

NOAA/National Hurricane Center TEXT PRODUCTS

Module 4 Advisory Product Activity Supplemental Handout

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This document contains text products created by the National Hurricane Center as accessible accompaniments to their advisory products.

These text pages can be used to participate in the AWR-343 Hurricane Awareness Module 4 Activities.

[Advisory 48: Tuesday, September 11, 2018 5 am AST](#)

Pages 2-4 of the Activity Handout (AWR343_PX_RC2020(a)) show the following Graphics and Updates for NOAA/NHC Advisory products:

1. 5-day Forecast Track (Tuesday, September 11)
2. Most Likely Arrival Time of Tropical-Storm-Force Winds
3. Quantitative Precipitation Forecast

Discussion questions for map 1 (5-day Forecast Track):

1. What Watches are currently in effect?

2. What preparedness actions should be conducted?

3. How can emergency managers and community leaders message these preparedness actions to the Whole Community?

Discussion questions for map 2 (Arrival time of tropical storm force winds):

1. What time and date will tropical-storm-force winds most likely start along the North Carolina coast?

2. Will outdoor preparedness activities likely be safe after this time?

Discussion questions for map 3 (Quantitative Precipitation Forecast):

1. What other hazards could be expected?

Text for the maps and advisories are below.

HURRICANE FLORENCE **FORECAST/ADVISORY** NUMBER 48
NWS NATIONAL HURRICANE CENTER MIAMI FL AL062018
0900 UTC TUE SEP 11 2018

SUMMARY OF 500 AM AST...0900 UTC...INFORMATION

LOCATION...26.4N 64.1W
ABOUT 410 MI...660 KM S OF BERMUDA
ABOUT 975 MI...1570 KM ESE OF CAPE FEAR NORTH CAROLINA
MAXIMUM SUSTAINED WINDS...140 MPH...220 KM/H
PRESENT MOVEMENT...WNW OR 290 DEGREES AT 15 MPH...24 KM/H
MINIMUM CENTRAL PRESSURE...944 MB...27.88 INCHES

WATCHES AND WARNINGS

CHANGES WITH THIS ADVISORY:

A Storm Surge Watch has been issued for the east coast of the United States from Edisto Beach, South Carolina northward to the North Carolina-Virginia border, including the Pamlico and Albemarle Sounds.

A Hurricane Watch has been issued for the east coast of the United States from Edisto Beach, South Carolina, northward to the North Carolina-Virginia border, including the Pamlico and Albemarle Sounds.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A Storm Surge Watch is in effect for...
* Edisto Beach South Carolina to the North Carolina-Virginia border
* Albemarle and Pamlico Sounds, including the Neuse and Pamlico

Rivers

A Hurricane Watch is in effect for...

- * Edisto Beach South Carolina to the North Carolina-Virginia border
- * Albemarle and Pamlico Sounds

Interests elsewhere in the southeastern and mid-Atlantic states should monitor the progress of Florence. Additional watches may be required later today.

A Storm Surge Watch means there is a possibility of life-threatening inundation, from rising water moving inland from the coastline, in the indicated locations during the next 48 hours. For a depiction of areas at risk, please see the National Weather Service Storm Surge Watch/Warning Graphic, available at hurricanes.gov.

A Hurricane Watch means that hurricane conditions are possible within the watch area. A watch is typically issued 48 hours before the anticipated first occurrence of tropical-storm-force winds, conditions that make outside preparations difficult or dangerous.

For storm information specific to your area, including possible inland watches and warnings, please monitor products issued by your local National Weather Service forecast office.

DISCUSSION AND OUTLOOK

At 500 AM AST (0900 UTC), the center of Hurricane Florence was located near latitude 26.4 North, longitude 64.1 West. Florence is moving toward the west-northwest near 15 mph (24 km/h). A west-northwestward to northwestward motion with a slight increase in forward speed are expected during the next couple of days. On the forecast track, the center of Florence will move over the southwestern Atlantic Ocean between Bermuda and the Bahamas through Wednesday, and approach the coast of North Carolina or South Carolina on Thursday.

Maximum sustained winds are near 140 mph (220 km/h) with higher gusts. Florence is a category 4 hurricane on the Saffir-Simpson Hurricane Wind Scale. Some strengthening is expected during the next day or so, and Florence is expected to be an extremely dangerous major hurricane through Thursday night.

Hurricane-force winds extend outward up to 40 miles (65 km) from the center and tropical-storm-force winds extend outward up to 150 miles (240 km).

The estimated minimum central pressure is 944 mb (27.88 inches).

HAZARDS AFFECTING LAND

STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters moving inland from the shoreline. The water has the potential to reach the following heights above ground if peak surge occurs at the time of high tide...

Edisto Beach to Murrells Inlet...2-4 ft
Murrells Inlet to Cape Fear...4-6 ft
Cape Fear to Cape Lookout including The Neuse and Pamlico River...6-12 ft
Cape Lookout to Ocracoke Inlet...5-8 ft
Ocracoke Inlet to North Carolina/Virginia Border...3-5 ft

The deepest water will occur along the immediate coast in areas of onshore winds, where the surge will be accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances. For information specific to your area, please see products issued by your local National Weather Service forecast office.

