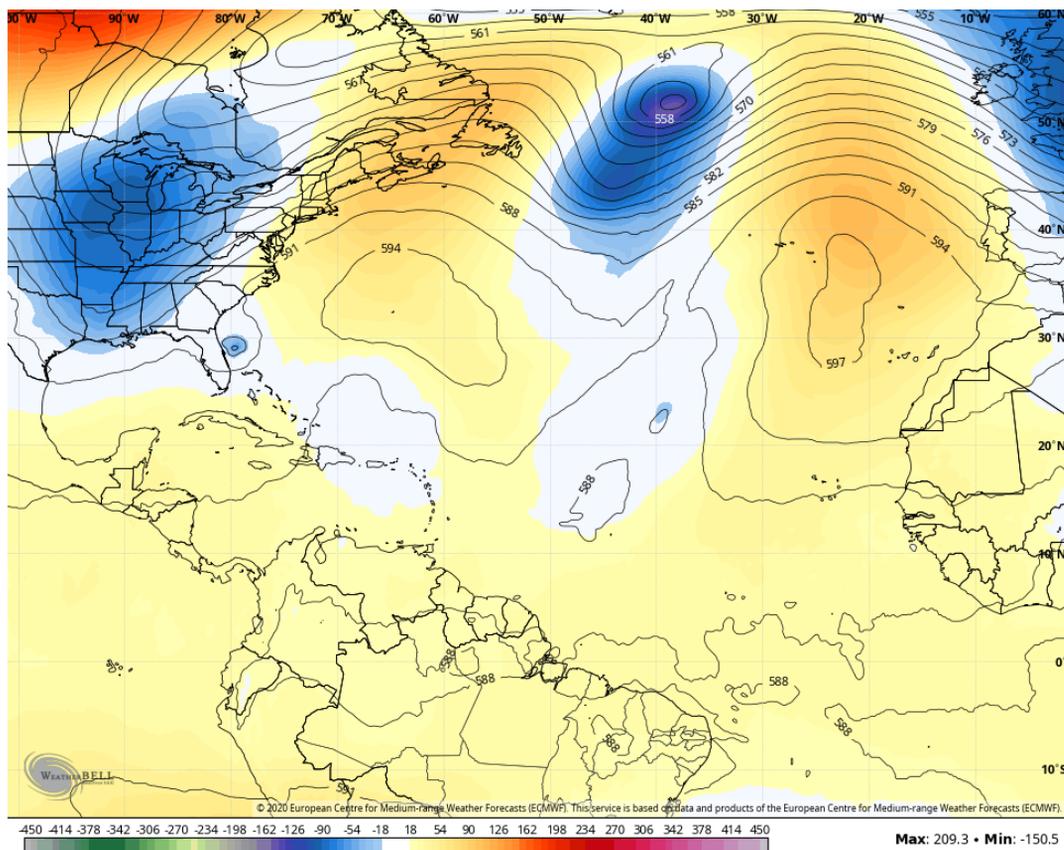


Figure 2. 500 millibar height analysis and anomaly pattern valid 0600Z August 3, 2020. Tropical Storm Isaias can be seen off the east coast of Florida between the subtropical ridge to the east and the mid-latitude trough building in from the west (Image from WeatherBELL).

With a well-defined surface circulation, over open, warm Atlantic waters (Figure 1), Isaias became an 80-mile-per-hour hurricane on July 31. The subtropical ridge continued to steer Hurricane Isaias west-northwest over the Bahamas with limited strengthening before reaching Andros Island. Interaction with Andros Island's topography, shallow water shoaling, and upper level shear fixed over Florida weakened Isaias rapidly to a 60-mile-per-hour tropical storm by 5 PM, August 1. As Isaias passed over the Bahamas, a deepening 500 millibar trough centered over the Mississippi River valley strengthened eastwards as the subtropical ridge weakened. The interaction of these two dominant synoptic features (Figure 2) put Isaias on a more northerly track paralleling the Florida coast. This turn to the north slowed the storm down to 9-mile-per-hour and induced the upwelling of deeper, cooler water. Despite being over very warm Gulf Stream water, westerly 850-200 millibar westerly shear (Figure 3), and the upwelling prevented intensification as Isaias tracked offshore Florida on August 2-3.

