



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

January 26, 2021

Specialist's Report

METEOROLOGY

ERA21LA085

Table Of Contents

A.	ACCIDENT	3
B.	METEOROLOGIST	3
C.	DETAILS OF THE INVESTIGATION	3
D.	WEATHER INFORMATION	3
1.0	Surface Observations	3
2.0	Weather Radar	5
3.0	Lightning.....	7
4.0	HRRR Model Sounding.....	7
5.0	Satellite Imagery	8
6.0	Pilot Reports.....	9
7.0	Area Forecast Discussion.....	9
8.0	Terminal Aerodrome Forecasts.....	10
9.0	AIRMETs SIERRA	10
10.0	SIGMETs	11
11.0	CWSU Products	11

A. ACCIDENT

Location: Midway, Georgia
Date: December 20, 2020
Time: 2011 eastern standard time (0111 UTC on December 21, 2020)¹
Aircraft: Type – Cessna 210L; Registration – N2246S

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
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National Transportation Safety Board

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's meteorological specialist did not travel in support of this accident investigation and gathered all weather data remotely. Unless otherwise noted, all times are in eastern standard time (EST) for December 20, 2020 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level (msl). The accident site was located at about: 31.718528° north latitude; 81.319325° west longitude at an elevation of about 5 feet.

This report provides information on the weather conditions and forecast applicable to the accident region around the accident time.

D. WEATHER INFORMATION

1.0 Surface Observations

An automated weather reporting station was located at Wright Army Airfield (Fort Stewart)/Midcoast Regional Airport (LHW) at Fort Stewart (in Hinesville), Georgia, which was located 16 miles northwest of the accident location at an elevation of about 45 feet and had a magnetic variation of about 7° west. Automated longline² reports from the LHW weather station during the times surrounding the accident time are presented here.

¹ UTC – abbreviation for Coordinated Universal Time

² “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station's Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline-dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

[1920 EST] SPECI KLHW 210020Z AUTO 06005KT 9SM OVC007 13/12 A2992 RMK AO2 RAB03E15DZB15E20 SLP135 \$=

[1950 EST] SPECI KLHW 210050Z AUTO 04007KT 8SM OVC006 13/12 A2991 RMK AO2 RAB03E15DZB15E20RAB50 SLP132 \$=

[1951 EST] SPECI KLHW 210051Z AUTO 04007KT 8SM -RA OVC006 13/12 A2991 RMK AO2 RAB03E15DZB15E20RAB50 SLP132 \$=

[1956 EST] METAR KLHW 210056Z AUTO 03006KT 7SM -RA OVC006 13/12 A2991 RMK AO2 RAB03E15DZB15E20RAB50 SLP132 P0001 T01260123 \$=

[2008 EST] SPECI KLHW 210108Z AUTO 06006KT 7SM OVC006 13/12 A2991 RMK AO2 RAE02DZB02E08 SLP132 \$=

[2021 EST] SPECI KLHW 210121Z AUTO 01004KT 9SM -RA OVC005 13/12 A2992 RMK AO2 RAE02DZB02E08RAB21 SLP135 \$=

[2041 EST] SPECI KLHW 210141Z AUTO 01004KT 3SM +RA BR BKN004 OVC008 13/12 A2992 RMK AO2 RAE02DZB02E08RAB21 BKN V OVC SLP135 \$=

At 2008 EST, the LHW weather station reported a wind from 060° at 6 knots, visibility of 7 statute mile, ceiling overcast at 600 feet above ground level (agl), temperature of 13° Celsius (C) and a dew point temperature of 12°C, altimeter setting of 29.91 inches of mercury; remarks: automated station with a precipitation discriminator, rain ended at 2002 EST and drizzle began at 2002 EST and drizzle ended at 2008 EST, sea level pressure of 1013.5 hectopascals (hPa), maintenance needed on the system.

An automated weather reporting station was located at Hunter Army Airfield (SVN) in Savannah, Georgia, which was located 20 miles north-northeast of the accident location at an elevation of about 40 feet and had a magnetic variation of about 7° west. Automated longline reports from the SVN weather station during the times surrounding the accident time are presented here.