RAINFALL: Florence is expected to produce total rainfall accumulations of 15 to 20 inches with isolated maxima to 30 inches near Florence's track over portions of North Carolina, Virginia, and northern South Carolina through Saturday. This rainfall may produce life-threatening flash flooding.

WIND: Hurricane conditions are possible within the watch area by late Thursday or Thursday night, with tropical storm conditions possible by Thursday morning.

SURF: Swells generated by Florence are affecting Bermuda and portions of the U.S. East Coast. These swells are likely to cause life-threatening surf and rip current conditions. Please consult products from your local weather office.

ZCZC MIATCDAT1 ALL
TTAA00 KNHC DDHHMM

Hurricane Florence **Discussion** Number 48
NWS National Hurricane Center Miami FL AL062018
500 AM AST Tue Sep 11 2018

Recent satellite imagery shows that the eye of Florence has become cloud filled and an earlier 0441 UTC microwave overpass revealed a double eyewall structure. These observations suggest that an eyewall replacement cycle is likely underway. Subjective and objective Dvorak current intensity numbers have not changed so the initial intensity will remain 120 kt for this advisory. An Air Force Reserve Hurricane Hunter mission is en route to the storm and should provide a better assessment of Florence's

structure and intensity this morning. NOAA buoy 41049 located about 80 nmi north of the eye, has reported tropical-storm-force winds during the last several hours and seas as high as 23 ft.

Florence's upper-level environment is predicted to remain quite favorable while the storm traverses sea surface temperatures of around 29C over the next 48 hours. Additional strengthening is forecast during this time, but some fluctuations in intensity are likely due to eyewall replacement cycles. The updated NHC intensity forecast once again calls for additional intensification and brings Florence to near category 5 strength within the next 24 to 36 hours. After 48 hours, a slight increase in southwesterly shear could result in some weakening, but Florence is expected to remain an extremely dangerous hurricane when it approaches the U.S. coastline.

Florence has accelerated as anticipated and is now moving west-northwestward or 290 degrees at 13 kt. The track forecast reasoning has not changed much. A mid-level ridge to the northeast of Bermuda is expected steer Florence quickly west-northwestward to northwestward toward the southeast United States coast over the next 2 to 3 days. By 72 hours, a high pressure ridge building over the Upper-Midwest and Great Lakes regions is forecast to cause a significant reduction in Florence's forward speed and the hurricane is predicted to meander over the eastern portions of North or South Carolina at days 4 and 5. The ECMWF has trended slower this cycle at days 4 and 5, and as a result the NHC forecast shows slightly less motion at those time periods. The spread in the guidance increases by 72 hours, with the GFS and its ensemble mean along the right side of the guidance, while the ECMWF remains along the left edge. It should be noted that there are still a number of ECMWF members that are even farther left. The NHC track forecast has been nudged to the left and is close to the TVCN consensus aid. Given the amount of uncertainty by day 3, it is important not to focus on the exact forecast track as average NHC errors at days 3, 4, and 5 are about 100, 140 and 180 n mi, respectively, and dangerous hazards will extend well away from the center. Storm Surge and Hurricane watches have been issued for a portion of the coast of South and North Carolina. Additional watches may be required later today.

Key Messages:

1. A life-threatening storm surge is likely along portions of the coastlines of South Carolina, North Carolina, and Virginia, and a Storm Surge Watch has been issued for a portion of this area. All interests from South Carolina into the mid-Atlantic region should ensure they have their hurricane plan in place and follow any advice given by local officials.
2. Life-threatening freshwater flooding is likely from a prolonged and exceptionally heavy rainfall event, which may extend inland over the Carolinas and Mid Atlantic for hundreds of miles as Florence is expected to slow down as it approaches the coast and moves inland.

3. Damaging hurricane-force winds are likely along portions of the coasts of South Carolina and North Carolina, and a Hurricane Watch has been issued for a part of this area. Damaging winds could also spread well inland into portions of the Carolinas and Virginia.

4. Large swells affecting Bermuda and portions of the U.S. East Coast will continue this week, resulting in life-threatening surf and rip currents.

FORECAST POSITIONS AND MAX WINDS

INIT	11/0900Z	26.4N	64.1W	120 KT	140 MPH
12H	11/1800Z	27.2N	66.4W	125 KT	145 MPH
24H	12/0600Z	28.7N	69.4W	130 KT	150 MPH
36H	12/1800Z	30.5N	72.2W	130 KT	150 MPH
48H	13/0600Z	32.2N	74.5W	125 KT	145 MPH
72H	14/0600Z	34.3N	77.1W	115 KT	130 MPH
96H	15/0600Z	35.2N	78.0W	45 KT	50 MPH...INLAND
120H	16/0600Z	36.0N	79.0W	25 KT	30 MPH...INLAND

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Forecaster Brown

ZCZC MIAPWSAT1 ALL
TTAA00 KNHC DDHHMM

HURRICANE FLORENCE WIND SPEED PROBABILITIES NUMBER 48
NWS NATIONAL HURRICANE CENTER MIAMI FL AL062018
0900 UTC TUE SEP 11 2018

AT 0900Z THE CENTER OF HURRICANE FLORENCE WAS LOCATED NEAR LATITUDE 26.4 NORTH...LONGITUDE 64.1 WEST WITH MAXIMUM SUSTAINED WINDS NEAR 120 KTS...140 MPH...220 KM/H.

