



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

August 23, 2019

Weather Study

METEOROLOGY

ERA19FA234

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A. ACCIDENT

Location: Americus, Georgia
Date: July 24, 2019
Time: 0550 eastern daylight time
0950 Coordinated Universal Time (UTC)
Aircraft: Cirrus SR22, Registration: N921CD

B. METEOROLOGIST

Paul Suffern
Senior Meteorologist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's (NTSB) Meteorologist did not travel for this investigation and gathered the weather data for this investigation from official National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) sources including the National Centers for Environmental Information (NCEI). All times are eastern daylight time (EDT) on July 24, 2019, and are based upon the 24-hour clock, where local time is -4 hours from UTC, and UTC=Z (unless otherwise noted). Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of miles. NWS airport and station identifiers use the standard International Civil Aviation Organization 4-letter station identifiers versus the International Air Transport Association 3-letter identifiers, which deletes the initial country code designator "K" for U.S. airports.

The accident site was located at latitude 32.1358° N, longitude 84.1944° W at an approximate elevation of 470 feet (ft).

D. FACTUAL INFORMATION

1.0 Synoptic Situation

The synoptic or large scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction and the Weather Prediction Center, located in College Park, Maryland. These are the base products used in describing synoptic weather features and in the creation of forecasts and warnings for the NWS. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular "Aviation Weather Services", AC 00-45H.¹

¹

1.1 Surface Analysis Chart

The southeastern United States section of the NWS Surface Analysis Chart for 0500 EDT is provided as figure 1 with the location of the accident site marked within the red circle. The chart indicated a low pressure system over southeastern Georgia with a pressure of 1011-hectopascals (hPa). A frontal boundaries stretched from the low pressure system both northeastward into the western Atlantic Ocean and southwestward across Florida and into the northeastern Gulf of Mexico. The accident site was located north of the frontal boundary on the cold side of the frontal boundary.

The station models around the accident site depicted air temperatures in the upper 60's to low 70's degrees Fahrenheit (°F), dew point temperatures around 70°F with a temperature-dew point spread of 3°F or less, light northeast to calm winds under 5 knots, and overcast cloud cover south and east of the accident site with mostly clear skies north and west of the accident site. Multiple station models along the frontal boundary from extreme southeast South Carolina, southern Georgia, and northern Florida indicated light to moderate rain.

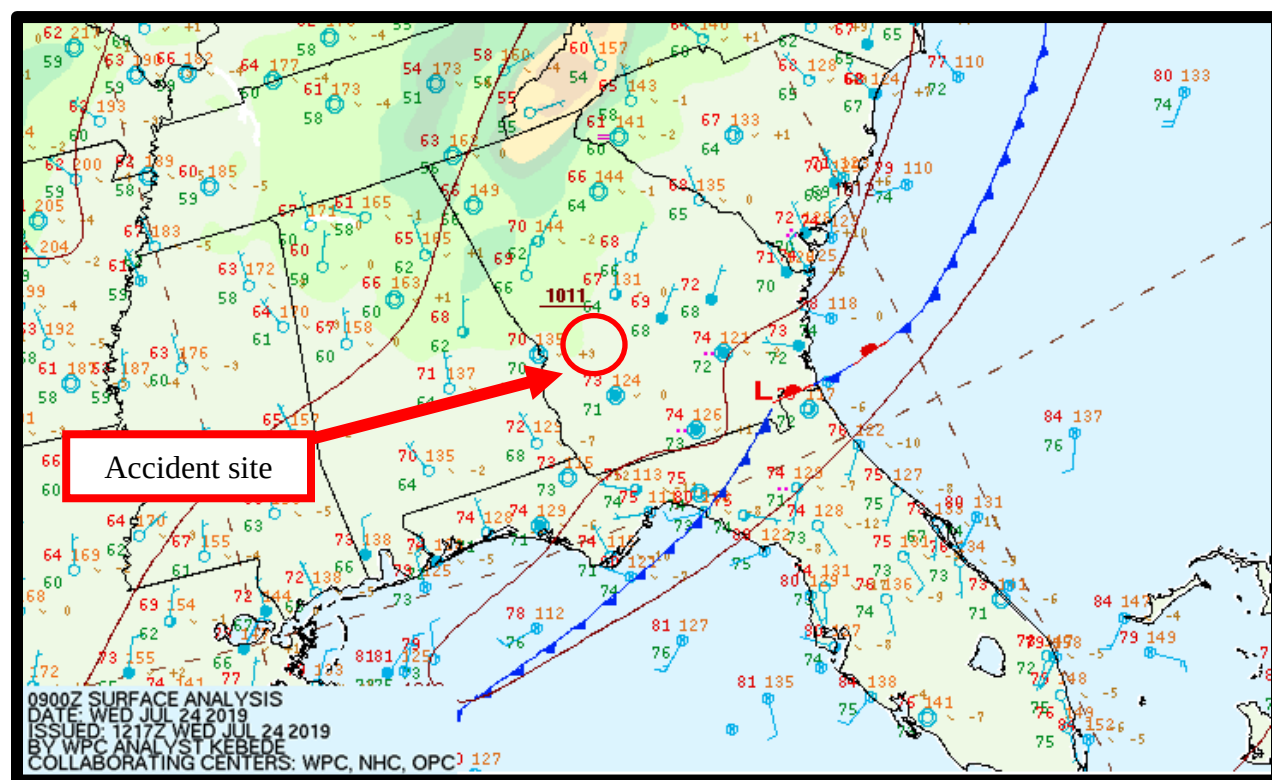


Figure 1 – NWS Surface Analysis Chart for 0500 EDT

https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1030235

1.2 Upper Air Charts

The NWS Storm Prediction Center (SPC) Constant Pressure Charts for 0800 EDT at 925-, 850-, 700-, 500-, and 300-hPa are presented in figures 2 through 6. The charts depicted a low- and mid-level trough² located above the accident site at 925- through 500-hPa (figures 2 through 5). Troughs can act as lifting mechanisms to help produce clouds and precipitation if sufficient moisture is present and there is upper level support from frontal systems. The wind was variable at 5 to 10 knots at 925-hPa with the wind becoming westerly at 10 to 15 knots by 500-hPa (figure 5). At 300-hPa, the wind was from the southwest at 25 to 30 knots (figure 6).