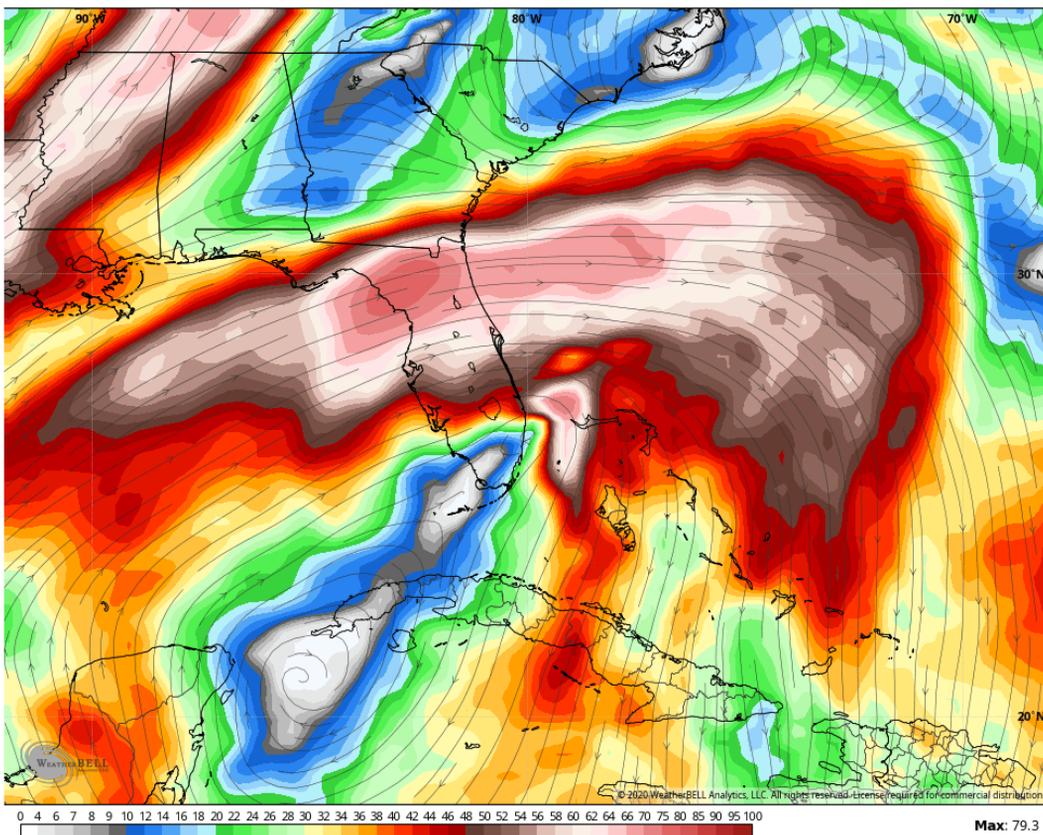


Figure 3. 850-200 millibar wind shear analysis 1200Z August 2, 2020 (Image from WeatherBELL).

The broad 500 millibar trough nudged Tropical Storm Isaias to a faster, more north-northeasterly course by midday August 3rd off the Georgia coast. There, the shear became more southwesterly and abated (Figure 4) giving Tropical Storm Isaias a brief window within which to intensify before landfall. As Tropical Storm Isaias passed offshore, the storm interacted with the right rear exit region of an unusually strong 200 millibar anticyclonically curved jet streak (Figure 5). Maximum winds within the jet streak were over 125 miles per hour, wind speeds usually associated with winter jet streaks and very rarely seen aloft during the summer. Strong divergence aloft due to right entrance jet streak region increases uplift and lowers surface pressures that, in conjunction with warm sea surface temperatures and reduced shear, increased the intensity of Tropical Storm Isaias to hurricane strength three hours before making landfall. After landfall, the anomalously strong 200 millibar upper level support kept Isaias a powerful tropical storm as it tracked north from eastern North Carolina to New England.