Z INDICATES COORDINATED UNIVERSAL TIME (GREENWICH)
ATLANTIC STANDARD TIME (AST)...SUBTRACT 4 HOURS FROM Z TIME
EASTERN DAYLIGHT TIME (EDT)...SUBTRACT 4 HOURS FROM Z TIME
CENTRAL DAYLIGHT TIME (CDT)...SUBTRACT 5 HOURS FROM Z TIME

WIND SPEED PROBABILITY TABLE FOR SPECIFIC LOCATIONS

CHANCES OF SUSTAINED (1-MINUTE AVERAGE) WIND SPEEDS OF AT LEAST
...34 KT (39 MPH... 63 KM/H)...
...50 KT (58 MPH... 93 KM/H)...
...64 KT (74 MPH...119 KM/H)...

FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

PROBABILITIES FOR LOCATIONS ARE GIVEN AS OP(CP) WHERE
OP IS THE PROBABILITY OF THE EVENT BEGINNING DURING
AN INDIVIDUAL TIME PERIOD (ONSET PROBABILITY)
(CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN
06Z TUE AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

PROBABILITIES ARE GIVEN IN PERCENT
X INDICATES PROBABILITIES LESS THAN 1 PERCENT
PROBABILITIES FOR 34 KT AND 50 KT ARE SHOWN AT A GIVEN LOCATION WHEN
THE 5-DAY CUMULATIVE PROBABILITY IS AT LEAST 3 PERCENT.
PROBABILITIES FOR 34...50...64 KT SHOWN WHEN THE 5-DAY
64-KT CUMULATIVE PROBABILITY IS AT LEAST 1 PERCENT.

Advisory 56: Thursday, September 13, 2018 5:00 AM EDT

Pages 5-7 of the Activity Handout (AWR343_PX_RC2020(a)) show the following Graphics and Updates for NOAA/NHC Advisory products:

1. 5-Day Forecast Track (Thursday, September 13)
2. Most Likely Arrival Time of Tropical-Storm-Force Winds
3. Quantitative Precipitation Forecast

Discussion questions for map 1 (5-day Forecast Track):

1. What Watches are currently in effect?
2. What preparedness actions should be conducted?
3. How can emergency managers and community leaders message these preparedness actions to the Whole Community?

Discussion questions for map 2 (Arrival time of tropical storm force winds):

1. What time and date will tropical-storm-force winds most likely start along the North Carolina coast?
2. Will outdoor preparedness activities likely be safe after this time?

Discussion questions for map 3 (Quantitative Precipitation Forecast):

1. What other hazards could be expected?

Text for the maps and advisories are below.

ZCZC MIATCMAT1 ALL
TTAA00 KNHC DDHMM

HURRICANE FLORENCE **FORECAST/ADVISORY** NUMBER 56
NWS NATIONAL HURRICANE CENTER MIAMI FL AL062018
0900 UTC THU SEP 13 2018

CHANGES IN WATCHES AND WARNINGS WITH THIS ADVISORY...

THE TROPICAL STORM WATCH FROM NORTH OF THE NORTH CAROLINA/VIRGINIA BORDER TO CAPE CHARLES LIGHT VIRGINIA AND FOR THE CHESAPEAKE BAY SOUTH OF NEW POINT COMFORT HAS BEEN CHANGED TO A TROPICAL STORM WARNING.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT...

A STORM SURGE WARNING IS IN EFFECT FOR...

- * SOUTH SANTEE RIVER SOUTH CAROLINA TO DUCK NORTH CAROLINA
- * ALBEMARLE AND PAMLICO SOUNDS... INCLUDING THE NEUSE AND PAMLICO RIVERS

A STORM SURGE WATCH IS IN EFFECT FOR...

- * EDISTO BEACH SOUTH CAROLINA TO SOUTH SANTEE RIVER SOUTH CAROLINA
- * NORTH OF DUCK NORTH CAROLINA TO THE NORTH CAROLINA/VIRGINIA BORDER

A HURRICANE WARNING IS IN EFFECT FOR...

- * SOUTH SANTEE RIVER SOUTH CAROLINA TO DUCK NORTH CAROLINA
- * ALBEMARLE AND PAMLICO SOUNDS

A HURRICANE WATCH IS IN EFFECT FOR...

- * EDISTO BEACH SOUTH CAROLINA TO SOUTH SANTEE RIVER SOUTH CAROLINA

A TROPICAL STORM WARNING IS IN EFFECT FOR...