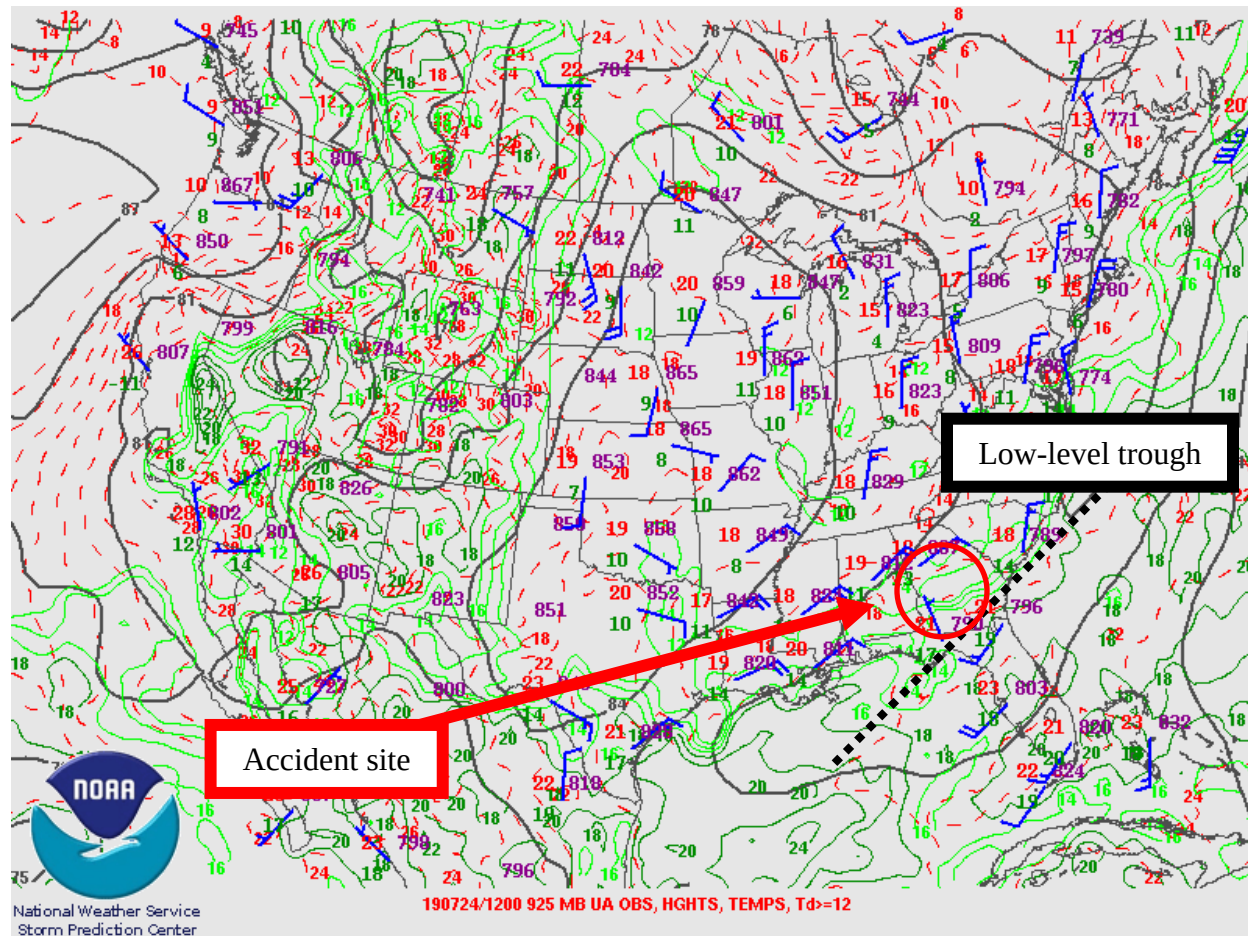


Figure 2 – 925-hPa Constant Pressure Chart for 0800 EDT

² Trough – An elongated area of relatively low atmospheric pressure or heights.