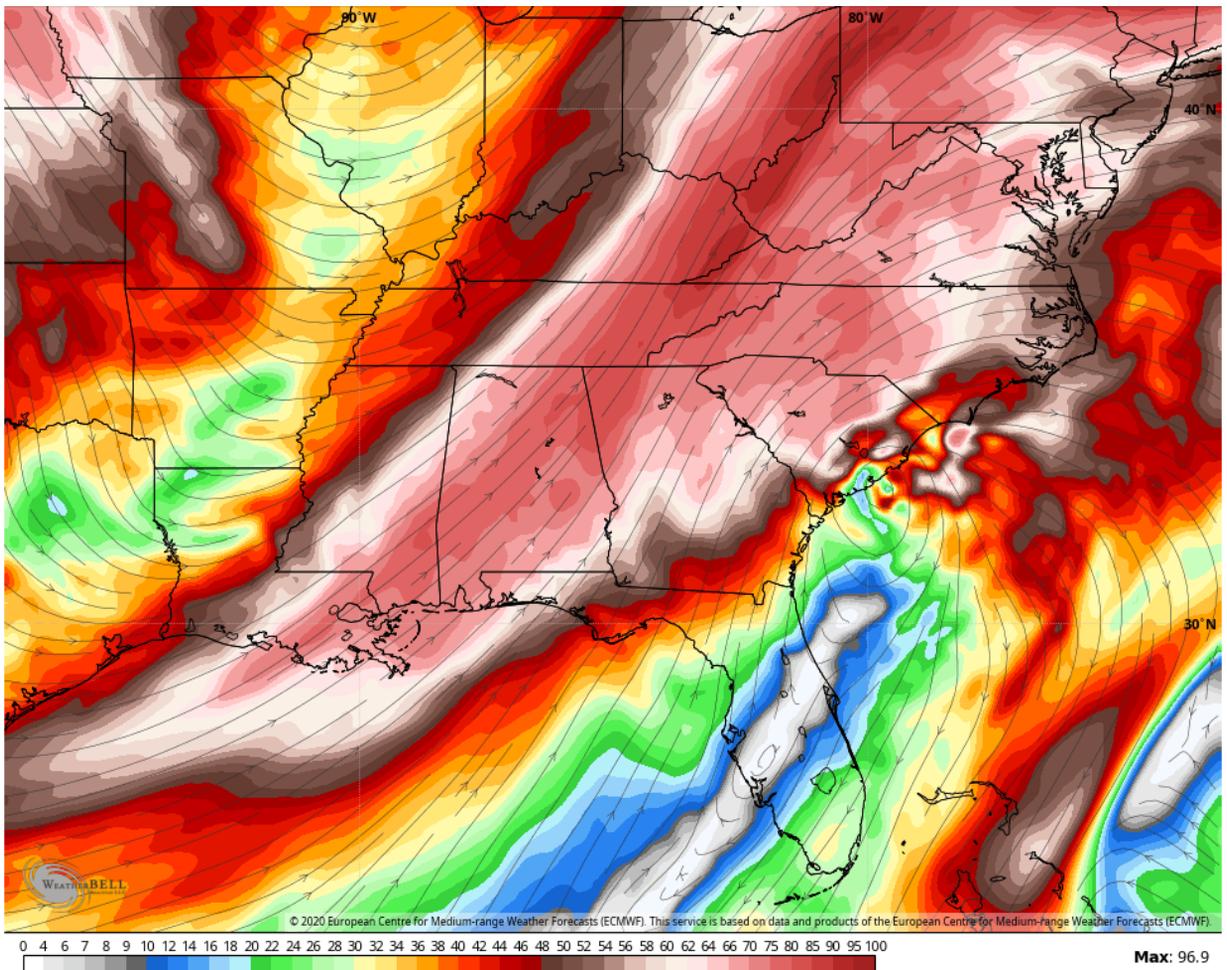


Figure 4. 850-200 millibar wind shear valid 0600Z August 4, 2020 (Image from WeatherBELL).