- * NORTH OF DUCK NORTH CAROLINA TO CAPE CHARLES LIGHT VIRGINIA
- * CHESAPEAKE BAY SOUTH OF NEW POINT COMFORT

INTERESTS ELSEWHERE IN THE SOUTHEASTERN AND MID-ATLANTIC STATES SHOULD MONITOR THE PROGRESS OF FLORENCE.

A STORM SURGE WARNING MEANS THERE IS A DANGER OF LIFE-THREATENING INUNDATION... FROM RISING WATER MOVING INLAND FROM THE COASTLINE. FOR A DEPICTION OF AREAS AT RISK... PLEASE SEE THE NATIONAL WEATHER SERVICE STORM SURGE WATCH/WARNING GRAPHIC... AVAILABLE AT HURRICANES.GOV. THIS IS A LIFE-THREATENING SITUATION. PERSONS LOCATED WITHIN THESE AREAS SHOULD TAKE ALL NECESSARY ACTIONS TO PROTECT LIFE AND PROPERTY FROM RISING WATER AND THE POTENTIAL FOR OTHER DANGEROUS CONDITIONS. PROMPTLY FOLLOW EVACUATION AND OTHER INSTRUCTIONS FROM LOCAL OFFICIALS.

A STORM SURGE WATCH MEANS THERE IS A POSSIBILITY OF LIFE-THREATENING INUNDATION... FROM RISING WATER MOVING INLAND FROM THE COASTLINE.

A HURRICANE WARNING MEANS THAT HURRICANE CONDITIONS ARE EXPECTED SOMEWHERE WITHIN THE WARNING AREA... IN THIS CASE WITHIN THE NEXT 12 TO 24 HOURS. PREPARATIONS TO PROTECT LIFE AND PROPERTY SHOULD BE NEARING COMPLETION.

A HURRICANE WATCH MEANS THAT HURRICANE CONDITIONS ARE POSSIBLE WITHIN THE WATCH AREA. A WATCH IS TYPICALLY ISSUED 48 HOURS BEFORE THE ANTICIPATED FIRST OCCURRENCE OF TROPICAL-STORM-FORCE

WINDS... CONDITIONS THAT MAKE OUTSIDE PREPARATIONS DIFFICULT OR DANGEROUS.

A TROPICAL STORM WARNING MEANS THAT TROPICAL STORM CONDITIONS ARE EXPECTED SOMEWHERE WITHIN THE WARNING AREA.

HURRICANE CENTER LOCATED NEAR 32.8N 74.7W AT 13/0900Z
POSITION ACCURATE WITHIN 15 NM

PRESENT MOVEMENT TOWARD THE NORTHWEST OR 315 DEGREES AT 13 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 956 MB
MAX SUSTAINED WINDS 95 KT WITH GUSTS TO 115 KT.
64 KT..... 70NE 60SE 50SW 60NW.
50 KT.....100NE 90SE 70SW 80NW.
34 KT.....170NE 150SE 110SW 140NW.
12 FT SEAS..330NE 240SE 240SW 300NW.
WINDS AND SEAS VARY GREATLY IN EACH QUADRANT. RADII IN NAUTICAL MILES ARE THE LARGEST RADII EXPECTED ANYWHERE IN THAT QUADRANT.

REPEAT...CENTER LOCATED NEAR 32.8N 74.7W AT 13/0900Z
AT 13/0600Z CENTER WAS LOCATED NEAR 32.5N 74.3W

FORECAST VALID 13/1800Z 33.7N 76.1W
MAX WIND 95 KT...GUSTS 115 KT.
64 KT... 70NE 60SE 50SW 60NW.
50 KT...100NE 90SE 70SW 80NW.
34 KT...170NE 150SE 110SW 130NW.

FORECAST VALID 14/0600Z 34.2N 77.4W
MAX WIND 90 KT...GUSTS 110 KT.
64 KT... 60NE 60SE 40SW 35NW.
50 KT... 90NE 80SE 60SW 50NW.
34 KT...160NE 150SE 100SW 90NW.

FORECAST VALID 14/1800Z 34.3N 78.4W...INLAND
MAX WIND 70 KT...GUSTS 85 KT.
64 KT... 50NE 50SE 30SW 20NW.
50 KT... 80NE 80SE 50SW 40NW.
34 KT...150NE 150SE 100SW 80NW.

FORECAST VALID 15/0600Z 34.1N 79.2W...INLAND
MAX WIND 50 KT...GUSTS 60 KT.
50 KT... 60NE 70SE 40SW 0NW.
34 KT...140NE 140SE 90SW 70NW.

FORECAST VALID 16/0600Z 33.9N 81.2W...INLAND
MAX WIND 30 KT...GUSTS 40 KT.

EXTENDED OUTLOOK. NOTE...ERRORS FOR TRACK HAVE AVERAGED NEAR 150 NM ON DAY 4 AND 175 NM ON DAY 5...AND FOR INTENSITY NEAR 15 KT EACH DAY

OUTLOOK VALID 17/0600Z 35.4N 83.3W...INLAND
MAX WIND 25 KT...GUSTS 35 KT.