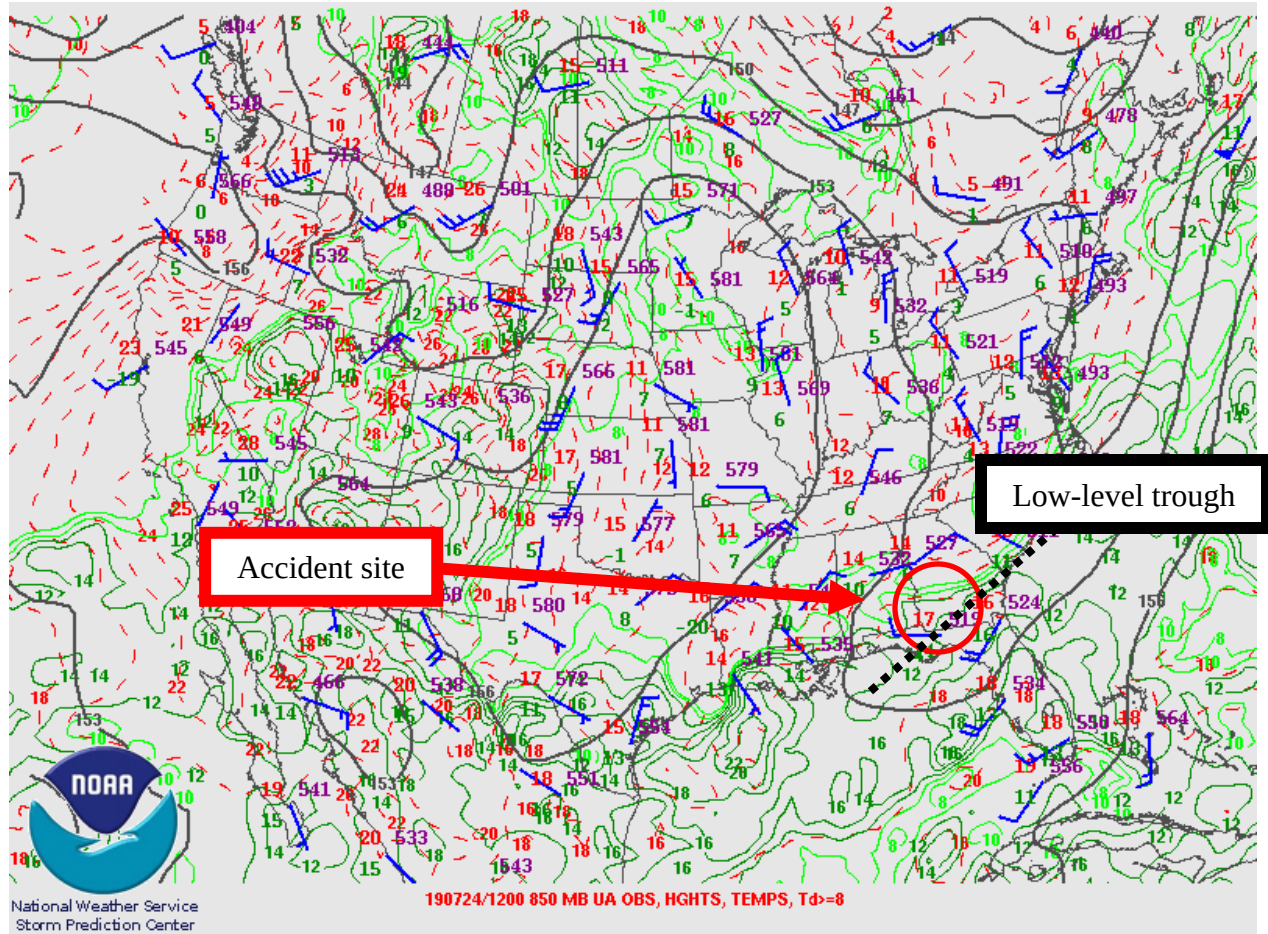


Figure 3 – 850-hPa Constant Pressure Chart for 0800 EDT

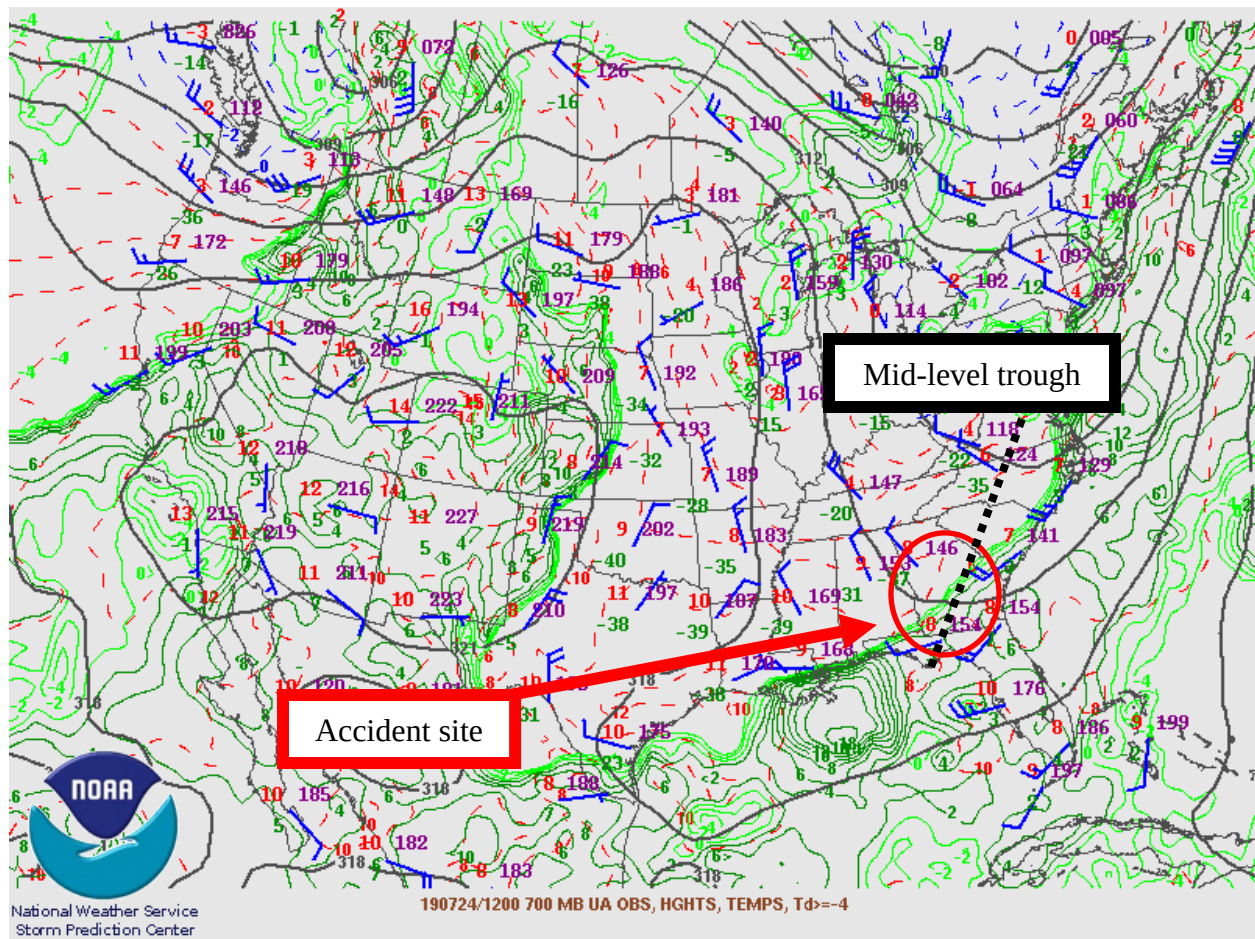
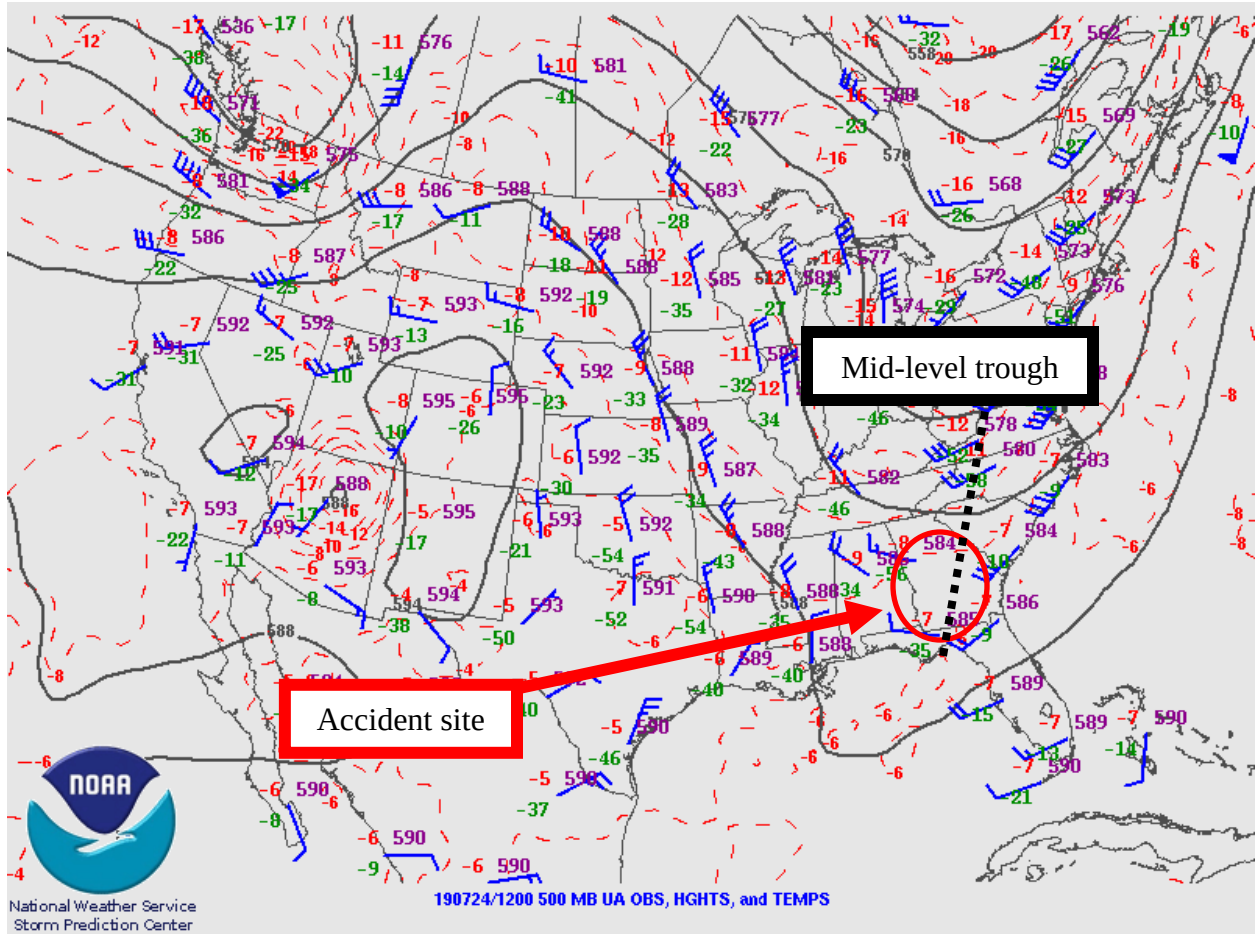