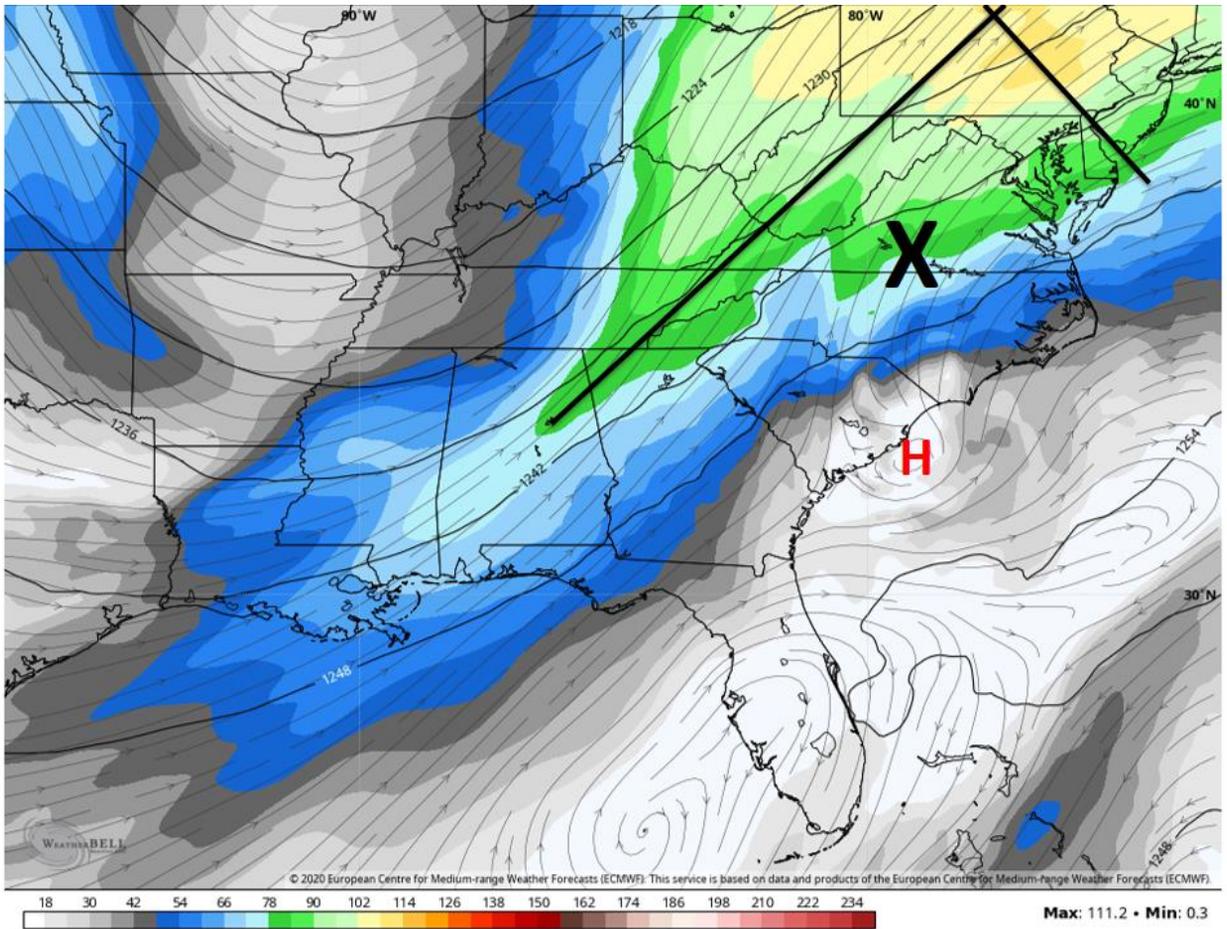