[1856 EST] METAR KSVN 202356Z AUTO 04006KT 10SM OVC004 13/11 A2992 RMK AO2 RAE05DZB05E12DZB26E39 OVC V BKN SLP135 P0001 60003 T01340114 10178 20134 57006 \$=

[1926 EST] SPECI KSVN 210026Z AUTO 04008KT 10SM OVC005 13/11 A2993 RMK AO2 SLP139 \$=

[1953 EST] SPECI KSVN 210053Z AUTO 05006KT 9SM -RA OVC005 13/11 A2992 RMK AO2 RAB53 SLP135 \$=

[1956 EST] METAR KSVN 210056Z AUTO 05007KT 8SM -RA OVC005 13/11 A2992 RMK AO2 RAB53 SLP135 P0000 T01250107 \$=

[2011 EST] SPECI KSVN 210111Z AUTO 06007KT 7SM -RA OVC004 13/11 A2991 RMK AO2 SLP132 \$=

[2014 EST] SPECI KSVN 210114Z AUTO 06005KT 8SM OVC004 12/11 A2991 RMK
AO2 RAE12DZB12E14 SLP132 \$=

[2031 EST] SPECI KSVN 210131Z AUTO 07005KT 10SM -RA OVC004 12/11 A2992
RMK AO2 RAE12DZB12E14RAB31 SLP135 \$=

At 2011 EST, the SVN weather station reported a wind from 060° at 7 knots, visibility of 7 statute mile, light rain, ceiling overcast at 400 feet agl, temperature of 13°C and a dew point temperature of 11°C, altimeter setting of 29.91 inches of mercury; remarks: automated station with a precipitation discriminator, sea level pressure of 1013.2 hPa, maintenance needed on the system.

Unofficial meteorological reporting station MDWG1 (data courtesy of MesoWest³) was located about 7 miles northwest of the accident site at an elevation of about 15 feet. Type, calibration, maintenance, and siting standards of this instrument, as well as the overall quality of the data, are not known. Reporting of certain parameters⁴ from MDWG1 (rounded to nearest whole numbers except for liquid precipitation accumulation) during the times surrounding the accident time are presented here (time in EST):

<u>Time</u>	<u>Temp</u>	<u>D_Temp</u>	<u>RH</u>	<u>W_Mag</u>	<u>W_Dir</u>	<u>G_Mag</u>	<u>P_Acc</u>
1804	57	57	99	2	041	6	44.30
1904	56	55	98	2	052	10	44.30
2004	55	55	99	4	052	8	44.34
2104	55	55	99	2	038	7	44.41

2.0 Weather Radar

WSR-88D Level-II weather radar imagery from Charleston, South Carolina (KCLX), are presented in figures 1-3. KCLX was located about 58 miles north-northeast of the accident location at an elevation of about 230 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the KCLX 0.352° tilt would have “seen” altitudes above the accident location of between about 1,700 and 7,500 feet msl. These images depict light to heavy levels of precipitation in the immediate vicinity of the accident location moving from the southwest. A vertical cross-section of the Level-II weather radar imagery around this time along a southwest-to-northeast-oriented line that goes through the accident location is presented in figure 3. This image depicts the vertical reflectivity pattern “tilting” to the northeast with increasing height.

³ <https://mesowest.utah.edu>

⁴ Temp=temperature (°Fahrenheit[F]); D_Temp=dew point temperature (°F); RH=relative humidity (%); W_Mag=average wind magnitude (miles-per-hour[mpH]); W_Dir=average wind direction (true); G_Mag=gust wind magnitude (mph); P_Acc=liquid precipitation accumulation (inches)