Figure 4 – 700-hPa Constant Pressure Chart for 0800 EDT



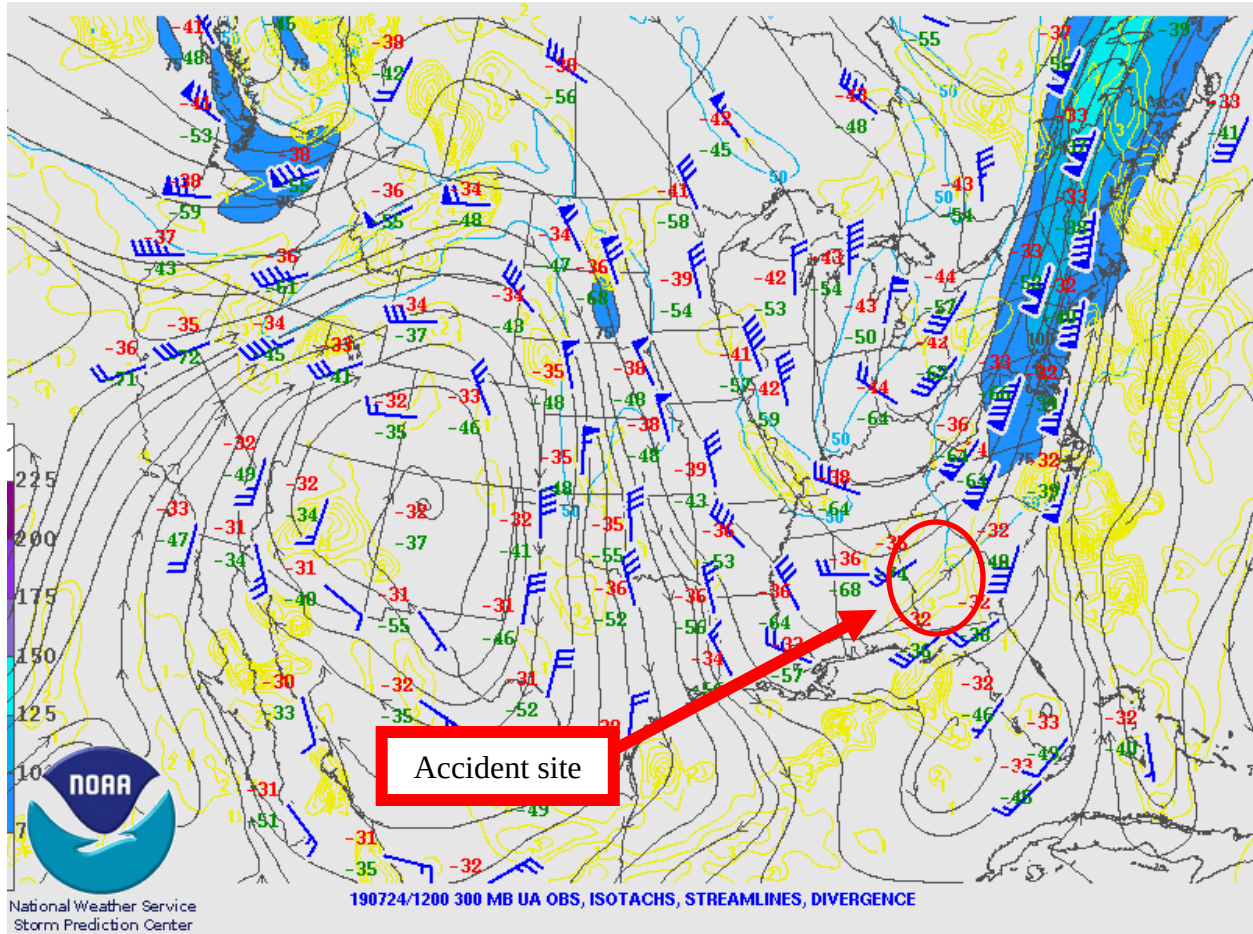


Figure 6 – 300-hPa Constant Pressure Chart for 0800 EDT

2.0 SPC Products

SPC issued the following Day 1 Convective Outlook at 2101 EDT on July 23, 2019, with areas of general thunderstorms forecast for the accident site (figure 7). SPC defines the “TSTM” area as an area that encloses where a 10% or higher probability of thunderstorms is forecast during the valid period. The SPC Day 1 Convective Outlook text follows figure 7:

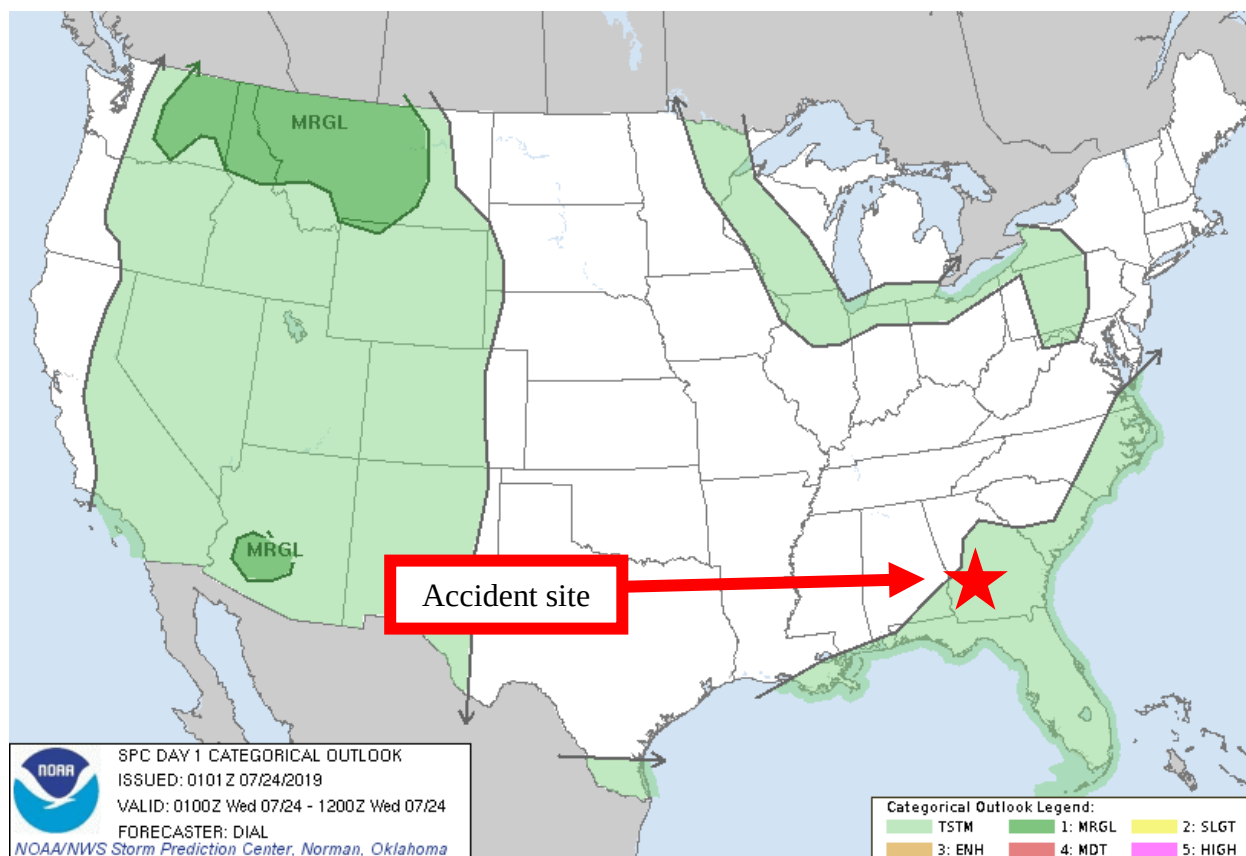


Figure 7 – SPC day 1 Convective Outlook valid at the time of the accident

SPC AC 240101

Day 1 Convective Outlook
NWS Storm Prediction Center Norman OK
0801 PM CDT Tue Jul 23 2019

Valid 240100Z - 241200Z

...THERE IS A MARGINAL RISK OF SEVERE THUNDERSTORMS OVER THE NORTHERN ROCKIES REGION AND SOUTHERN ARIZONA...

...SUMMARY...

Isolated downburst winds remain possible this evening over the northern Rockies region as well as over southern Arizona.

...Northern Rockies area...

Mid-level ascent accompanying a series of embedded vorticity maxima moving around the northern periphery of an upper ridge along with heating over the mountains has fostered the development of scattered thunderstorms over the northern Rockies. The Great Falls MT 00Z RAOB shows a well mixed boundary layer from 900-650 mb, with 50F near surface temperature-dewpoint spreads along with 1000 J/kg MLCAPE. This environment will promote a few instances of downburst winds as storms move northeast off the higher terrain this evening.

Other storms may develop later this evening from northeastern WA into northern ID, along a cold front accompanied by deeper forcing for ascent attending a shortwave trough moving through the Pacific Northwest. These storms will exist within a strongly sheared environment and may pose at least a marginal risk for a few strong to damaging gusts. Overall severe threat in this region should remain limited by weak instability and a stabilizing near-surface layer.

...Southern Arizona...

Storms moving westward off the higher terrain will remain capable of producing isolated downburst winds over southern AZ this evening where deeply mixed boundary layers and steep low-level lapse rates exist.

..Dial.. 07/24/2019

[CLICK TO GET WUUS01 PTSDY1 PRODUCT](#)

NOTE: THE NEXT DAY 1 OUTLOOK IS SCHEDULED BY 0600Z

3.0 Surface Observations

The area surrounding the accident site was documented using official Meteorological Aerodrome Reports (METARs) and Specials (SPECIs). Figure 8 is a sectional chart with the accident site and the closest weather reporting location to the accident site marked.