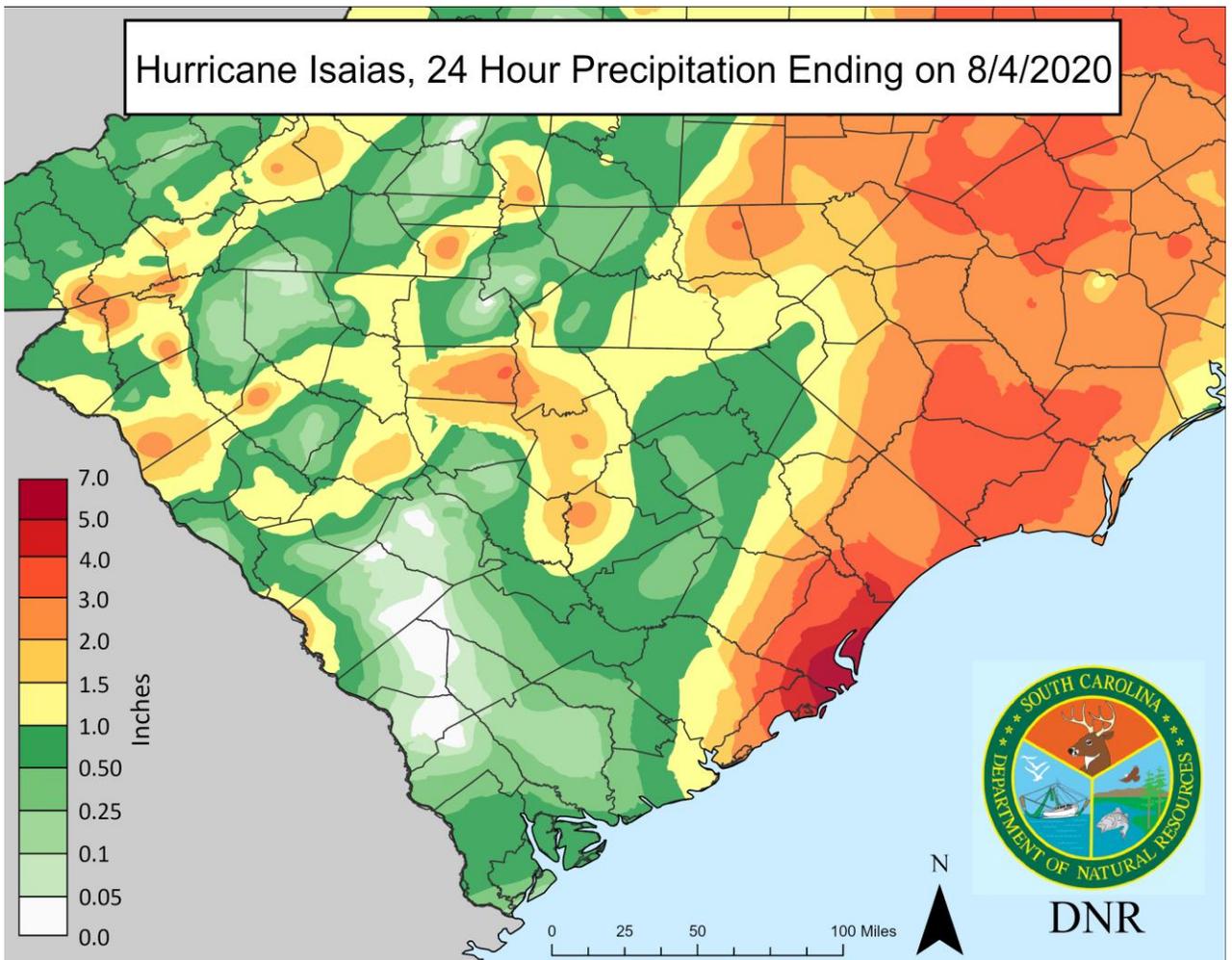