OUTLOOK VALID 18/0600Z 39.5N 81.0W...POST-TROP/REMNT LOW
MAX WIND 20 KT...GUSTS 30 KT.

REQUEST FOR 3 HOURLY SHIP REPORTS WITHIN 300 MILES OF 32.8N 74.7W

NEXT ADVISORY AT 13/1500Z

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FORECASTER BROWN

NNNN

ZCZC MIATCPAT1 ALL
TTAA00 KNHC DDHMM

BULLETIN

Hurricane Florence **Advisory** Number 56
NWS National Hurricane Center Miami FL AL062018
500 AM EDT Thu Sep 13 2018

...OUTER RAIN BANDS OF FLORENCE ARE APPROACHING THE COAST OF
NORTH CAROLINA...
...LIFE-THREATENING STORM SURGE AND RAINFALL EXPECTED...

SUMMARY OF 500 AM EDT...0900 UTC...INFORMATION

LOCATION...32.8N 74.7W
ABOUT 205 MI...325 KM ESE OF WILMINGTON NORTH CAROLINA
ABOUT 250 MI...405 KM ESE OF MYRTLE BEACH SOUTH CAROLINA
MAXIMUM SUSTAINED WINDS...110 MPH...175 KM/H
PRESENT MOVEMENT...NW OR 315 DEGREES AT 15 MPH...24 KM/H
MINIMUM CENTRAL PRESSURE...956 MB...28.23 INCHES

WATCHES AND WARNINGS

CHANGES WITH THIS ADVISORY:

The Tropical Storm Watch from north of the North Carolina/Virginia border to Cape Charles Light Virginia and for the Chesapeake Bay south of New Point Comfort has been changed to a Tropical Storm Warning.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A Storm Surge Warning is in effect for...

- * South Santee River South Carolina to Duck North Carolina
- * Albemarle and Pamlico Sounds, including the Neuse and Pamlico Rivers

A Storm Surge Watch is in effect for...

- * Edisto Beach South Carolina to South Santee River South Carolina
- * North of Duck North Carolina to the North Carolina/Virginia border

A Hurricane Warning is in effect for...

- * South Santee River South Carolina to Duck North Carolina
- * Albemarle and Pamlico Sounds

A Hurricane Watch is in effect for...

- * Edisto Beach South Carolina to South Santee River South Carolina

A Tropical Storm Warning is in effect for...

- * North of Duck North Carolina to Cape Charles Light Virginia
- * Chesapeake Bay south of New Point Comfort

Interests elsewhere in the southeastern and mid-Atlantic states should monitor the progress of Florence.

A Storm Surge Warning means there is a danger of life-threatening inundation, from rising water moving inland from the coastline. For a depiction of areas at risk, please see the National Weather Service Storm Surge Watch/Warning Graphic, available at hurricanes.gov. This is a life-threatening situation. Persons located within these areas should take all necessary actions to protect life and property from rising water and the potential for other dangerous conditions. Promptly follow evacuation and other instructions from local officials.

A Storm Surge Watch means there is a possibility of life-threatening inundation, from rising water moving inland from the coastline.

A Hurricane Warning means that hurricane conditions are expected somewhere within the warning area, in this case within the next 12 to 24 hours. Preparations to protect life and property should be nearing completion.

A Hurricane Watch means that hurricane conditions are possible within the watch area. A watch is typically issued 48 hours before the anticipated first occurrence of tropical-storm-force winds, conditions that make outside preparations difficult or dangerous.

A Tropical Storm Warning means that tropical storm conditions are expected somewhere within the warning area.

For storm information specific to your area, including possible inland watches and warnings, please monitor products issued by your local National Weather Service forecast office.

DISCUSSION AND OUTLOOK

At 500 AM EDT (0900 UTC), the center of Hurricane Florence was located near latitude 32.8 North, longitude 74.7 West. Florence is moving toward the northwest near 15 mph (24 km/h), and this general motion, accompanied by a gradual decrease in forward speed, is expected to continue through today. A turn to the west-northwest and west at an even slower forward speed is expected tonight and Friday, and a slow west-southwestward motion is forecast Friday night and Saturday. On the forecast track, the center of Florence will approach the coasts of North and South Carolina later today, then move near or over the coast of southern North Carolina and eastern South Carolina in the hurricane warning area tonight and Friday. A slow motion over eastern South Carolina is forecast Friday night through Saturday night.

Maximum sustained winds are near 110 mph (175 km/h) with higher gusts. Little change in strength is expected before the center

reaches the coast, with weakening expected after the center moves inland.

Florence is a large hurricane. Hurricane-force winds extend outward up to 80 miles (130 km) from the center and tropical-storm-force winds extend outward up to 195 miles (315 km). A NOAA buoy located about 80 miles (130 km) south of the center of Florence has recently reported sustained winds of 52 mph (83 km/h) with a gust to 64 mph (104 km/h).

The estimated minimum central pressure is 956 mb (28.23 inches).

HAZARDS AFFECTING LAND

STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters moving inland from the shoreline. The water has the potential to reach the following heights above ground if peak surge occurs at the time of high tide...