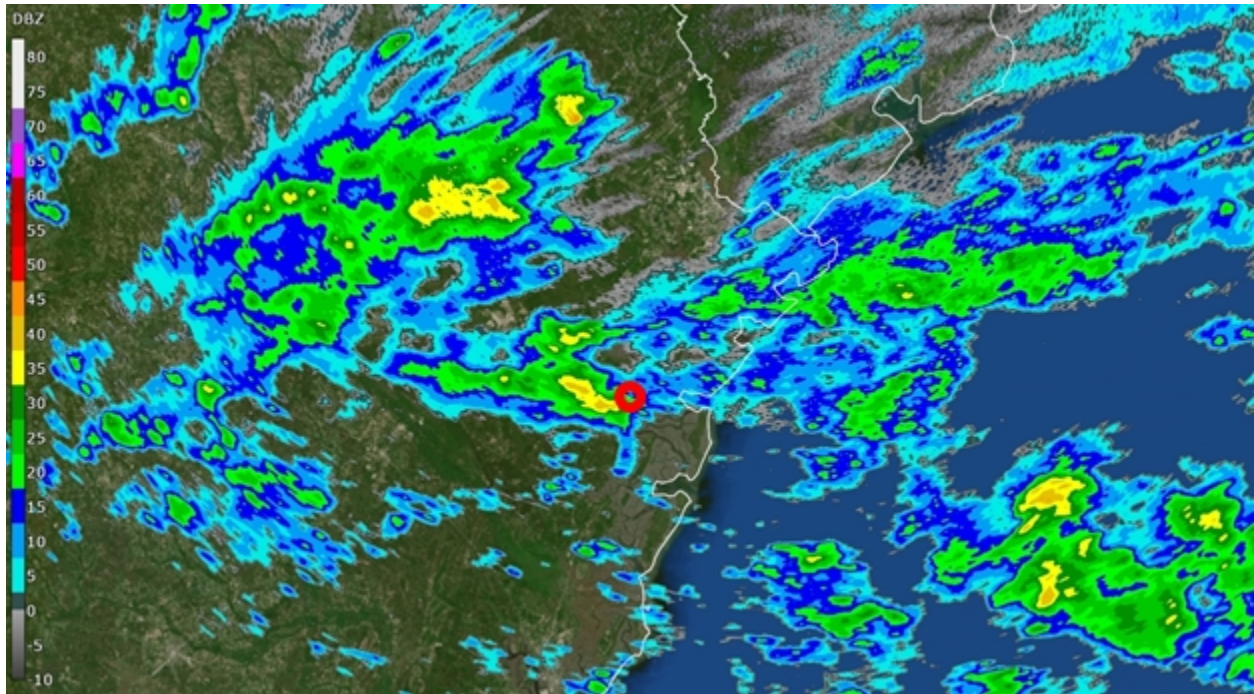


Figure 1 – KCLX 0.352° Level-II base reflectivity product from a sweep initiated at 2004:20 EST. Accident location is within the red circle.