Figure 8 – Sectional chart of accident area with the location of the accident site and the closest surface observation site

The closest official weather reporting facility to the accident site was from the departure airport of Jimmy Carter Regional Airport (KACJ) Americus, Georgia, at an elevation of 468 ft, and was 2 mile south-southeast of the accident site. KACJ had an Automated Weather Observing System (AWOS³) whose reports were not supplemented and KACJ had a 5° westerly magnetic variation⁴ (figure 8). The following observations were taken and disseminated during the times surrounding the accident:⁵

[0350 EDT] METAR KACJ 240750Z AUTO 07004KT 10SM SCT007 SCT090 22/21 A2993 RMK AO2=

[0410 EDT] METAR KACJ 240810Z AUTO 04004KT 10SM BKN007 22/21 A2993 RMK AO2=

[0430 EDT] METAR KACJ 240830Z AUTO 04006KT 10SM OVC005 22/21 A2993 RMK AO2=

³ AWOS – Automated Weather Observing System is equipped with meteorological instruments to observe and report temperature, dewpoint, wind speed and direction, visibility, cloud coverage and ceiling up to twelve thousand feet, and altimeter setting.

⁴ Magnetic variation – The angle (at a particular location) between magnetic north and true north. Latest measurement taken from <https://skyvector.com/>

⁵ Bolded sections in this report highlight information that directly reference the weather conditions that affected the accident location around the accident time.

[0450 EDT] METAR KACJ 240850Z AUTO 05007KT 10SM OVC005 22/20 A2993 RMK AO2=

[0510 EDT] METAR KACJ 240910Z AUTO 05006KT 10SM BKN005 OVC050 22/20 A2994 RMK AO2=

[0530 EDT] METAR KACJ 240930Z AUTO 05005KT 10SM BKN007 OVC050 22/21 A2994 RMK AO2=

ACCIDENT TIME 0550 EDT

[0550 EDT] METAR KACJ 240950Z AUTO 05005KT 10SM OVC005 22/21 A2995 RMK AO2=

[0610 EDT] METAR KACJ 241010Z AUTO 05007KT 10SM OVC005 22/21 A2996 RMK AO2=

[0630 EDT] METAR KACJ 241030Z AUTO 04006KT 10SM OVC005 22/20 A2996 RMK AO2=

KACJ weather at 0510 EDT, automated, wind from 050° at 6 knots, 10 miles visibility or greater, a broken ceiling at 500 ft above ground level (agl), overcast skies at 5,000 ft agl, temperature of 22° Celsius (C), dew point temperature of 20°C, and an altimeter setting of 29.94 inches of mercury (inHg). Remarks, station with a precipitation discriminator.

KACJ weather at 0530 EDT, automated, wind from 050° at 5 knots, 10 miles visibility or greater, a broken ceiling at 700 ft agl, overcast skies at 5,000 ft agl, temperature of 22°C, dew point temperature of 21°C, and an altimeter setting of 29.94 inHg. Remarks, station with a precipitation discriminator.

KACJ weather at 0550 EDT, automated, wind from 050° at 5 knots, 10 miles visibility or greater, an overcast ceiling at 500 ft agl, temperature of 22°C, dew point temperature of 21°C, and an altimeter setting of 29.95 inHg. Remarks, station with a precipitation discriminator.

KACJ weather at 0610 EDT, automated, wind from 050° at 7 knots, 10 miles visibility or greater, an overcast ceiling at 500 ft agl, temperature of 22°C, dew point temperature of 21°C, and an altimeter setting of 29.96 inHg. Remarks, station with a precipitation discriminator.

The observations from KACJ surrounding the accident time indicated IFR⁶ ceiling conditions with a northeast surface wind around 5 knots.

⁶ As defined by the NWS and the FAA Aeronautical Information Manual (AIM) section 7-1-7 defines the following general flight categories:

- Low Instrument Flight Rules (LIFR*) – ceiling below 500 ft above ground level (agl) and/or visibility less than 1 statute mile.
- Instrument Flight Rules (IFR) – ceiling between 500 to below 1,000 feet agl and/or visibility 1 to less than 3 miles.
- Marginal Visual Flight Rules (MVFR**) – ceiling from 1,000 to 3,000 ft agl and/or visibility 3 to 5 miles.
- Visual Flight Rules (VFR) – ceiling greater 3,000 ft agl and visibility greater than 5 miles.

4.0 Upper Air Data

A High-Resolution Rapid Refresh (HRRR)⁷ model sounding was created for the accident site for 0600 EDT with a station elevation of 449 ft.⁸ The 0600 EDT HRRR sounding was plotted on a standard Skew-T Log P diagram⁹ with the derived stability parameters included in figure 9 with data from the surface to 600-hPa (or approximately 14,000 ft msl). This data was analyzed using the RAOB¹⁰ software package. The sounding depicted the lifted condensation level (LCL)¹¹ and the level of free convection (LFC)¹² at 380 ft agl (829 ft msl), and the convective condensation level (CCL)¹³ at 5,602 ft agl (6,051 ft msl). The sounding had a greater than 90% relative humidity from the surface through 2,500 ft msl. The freezing level was located at 15,289 ft msl. The precipitable water value was 1.39 inches.

* By definition, IFR is a ceiling less than 1,000 ft agl and/or visibility less than 3 miles while LIFR is a sub-category of IFR.

**By definition, VFR is a ceiling greater than or equal to 3,000 ft agl and visibility greater than 5 miles while MVFR is a sub-category of VFR.

⁷ 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.

⁸ HRRR sounding was created using NOAA Air Resource Laboratory: <https://ready.arl.noaa.gov/READYamet.php>

⁹ Skew T log P diagram – is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

¹⁰ RAOB – (The complete Rawinsonde Observation program) is an interactive sounding analysis program developed by Environmental Research Services, Matamoras, Pennsylvania.

¹¹ LCL - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

¹² LFC – The level at which a parcel of saturated air becomes warmer than the surrounding air and begins to rise freely. This occurs most readily in a conditionally unstable atmosphere.

¹³ CCL – The level in the atmosphere to which an air parcel, if heated from below, will rise dry adiabatically, without becoming colder than its environment just before the parcel becomes saturated.