Figure 5.200 millibar height and wind speed analysis. Jet streak right entrance region indicated by black X. Approximate position of Hurricane Isaias indicated by red H (Image from WeatherBELL).

# RAINFALL TOTALS

The heaviest rainfall from Hurricane Isaias remained offshore, however, portions of Georgetown and Horry counties reported rainfall totals over three inches. The highest reported rainfall was 6.80 inches recorded by a CoCoRaHS observer on Pawleys Island. Some locations broke their daily rainfall records, including the 3.31 inches reported at the National Weather Service (NWS) station in Myrtle Beach. As the storm moved across eastern North Carolina, it produced widespread rain, which resulted in some local rivers to rise to minor flood stage.

Station	Station Type	Rainfall Total (in)
Pawley's Island 2.4 NW	CoCoRaHS	6.80
Georgetown 6.0 S	CoCoRaHS	6.54
Georgetown County Airport	NWS	5.80
Pawley's Island 0.8 WNW	CoCoRaHS	5.53
Georgetown 11.2 SW	CoCoRaHS	5.32
Georgetown 1.0 E	CoCoRaHS	5.31
Murrell's Inlet 2.4 NW	CoCoRaHS	5.25



# WIND GUSTS

The core of Hurricane Isaias' strongest winds remained offshore of the South Carolina Coast. Below is a table of select maximum recorded wind gusts (over 40 mph) from across the state.

Location	Maximum Wind Gust	Date and Time (EDT)	Station Type
Buoy 41004	78 mph	08/03 at 8:00 PM	National Data Buoy Center
Buoy 41029	60 mph	08/03 at 6:38 PM	National Data Buoy Center
Myrtle Beach	53 mph	08/03 at 10:44 PM	National Weather Service
North Myrtle Beach	53 mph	08/03 at 10:16 PM	National Weather Service
Folly Beach	52 mph	08/03 at 3:04 PM	WeatherFlow
Fort Sumter	49 mph	08/03 at 6:09 PM	WeatherFlow
Georgetown	49 mph	08/03 at 9:35 PM	National Weather Service
Isle of Palms	45 mph	08/03 at 6:15 PM	WeatherFlow
Sullivan's Island	44 mph	08/03 at 6:08 PM	WeatherFlow
Charleston International Airport	43 mph	08/03 at 3:41 PM	National Weather Service

Unlike other tropical cyclones to impact the state, Hurricane Isaias only spawned one weak tornado in Georgetown County.