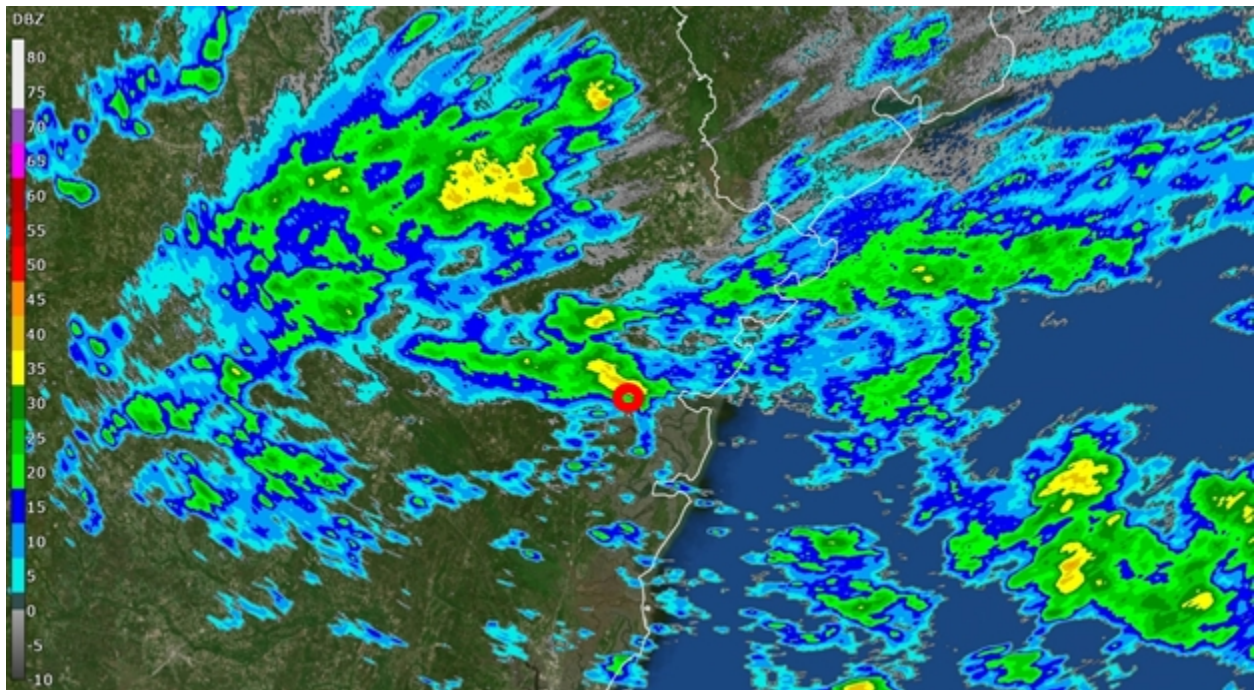


Figure 2 – KCLX 0.352° Level-II base reflectivity product from a sweep initiated at 2009:51 EST. Accident location is within the red circle.

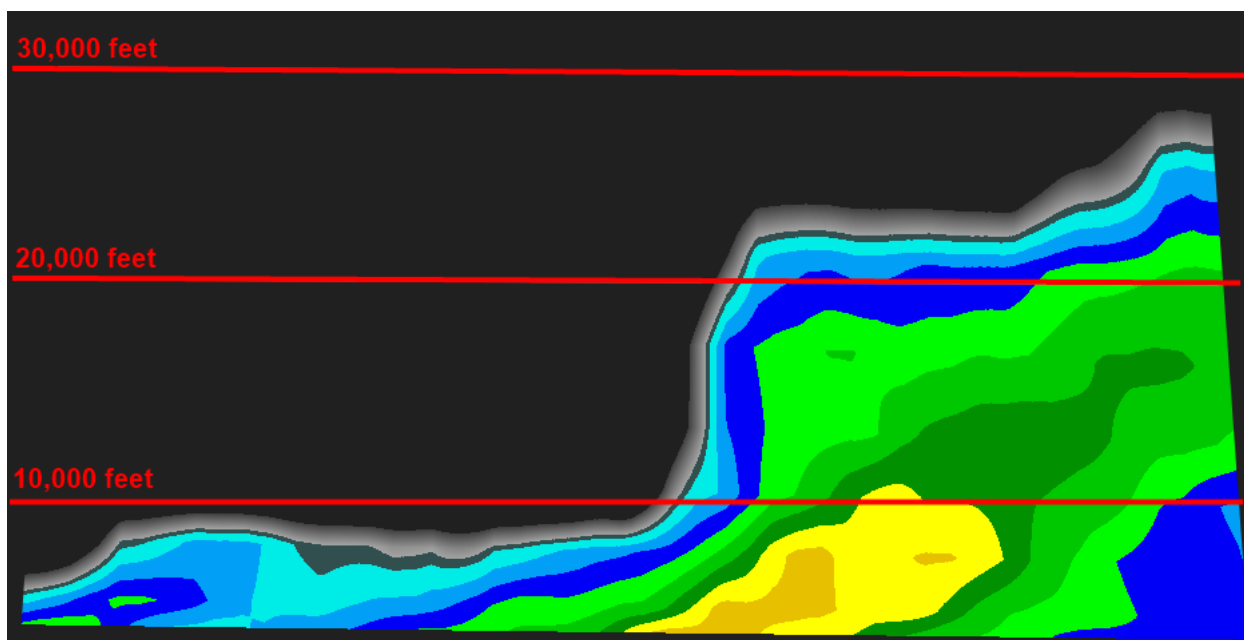


Figure 3 – Vertical cross-section of the KCLX Level-II weather radar imagery for the volume scan initiated at 2009 EST. Color table is as presented in figures 1 and 2. The left-hand-side surface coordinates are 31.684376° latitude, -81.384193° longitude; the right-hand-side surface coordinates are 31.765274° latitude, -81.233818° longitude.