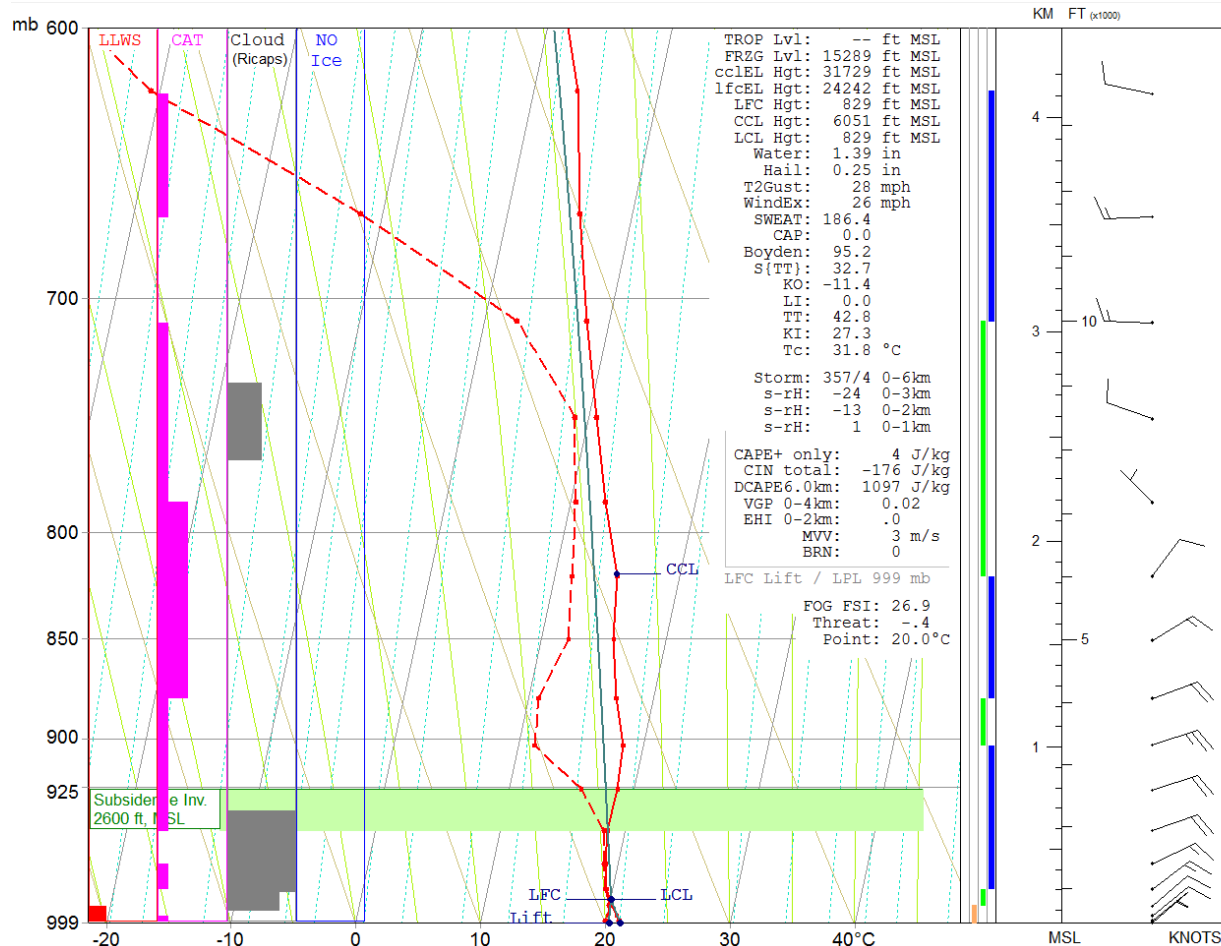


Figure 9 – 0600 EDT HRRR sounding for the accident site

The 0600 EDT HRRR sounding for the accident site indicated a stable environment from the 550 ft agl (~1,000 ft msl) through 3,000 ft msl. Alternating layers of conditions instability and stable vertical environment were indicated above 3,000 ft msl with an unstable and conditionally unstable layer below 550 ft agl to the surface. RAOB identified the possibility of clouds with bases from 300 ft agl through 2,050 ft agl (~2,500 ft msl). RAOB did not indicate the possibility of icing conditions below 14,000 ft msl. An inversion¹⁴ due to subsidence was located at 2,600 ft msl and would have helped to keep any cloud cover in place below the inversion if no vertical mixing occurred.

¹⁴ Inversion – A departure from the usual decrease of the value of an atmospheric property with increasing altitude; also, the layer through which this departure occurs (the "inversion layer"), or the lowest altitude at which the departure is found (the "base of the inversion").

The 0600 EDT HRRR sounding wind profile indicated a surface wind from 048° at 6 knots with the wind backing¹⁵ to the west by 10,000 ft msl. The wind speed increased to 25 knots by 3,000 ft msl. RAOB indicated light low-level wind shear (LLWS) between the surface and ~1,000 ft agl. RAOB indicated moderate or greater clear-air turbulence (CAT) existed between 4,000 and 7,000 ft msl with light CAT in several layers between the surface and 4,000 ft (figure 10).

Level	Height (ft-MSL)	Pres (mb)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS	Icing - Type (AFGWC method)	Wave/x---W---Turb nm fpm max
1	449	999	21.2	20.3	95	48 / 6				
2	478	998	21.1	20.0	93	49 / 6	LGT	LIGHT		
3	564	995	20.8	20.1	96	49 / 9		LIGHT		
4	719	990				48 / 11				
5	736	989	20.2	20.0	99					
6	996	980	19.5	19.4	99	51 / 13	LGT			
7	1404	966	19.0	18.9	99	63 / 16				
8	1936	948	18.6	18.3	98	70 / 18	LGT			
9	2589	926				71 / 22				
10	2600	926	18.7	15.8	83		LGT			
11	3310	903	18.4	11.3	63	71 / 26	LGT			
12	4067	879	17.0	10.8	67	68 / 22	MDT			
13	4987	851				57 / 14				
14	5006	850	15.8	12.2	79		MDT			
15	6009	820	15.0	11.4	79	35 / 8	MDT			
16	7184	786	12.8	10.4	85	318 / 5	LGT			
17	8484	750				291 / 11				
18	8512	749	10.6	8.9	89		LGT			
19	9980	710				272 / 15				
20	10009	709	8.2	2.6	68					
21	11611	668				267 / 15				
22	11657	667	5.8	-11.8	27		LGT			
23	13481	623				282 / 10				
24	13523	622	3.5	-30.7	6					
25	15581	575				298 / 8				
26	15642	574	-0.7	-44.5	2					

Figure 10 – 0600 EDT HRRR sounding text information

5.0 Satellite Data

Data from the Geostationary Operational Environmental Satellite number 16 (GOES-16) data was obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison in Madison, Wisconsin, and processed using the Man-computer Interactive Data Access System software. Visible (band 2) and infrared (bands 13) imagery at wavelengths of 0.64 microns (μm) and 10.3 μm, respectively, were retrieved for the period. Satellite imagery surrounding the time of the accident, from 0400 EDT through 1100 EDT at approximately 5-minute intervals were reviewed, and the closest images to the time of the accident are documented here. Due to the light and angle of the sun the visible imagery was not helpful for this investigation.

¹⁵ A counter-clockwise turning of the wind with height in the northern hemisphere.

Figures 11 and 12 present the GOES-16 infrared imagery from 0540 and 0550 EDT at 4X magnification and with a temperature enhancement curve applied with the accident site highlighted with a black square. Inspection of the infrared imagery indicated cloud cover over the accident site at the accident time with the lowest brightness temperatures (green and yellow colors, higher clouds) located to the east and south of the accident site. The cloud cover was moving from southwest to northeast (attachment 1). Based on the brightness temperatures above the accident site (286 Kelvin) and the vertical temperature profile provided by the 0600 EDT HRRR sounding, the approximate cloud-top heights over the accident site were 6,500 ft msl at 0550 EDT. It should be noted these figures have not been corrected for any parallax error.