Cape Fear NC to Cape Lookout NC, including the Neuse, Pamlico, Pungo, and Bay Rivers...9-13 ft
North Myrtle Beach SC to Cape Fear NC...6-9 ft
Cape Lookout NC to Ocracoke Inlet NC...6-9 ft
South Santee River SC to North Myrtle Beach SC...4-6 ft
Ocracoke Inlet NC to Salvo NC...4-6 ft
Salvo NC to North Carolina/Virginia Border...2-4 ft
Edisto Beach SC to South Santee River SC...2-4 ft

The deepest water will occur along the immediate coast in areas of onshore winds, where the surge will be accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances. For information specific to your area, please see products issued by your local National Weather Service forecast office.

RAINFALL: Florence is expected to produce heavy and excessive rainfall in the following areas...

Coastal North Carolina into far northeastern South Carolina...20 to 30 inches, isolated 40 inches. This rainfall would produce catastrophic flash flooding and prolonged significant river flooding.

Rest of South and North Carolina into southwest Virginia...6 to 12 inches, isolated 24 inches.

WIND: Hurricane conditions are expected to reach the coast within the hurricane warning area this evening or early Friday. Winds are expected to first reach tropical storm strength by later this morning or early this afternoon, making outside preparations difficult or dangerous. Preparations to protect life and property

should be nearing completion.

TORNADOES: A few tornadoes are possible in eastern North Carolina through Friday.

SURF: Swells generated by Florence are affecting Bermuda, portions of the U.S. East Coast, and the northwestern and central Bahamas. These swells are likely to cause life-threatening surf and rip current conditions. Please consult products from your local weather office.

NEXT ADVISORY

Next intermediate advisory at 800 AM EDT.

Next complete advisory at 1100 AM EDT.

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Forecaster Brown

ZCZC MIATCDAT1 ALL
TTAA00 KNHC DDHMM

Hurricane Florence **Discussion** Number 56
NWS National Hurricane Center Miami FL AL062018
500 AM EDT Thu Sep 13 2018

The satellite presentation of Florence has changed little overnight with the eye waxing and waning in infrared imagery. The eye has moved into NWS radar range and can be seen in radar data from Morehead City and Wilmington NWS 88-D imagery. An 0616 UTC AMSR2 microwave overpass indicated that the convection over the southern and southeastern portions of the storm is still disrupted, and that the eyewall was open to the southeast. An Air Force Hurricane Hunter aircraft also reported that the eyewall was not fully intact on its last pass through the storm just after that time. The Air Force plane measured a peak 700-mb flight level wind of 102 kt and peak SFMR winds of 85 kt during the mission. These data suggest that the intensity may be slightly lower, but the initial intensity has been maintained at 95 kt, since the plane may not have sampled the strongest winds. Another Air Force plane will be in Florence shortly, and should provide a better assessment of the intensity of the hurricane. As mentioned in the previous discussion, it appears that some southern shear has caused the degradation of the inner core. The global models suggest that this shear will relax today while Florence moves over warm waters, however, given the current storm structure, little overall change in strength is anticipated as Florence approaches the coast. Gradual weakening should occur as the hurricane interacts with land in 24-36 h, with a faster rate of weakening predicted once Florence moves farther inland.

Florence is moving northwestward or 315 degrees at 13 kt. A developing mid-level ridge over the north-central United States should cause the forward speed of the hurricane to decrease today. As the steering currents collapse tonight and Friday, Florence is forecast to drift westward or west-southwestward and continue that slow motion into the weekend. The global models predict that the ridge will slide eastward over the weekend, which should allow Florence to turn northwestward and northward by the end of the forecast period. Although there is still some spread in the guidance by 48 hours, with the GFS along the northern side of the guidance envelope, and the ECWMF along the southern edge, the various consensus aids have moved little. As a result, the new NHC forecast track is very similar to the previous advisory.

Aircraft and satellite wind data show that Florence is a large hurricane. Life-threatening storm surge, heavy rainfall, and damaging wind will cover a large area regardless of exactly where the center of Florence moves.

Key Messages:

1. A life-threatening storm surge is now highly likely along portions of the coastlines of South Carolina and North Carolina, and a Storm Surge Warning is in effect for a portion of this area. All interests in these areas should complete preparations and follow any advice given by local officials.

2. Life-threatening, catastrophic flash flooding and prolonged significant river flooding are likely over portions of the Carolinas and the southern and central Appalachians late this week into early next week, as Florence is expected to slow down as it approaches the coast and moves inland.

3. Damaging hurricane-force winds are likely along portions of the coasts of South Carolina and North Carolina, and a Hurricane Warning is in effect. Strong winds could also spread inland into portions of the Carolinas.

4. Large swells affecting Bermuda, portions of the U.S. East Coast, and the northwestern and central Bahamas will continue this week, resulting in life-threatening surf and rip currents.