3.0 Lightning

A review of the Earth Networks Total Lightning Network (ENTLN) lightning database indicated that there was no lightning activity between 1950 and 2010 EST around the accident location.⁵

4.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model⁶ sounding (figure 4) for the accident site at 2000 EST was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. Nearest the surface the wind was from the east-northeast at magnitude of 5 knots and remained from this direction through about 1,400 feet with magnitudes increasing to 10-15 knots in the layer. Above this layer the wind veered⁷ to a southwest wind of about 35 knots at about 6,700 feet. The relative humidity was 97 percent or greater from near the surface to about 12,000

⁵ The ENTLN was queried for a geographic area bounded by latitudes 30.03662°N and 29.40491°N, and longitudes 95.37781°W and 93.6145°W.

⁶ The HRRR is a NOAA real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.

⁷ A veering wind's wind barbs turn clock-wise with increasing height.

feet, and the Rawinsonde Observation Program (RAOB) identified cloudy conditions between about 300 and 13,000 feet. RAOB identified moderate low-level wind shear at the surface.

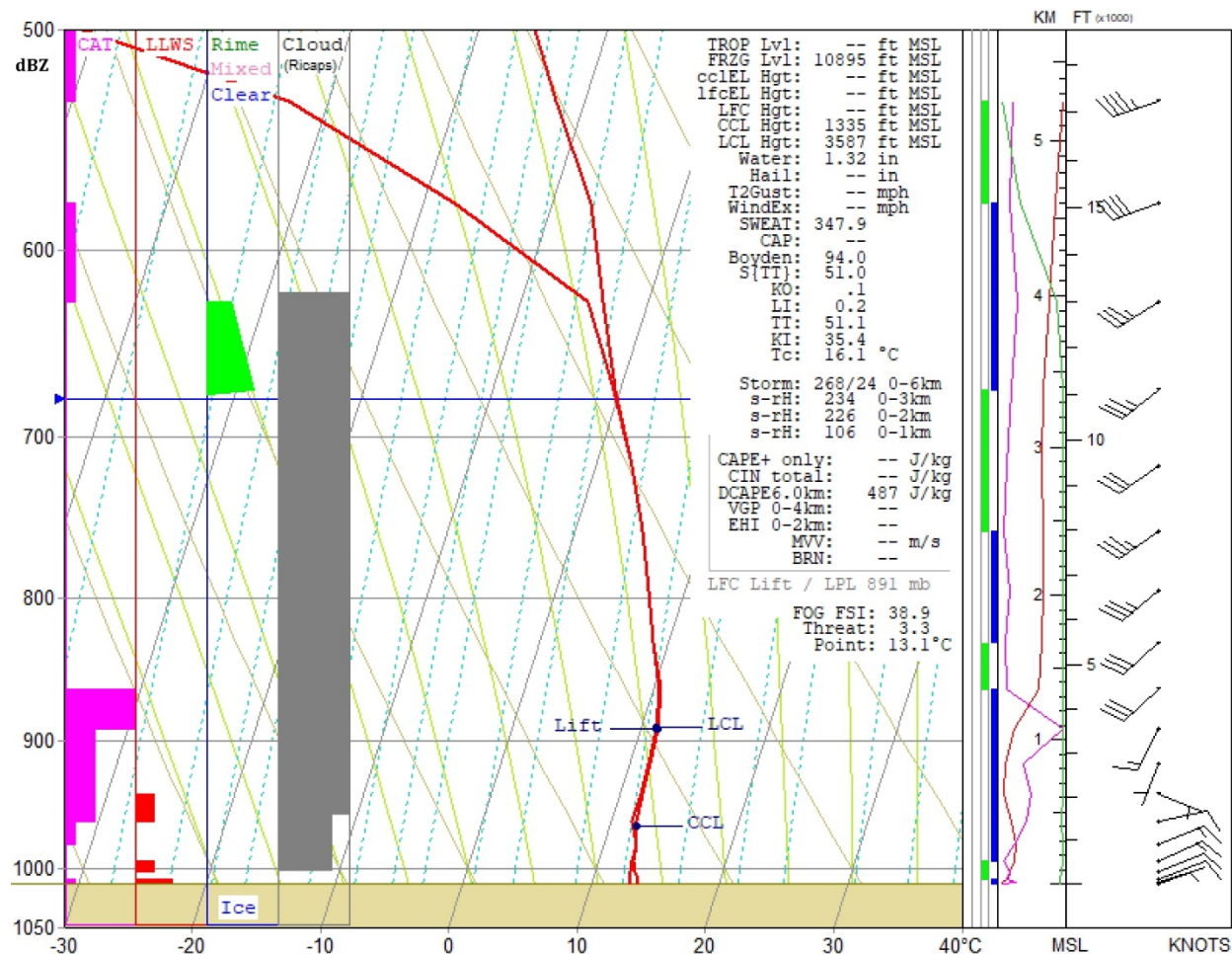


Figure 4 – HRRR model sounding data in SkewT/LogP format for 2000 EST at the accident site, surface to 500 hPa.

5.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 infrared (10.3 μ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Imagery from 2011 EST is presented in figure 5. The GOES-16 infrared brightness temperatures over the accident location were -1°C, which, when considering the HRRR model sounding, corresponded to cloud top heights of about 11,500 feet.

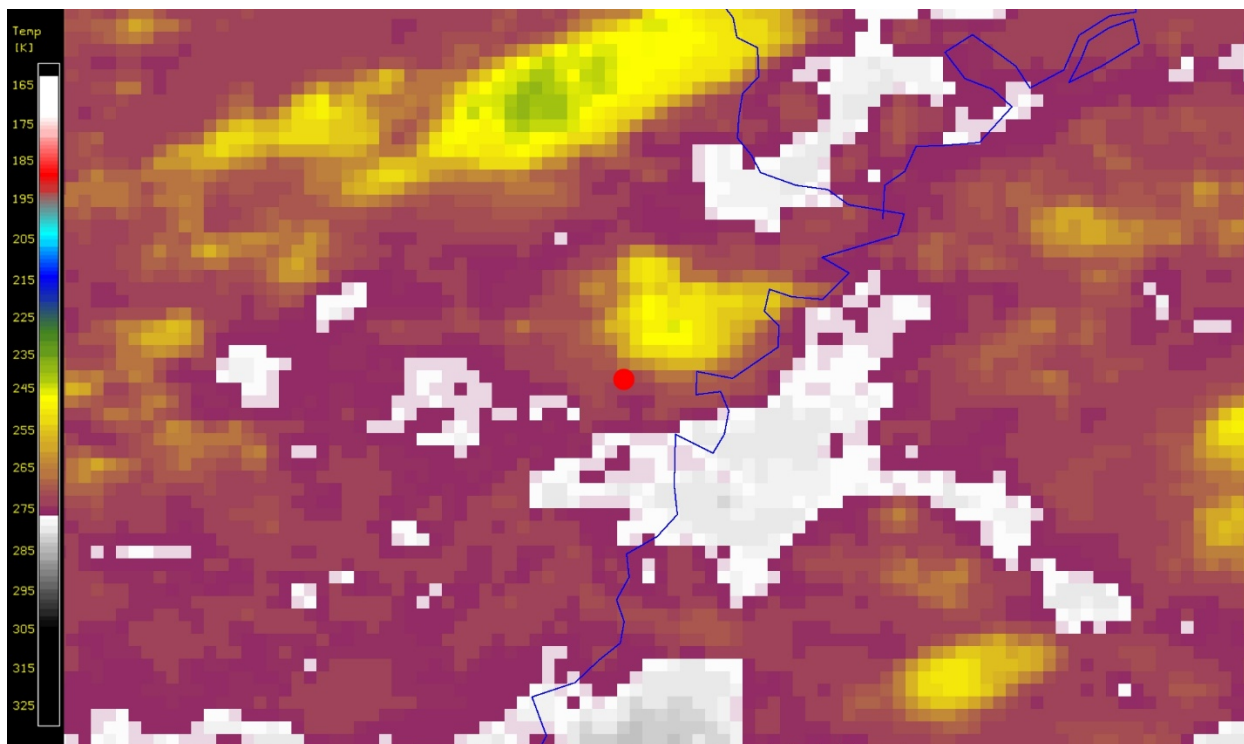


Figure 5 – GOES-16 infrared brightness temperature imagery from 2011 EST. Accident location is denoted by the red circle. This image has not been corrected for any parallax error.