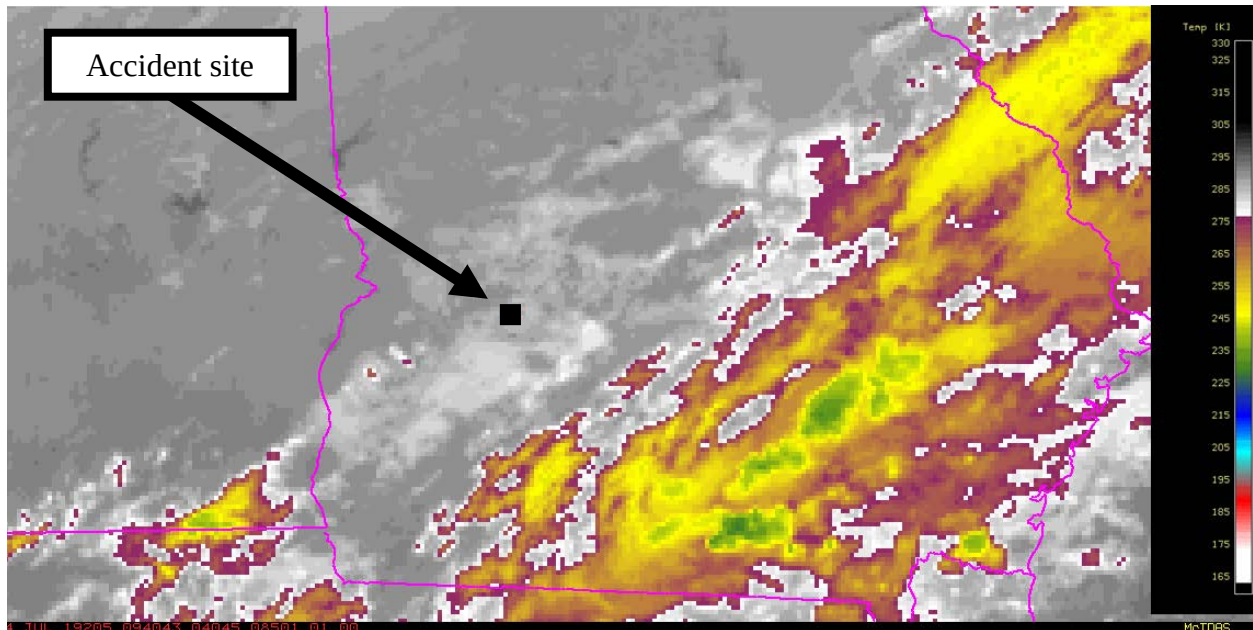


Figure 11 – GOES-16 infrared image at 0540 EDT

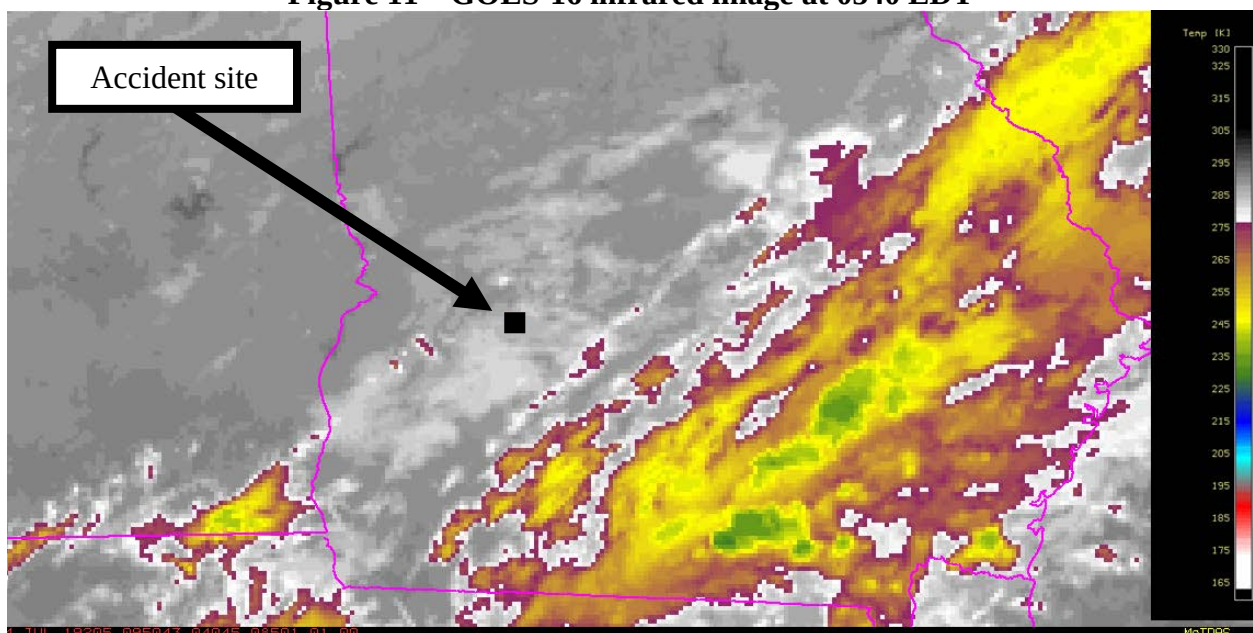


Figure 12 – GOES-16 infrared image at 0550 EDT

6.0 Regional Radar Imagery Information

A regional view of the NWS National Composite Radar Mosaic is included as figure 13 for 0550 EDT with the approximate location of the accident site marked by a red circle. The image depicted no precipitation echoes above the accident site at the accident time. There were 20 to 50 decibels (dBZ¹⁶) echoes located in southeastern Georgia (figure 13).

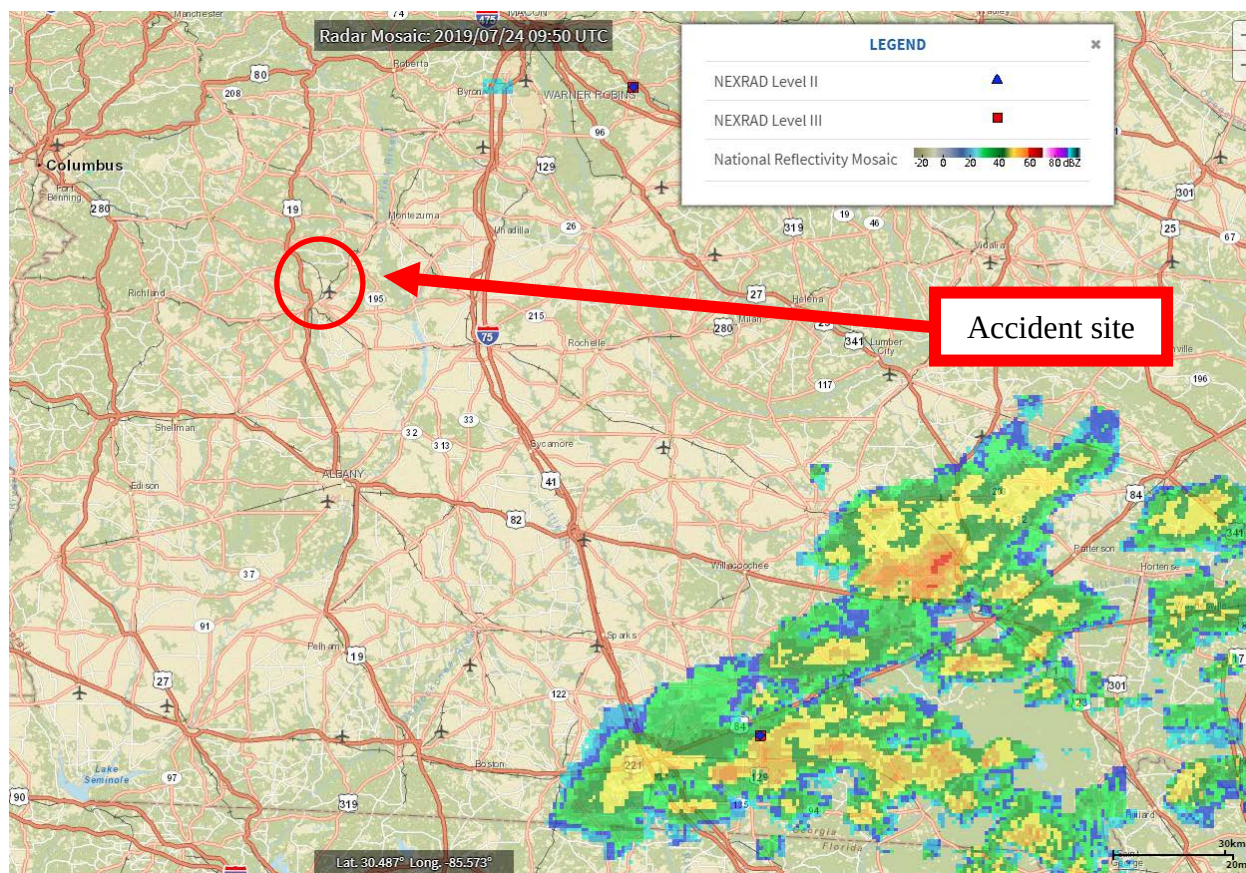


Figure 13 – Regional Composite Reflectivity image for 0550 EDT

7.0 Pilot Reports¹⁷

There were no pilot reports (PIREPs) reported into the national airspace within 200 miles of the accident site from about two hours prior to the accident time to about two hours after the accident time for below FL180¹⁸.