## Tornado – Murrells Inlet / Garden City

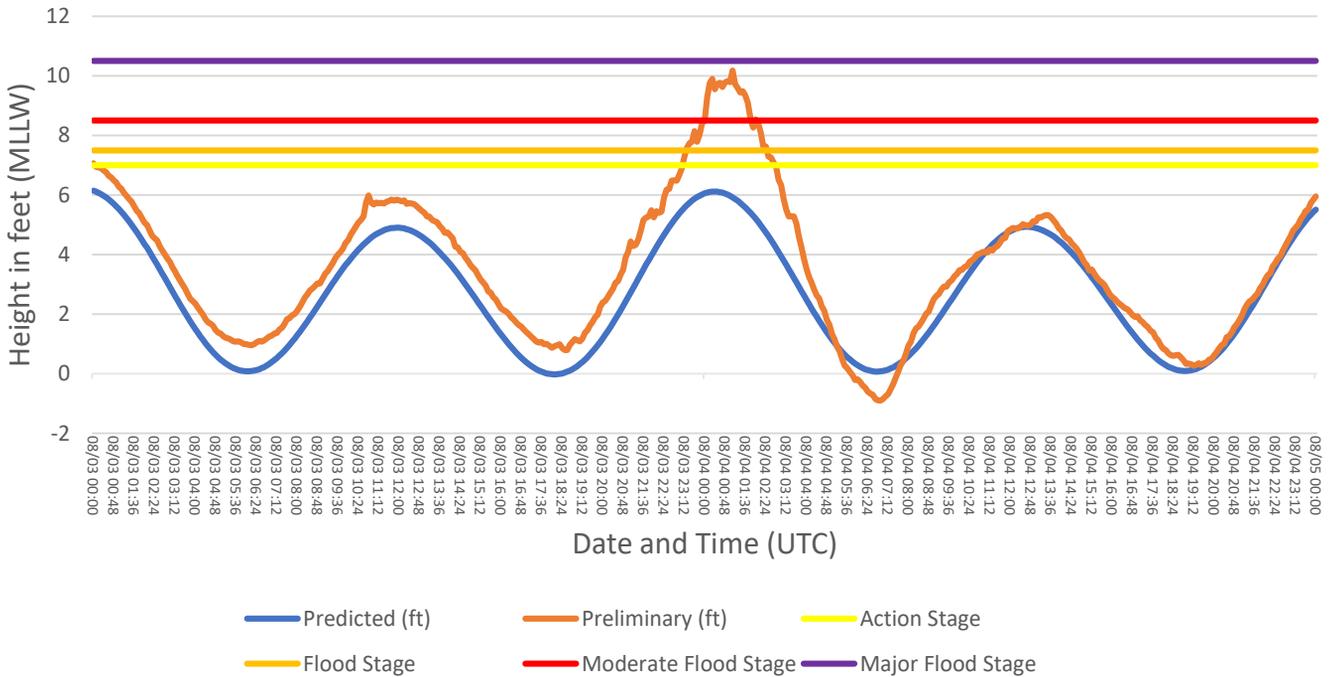
Rating: EF0 (estimated maximum winds of 80 mph)

Date: 2020-08-03

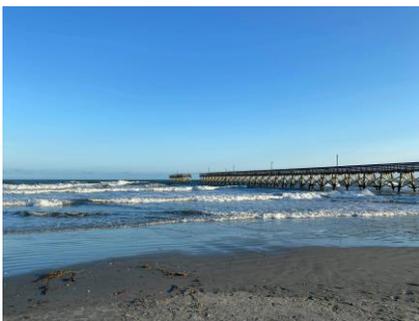
Narrative: Waterspout moved onshore near 813 South Waccamaw Drive in Garden City. It caused damage to a few homes as it quickly moved across the island (0.2-mile long path). It dissipated over the adjacent marshes west of the island. An injury occurred at one of the homes along the beachfront.

Additional tornadoes were confirmed in Brunswick County, North Carolina, near the cities of Bald Head Island, Belville, Leland, and Southport.

## NOAA/NOS/CO-OPS - Hurricane Isaias Observed Water Levels at the Springmaid Pier, SC



The Springmaid Pier gauge reached 10.18 ft. MLLW during high tide, which is the third-highest level on record at the location, behind Hurricane Hugo in 1989 and Hurricane Matthew in 2016. The approach of Hurricane Isaias occurred during a full moon cycle, which contributed to the higher astronomical tide and resulting storm surge. Overall, the impacts were less than those observed during Hurricane Dorian in 2019. In Georgetown County, sand and debris covered some of the roads on Pawley's Island, and there were reports of ankle-deep water along many beachfront roads during high tide. Horry County emergency personnel performed water rescues in flooded areas near Cherry Grove, and the middle portion of the Sea Cabin Pier in Cherry Grove was destroyed. The dune erosion in the area was severe, and water moved much of the sand a block inland, requiring road graders to remove the sand. Storm surge pushed multiple blocks inland from the beach areas, and city officials estimated damage of over \$2 million.



Pictures of damage to the Sea Cabin Pier and cut sand dunes in Cherry Grove, SC. Courtesy of C. Jackson.