6.0 Pilot Reports

There were no publicly longline-disseminated pilot reports⁸ made between 1800 EST and 2200 EST within 50 miles of the accident location.

7.0 Area Forecast Discussion

Presented here is the “Aviation” section of the Area Forecast Discussion issued at 1932 EST by the National Weather Service (NWS) Charleston, South Carolina, Weather Forecast Office.

*FXUS62 KCHS 210032
AFDCHS
Area Forecast Discussion
National Weather Service Charleston SC
732 PM EST Sun Dec 20 2020*

.AVIATION /01Z MONDAY THROUGH FRIDAY/...

Considerable moisture will remain in place tonight into Monday morning as low pressure passes offshore, as the in-situ wedge gradually erodes with time. Unlike last night, all guidance to some degree points toward IFR or even LIFR to persist at both

⁸ These do not include pilot reports only broadcast via radio.

KCHS and KSAV through about 16-17Z Monday, before VFR conditions return with gusty W-NW winds.

Periods of RA/-RA and/or DZ will occur tonight, tapering off and ending late tonight and very early Monday as a short wave moves through. But it'll take a little longer for drier air aloft to work its way in to the lower levels Monday morning, so that's why the delay in the return to VFR weather.

All aviation interest are advised that ceilings could be down near airfield minimums at times tonight, with nearby sites already showing ceilings as low as 200-300 feet.

Extended Outlook...Flight restrictions possible Wednesday night through Friday morning as a cold front affects the area. Gusty winds Thursday through Friday.

8.0 Terminal Aerodrome Forecasts

The closest NWS Terminal Aerodrome Forecast (TAF) site was Savannah/Hilton Head International Airport (SAV) in Savannah, Georgia, which was located about 25 miles north-northeast of the accident location, but its TAFs were not applicable to the accident site. According to NWS Instruction 10-813: "A NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex."⁹

At 1845 EST a TAF was issued by the NWS for SAV that forecasted for the accident time: wind from 030° at 5 knots, visibility greater than 6 statute miles, light rain, ceiling overcast at 700 feet agl.

KSAV 202345Z 2100/2124 **03005KT 6SM -RA OVC007**
FM210200 03005KT 4SM -RA BR OVC005
FM211000 33008KT P6SM SCT005 OVC008
FM211600 28011G17KT P6SM FEW035=

9.0 AIRMETs SIERRA

The NWS Aviation Weather Center (AWC) issued an Airmen's Meteorological Information (AIRMET) SIERRA advisory at 1545 EST for instrument flight rule conditions (IFR) with precipitation and mist that was applicable to the accident location at the accident time.

WAUS42 KKCI 202045
WA2S
-MIAS WA 202045
AIRMET SIERRA UPDT 7 FOR IFR AND MTN OBSCN VALID UNTIL 210300
.

⁹ www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

*AIRMET IFR...NC SC GA FL AND CSTL WTRS
FROM 20ENE HMV TO 50ESE ORF TO 90SE ECG TO 70ESE ILM TO 60ESE SAV
TO 30NW ORL TO 100SSE SJI TO 40W CEW TO 50SW PZD TO 30SSE LGC TO
30NE MCN TO 30NE ODF TO 20ENE HMV
CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z THRU 09Z.*

10.0 SIGMETs

There were no convective or non-convective Significant Meteorological Information (SIGMET) advisories active for the accident location at the accident time.

11.0 CWSU Products

The following Center Weather Advisory (CWA) was issued by the NWS Center Weather Service Unit (CWSU) at the Jacksonville Air Route Traffic Control Center that was active for an area near, but not including, the accident location.¹⁰

*FAUS22 KZJX 202340
ZJX2 CWA 202340
ZJX CWA 207 VALID UNTIL 210140
FROM 65WNW SAV-50NNE CRG-70SSW SZW-25S CEW-65WNW SAV
AREA IFR/LIFR CIG BLW 005 AND/OR VIS BLW 3SM IN -SHRA/BR. LTL CHG
EXPCD THRU PD. GA FL AL*

Submitted by:

Mike Richards
Senior Meteorologist

¹⁰ At its closest point, the boundary of the CWA was located approximately 10-15 miles southwest of the accident location. The CWA did not cover any portion of the accident aircraft's flight path on the accident flight.