¹⁶ dBZ – A non-dimensional “unit” of radar reflectivity which represents a logarithmic power ratio (in decibels , or dB) with respect to radar reflectivity factor, Z.

¹⁷ Only pilot reports with the World Meteorological Organization (WMO) header UBGA**, UBAL**,UBFL**, and UBSC** identifier were considered.

¹⁸ Flight Level – A Flight Level (FL) is a standard nominal altitude of an aircraft, in hundreds of ft. This altitude is calculated from the International standard pressure datum of 1013.25-hPa (29.92 inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above mean sea level or above ground level.

8.0 SIGMET

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

9.0 CWSU Advisories

There were no Center Weather Service Unit (CWSU) Center Weather Advisories (CWA) or Meteorological Impact Statement (MIS) valid for the accident site at the accident time.

10.0 AIRMETs

The NWS Aviation Weather Center issued Airmen's Meteorological Information (AIRMET) advisory Sierra which was valid for the accident site at the accident time. AIRMET Sierra warned of IFR conditions due to precipitation and mist:

WAUS42 KKCI 240845

WA2S

-MIAS WA 240845

AIRMET SIERRA UPDT 2 FOR IFR VALID UNTIL 241500

.

AIRMET IFR...NC SC GA NY NJ PA OH WV MD DC VA

FROM 20WNW ALB TO 20SE SAX TO 20SE PSB TO 20SW CSN TO 40W GSO TO

20W ODF TO GQO TO HNV TO HNN TO 20W JST TO 30SSE BUF TO 20WNW ALB

CIG BLW 010/VIS BLW 3SM BR. CONDS ENDG 12-15Z.

.

AIRMET IFR...NC SC GA FL VA AND CSTL WTRS

FROM 40SSE CSN TO 60ENE ORF TO 90ESE ECG TO 80SE ILM TO 70ENE

CRG TO 50SW CRG TO 60SSW TLH TO 50SE CEW TO 40NNW PZD TO 30SSE

IRQ TO FLO TO 40SSE CSN

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 15Z ENDG 15-18Z.

....

11.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) products made available before the accident flight are shown in attachment 2. The GFA surface forecast products indicated VFR conditions would prevail, but that a G-AIRMET (graphical-AIRMET) was current. A chance of rain shower activity (between 30 and 60 percent chance) and scattered thunderstorm activity near the accident site was also forecast for 0500 EDT with a light and variable surface wind. The GFA cloud forecast products indicated an overcast cloud ceiling between 400 to 4,000 ft msl with cloud tops to 14,000 ft msl. For more information please see attachment 2.

12.0 Terminal Aerodrome Forecast¹⁹

There were no Terminal Aerodrome Forecast (TAF) sites located within 30 miles of the accident site.

¹⁹ <https://www.nws.noaa.gov/directives/sym/pd01008013curr.pdf>

13.0 NWS Area Forecast Discussion

The NWS Office in Peachtree City, Georgia, (FFC) issued the following Area Forecast Discussion (AFD) at 0426 EDT (closest AFD to the accident time with an aviation section). The aviation section of the AFD discussed VFR for all FFC TAF sites with possible MVFR at Middle Georgia Regional Airport (KMCN) through 0800 EDT:

FXUS62 KFFC 240826
AFDFFC

Area Forecast Discussion
National Weather Service Peachtree City GA
426 AM EDT Wed Jul 24 2019

.SHORT TERM /Today through Thursday/...

Quiet short term in store with drier air mass in place over the state. Remaining precip has moved south of the CWA, but couldn't rule out a return of a few showers this morning in the far southeastern CWA.

Mild temperatures will continue through the short term with average highs in the 80s and cool morning lows in the 60s.

.LONG TERM /Thursday Night through Tuesday/...

The extended forecast starts off dry with things transitioning back to afternoon and evening showers and thunderstorms by the weekend. Temps also start off a bit cooler than we have seen this summer but they warm up though the weekend. Not looking to break any low temp records but definitely cooler. The surface front that moved south through the area yesterday becomes stays fairly stationary across the northern Gulf coast and North Florida through Friday morning. This front then begins to lift back northward Friday afternoon into south and central GA. The Bermuda ridge builds back in across FL which pushes the old front back northward increasing moisture across GA into the weekend. This front is fairly weak buy the end of the week so it will be no where near as organized as it was when it when south through the area. As the front pushes back northward, precip chances also increase across the area Sat/Sun and into the beginning of next week. Instability remains weak to moderate, and combined with no real focusing mechanism not expecting much in the way of severe storms through the period.

&&

.AVIATION...

06Z Update...

VFR conditions expected through the period. SCT MVFR cigs possible

through 12z at KMCN. ENE-NE winds will become more Northerly through the day, with brief periods of NNE possible after 18z. Speeds will generally be 8kt or less.

//ATL Confidence...06Z Update...
Medium on wind direction.
High on all other elements.

31

&&

.PRELIMINARY POINT TEMPS/POPS...

Athens	87	63	87	65	/	0	0	0	0
Atlanta	85	65	86	66	/	0	0	0	0
Blairsville	80	56	79	59	/	0	0	5	5
Cartersville	85	61	87	65	/	0	0	0	0
Columbus	88	66	89	68	/	5	5	0	5
Gainesville	84	63	84	65	/	0	0	0	0
Macon	87	64	89	67	/	5	0	5	5
Rome	86	61	87	64	/	0	0	0	0
Peachtree City	85	63	87	65	/	5	0	0	5
Vidalia	88	67	90	68	/	20	10	10	10

&&

.FFC WATCHES/WARNINGS/ADVISORIES...

NONE.

&&

\$\$

14.0 Winds and Temperature Aloft Forecast

The NWS 0400 EDT Winds and Temperature Aloft forecast valid for 0800 EDT for the closest point to the accident site is included below:

FBUS31 KWN0 240800

FD1US1

DATA BASED ON 240600Z

VALID 241200Z FOR USE 0800-1500Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
CSG	0722	0505+13	3110+09	3210+06	3111-08	2921-20	253433	244942	263951

The accident site was closest to the Columbus, Georgia, (CSG) forecast point. The CSG forecast for use between 0400 EDT and 1100 EDT indicated a wind at 3,000 ft from 070° at 22 knots and at 6,000 ft a wind from 050° at 5 knots with a temperature of 13°C.

15.0 Pilot Weather Briefing

The accident pilot did not request nor receive a weather briefing through Leidos.

A check of ForeFlight was done and revealed that the accident pilot did not request a weather briefing through ForeFlight. It is unknown if the accident pilot checked or received any additional weather information before or during the accident flight.

16.0 Astronomical Data

The astronomical data obtained for the accident site on July 24, 2019, indicated the following:

SUN

Accident	0550 EDT²⁰
Begin civil twilight	0619 EDT
Sunrise	0646 EDT
Sun transit	1343 EDT
Sunset	2040 EDT
End civil twilight	2107 EDT

MOON

Moonrise	0049 EDT
Accident	0550 EDT²¹
Moon transit	0708 EDT
Moonset	1334 EDT

At the time of the accident the Moon's altitude was 56.59° above the horizon at an azimuth of 143.42° with the Moon at third quarter and 56.5% illumination. The cloud cover (section 3.0) would have obstructed any Moon illumination at the accident time through 6,500 ft msl (section 5.0).

E. LIST OF ATTACHMENTS

Attachment 1 – GOES-16 infrared animation from 0506 to 0806 EDT

Attachment 2 – GFA products available before the accident flight for around the accident time

Submitted by:

Paul Suffern
Senior Meteorologist

²⁰ Inserted accident time for reference and context.

²¹ Inserted accident time for reference and context.

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