FORECAST POSITIONS AND MAX WINDS

INIT	13/0900Z	32.8N	74.7W	95 KT	110 MPH	
12H	13/1800Z	33.7N	76.1W	95 KT	110 MPH	
24H	14/0600Z	34.2N	77.4W	90 KT	105 MPH	
36H	14/1800Z	34.3N	78.4W	70 KT	80 MPH...	INLAND
48H	15/0600Z	34.1N	79.2W	50 KT	60 MPH...	INLAND
72H	16/0600Z	33.9N	81.2W	30 KT	35 MPH...	INLAND
96H	17/0600Z	35.4N	83.3W	25 KT	30 MPH...	INLAND
120H	18/0600Z	39.5N	81.0W	20 KT	25 MPH...	POST-TROP/REMNT LOW

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Forecaster Brown

NNNN

ZCZC MIAPWSAT1 ALL
TTAA00 KNHC DDHHMM

HURRICANE FLORENCE **WIND SPEED PROBABILITIES** NUMBER 56
NWS NATIONAL HURRICANE CENTER MIAMI FL AL062018
0900 UTC THU SEP 13 2018

AT 0900Z THE CENTER OF HURRICANE FLORENCE WAS LOCATED NEAR LATITUDE
32.8 NORTH...LONGITUDE 74.7 WEST WITH MAXIMUM SUSTAINED WINDS NEAR
95 KTS...110 MPH...175 KM/H.

Z INDICATES COORDINATED UNIVERSAL TIME (GREENWICH)
ATLANTIC STANDARD TIME (AST)...SUBTRACT 4 HOURS FROM Z TIME
EASTERN DAYLIGHT TIME (EDT)...SUBTRACT 4 HOURS FROM Z TIME
CENTRAL DAYLIGHT TIME (CDT)...SUBTRACT 5 HOURS FROM Z TIME

WIND SPEED PROBABILITY TABLE FOR SPECIFIC LOCATIONS

CHANCES OF SUSTAINED (1-MINUTE AVERAGE) WIND SPEEDS OF AT LEAST
...34 KT (39 MPH... 63 KM/H)...
...50 KT (58 MPH... 93 KM/H)...
...64 KT (74 MPH...119 KM/H)...

FOR LOCATIONS AND TIME PERIODS DURING THE NEXT 5 DAYS

PROBABILITIES FOR LOCATIONS ARE GIVEN AS OP(CP) WHERE
OP IS THE PROBABILITY OF THE EVENT BEGINNING DURING
AN INDIVIDUAL TIME PERIOD (ONSET PROBABILITY)
(CP) IS THE PROBABILITY OF THE EVENT OCCURRING BETWEEN
06Z THU AND THE FORECAST HOUR (CUMULATIVE PROBABILITY)

PROBABILITIES ARE GIVEN IN PERCENT
X INDICATES PROBABILITIES LESS THAN 1 PERCENT
PROBABILITIES FOR 34 KT AND 50 KT ARE SHOWN AT A GIVEN LOCATION WHEN
THE 5-DAY CUMULATIVE PROBABILITY IS AT LEAST 3 PERCENT.
PROBABILITIES FOR 34...50...64 KT SHOWN WHEN THE 5-DAY
64-KT CUMULATIVE PROBABILITY IS AT LEAST 1 PERCENT.

Advisory 68: Sunday, September 16, 2018 5:00 AM EDT

Page 8 of the Activity Handout (AWR343_PX_RC2020(a)) show the following Graphic and Update for NOAA/NHC Advisory products:

1. 5-Day Forecast Track (Sunday, September 16)

Discussion questions for map 1 (5-day Forecast Track):

1. What Watches are currently in effect?
2. What preparedness actions should be conducted?
3. How can emergency managers and community leaders message these preparedness actions to the Whole Community?

BULLETIN

Tropical Depression Florence **Advisory** Number 68
NWS National Hurricane Center Miami FL AL062018
500 AM EDT Sun Sep 16 2018

...FLORENCE WEAKENS TO A DEPRESSION BUT FLASH FLOODING AND MAJOR RIVER FLOODING WILL CONTINUE OVER A SIGNIFICANT PORTION OF THE CAROLINAS...

SUMMARY OF 500 AM EDT...0900 UTC...INFORMATION

LOCATION...33.8N 81.4W
ABOUT 20 MI...35 KM SW OF COLUMBIA SOUTH CAROLINA
MAXIMUM SUSTAINED WINDS...35 MPH...55 KM/H
PRESENT MOVEMENT...W OR 280 DEGREES AT 8 MPH...13 KM/H
MINIMUM CENTRAL PRESSURE...1000 MB...29.53 INCHES

WATCHES AND WARNINGS

CHANGES WITH THIS ADVISORY:

The Tropical Storm Warning from South Santee River South Carolina to Surf City North Carolina is discontinued.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

There are no coastal watches or warnings in effect.

Interests in the southeastern and mid-Atlantic states should monitor the progress of Florence due to the heavy rainfall threat.

DISCUSSION AND OUTLOOK

At 500 AM EDT (0900 UTC), the center of Tropical Depression Florence was located near latitude 33.8 North, longitude 81.4 West. The depression is moving toward the west near 8 mph (13 km/h). A turn toward the northwest with an increase in forward speed is expected today, followed by a turn toward the north and northeast with an additional increase in forward speed on Monday. On the forecast track, Florence's center will move across the western Carolinas today and then recurve over the Ohio Valley and Northeast U.S. Monday and Tuesday.

Maximum sustained winds have decreased to near 35 mph (55 km/h) with higher gusts. Continued gradual weakening is forecast during the next couple of days.

The estimated minimum central pressure is 1000 mb (29.53 inches).

HAZARDS AFFECTING LAND

RAINFALL: Florence is expected to produce heavy and excessive rainfall in the following areas...

Central and western North Carolina into far southwest Virginia...

An additional 5 to 10 inches, with storm total accumulations of 15 to 20 inches in western North Carolina. These rainfall amounts will produce catastrophic flash flooding, prolonged significant river flooding, and an elevated risk for landslides in western North Carolina and far southwest Virginia.

Southern North Carolina into Northern South Carolina...

An additional 4 to 6 inches, isolated 8 inches. This rainfall will result in additional flash flooding while also exacerbating the river flooding. Storm total accumulations of 30 to 40 inches in southeast North Carolina.

West-central Virginia, north of Roanoke and west of Charlottesville...

2 to 4 inches, isolated 6 inches. This rainfall will result in flash flooding and potentially lead to some river flooding.

TORNADOES: A few tornadoes remain possible across North Carolina

and eastern South Carolina today and tonight.

SURF: Swells generated by Florence are affecting Bermuda, portions of the U.S. East Coast, and the northwestern and central Bahamas. These swells are likely to cause life-threatening surf and rip current conditions. Please consult products from your local weather office.

NEXT ADVISORY

This is the last advisory issued by the National Hurricane Center on Florence. Future information on Florence can be found in Public Advisories issued by the Weather Prediction Center beginning at 11 AM EDT, under AWIPS header TCPAT1, WMO header WTNT31 KWNH, and on the web at <https://www.wpc.ncep.noaa.gov>.

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Forecaster Pasch

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ZCZC MIATCDAT1 ALL

TTAA00 KNHC DDHHMM

Tropical Depression Florence **Discussion** Number 68
NWS National Hurricane Center Miami FL AL062018
500 AM EDT Sun Sep 16 2018

Surface observations indicate that there are no longer any sustained tropical-storm-force winds as the center of Florence has moved farther inland over South Carolina. Therefore, the system is being downgraded to a tropical depression at this time. Maximum winds are estimated to be 30 kt. Continued gradual weakening is likely, and the numerical guidance suggests that the cyclone will be disorganized enough to become a remnant low in 36 hours or so. In 72 hours, global models indicate that the system will become an extratropical cyclone, with some strengthening due to baroclinic processes as it moves over the Atlantic in 3-5 days. This scenario is very similar to that from the previous advisory.

The forward speed of Florence has increased somewhat early this morning and the motion is now near 280/7 kt. The high pressure system that has been blocking the forward progress of Florence is predicted to slide eastward and southeastward during the next day or so. As a result, over the next couple of days, Florence is expected to move northwestward, northward, and then north-northeastward around the periphery of the high. Later in the forecast period, Florence should accelerate east-northeastward in the mid-latitude westerlies. The official track forecast is similar to the previous one and close to the dynamical model consensus.

This will be the last advisory issued by the National Hurricane Center on Florence. Future information on Florence can be found in Public Advisories issued by the Weather Prediction Center beginning

at 11 AM EDT, under AWIPS header TCPAT1, WMO header WTNT31 KWNH,
and on the web at <https://www.wpc.ncep.noaa.gov>.

Key Messages:

1. Life-threatening, catastrophic flash floods and prolonged significant river flooding are likely over portions of the Carolinas and the southern to central Appalachians from western North Carolina into west-central Virginia and far eastern West Virginia through early this week, as Florence continues to move slowly inland. In addition to the flash flood and flooding threat, landslides are also possible in the higher terrain of the southern and central Appalachians across western North Carolina into southwest Virginia.

2. Large swells affecting Bermuda, portions of the U.S. East Coast, and the northwestern and central Bahamas will continue this week, resulting in life-threatening surf and rip currents.

FORECAST POSITIONS AND MAX WINDS

INIT	16/0900Z	33.8N	81.4W	30 KT	35 MPH...INLAND
12H	16/1800Z	34.7N	82.5W	30 KT	35 MPH...INLAND
24H	17/0600Z	36.7N	83.6W	25 KT	30 MPH...INLAND
36H	17/1800Z	38.7N	82.6W	20 KT	25 MPH...POST-TROP/REMNT LOW
48H	18/0600Z	39.8N	79.5W	20 KT	25 MPH...POST-TROP/REMNT LOW
72H	19/0600Z	42.0N	68.0W	30 KT	35 MPH...POST-TROP/EXTRATROP
96H	20/0600Z	43.5N	55.0W	35 KT	40 MPH...POST-TROP/EXTRATROP
120H	21/0600Z	46.0N	40.0W	40 KT	45 MPH...POST-TROP/EXTRATROP

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Forecaster Pasch

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