NTSB | National Transportation Safety Board

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Date: 4/27/2023

Subject: ERA23FA209, Weather Data

The following factual weather data were provided by NTSB Meteorologist Donald Eick:

Data Requested

Synoptic Conditions - The NWS Surface Analysis Chart for 1400 EDT with a basic topographic chart is included as figure 1. The chart depicted a low-pressure system with a central pressure of 1013-hectopscals (hPa) over southern Mississippi along a stationary front that extended eastward over southern Alabama and Georgia, and then northeastward along the Georgia and the South Carolina Atlantic coast. A high-pressure system with a central pressure of 1022-hPa was located over the western South Carolina and North Carolina border, with a ridge extending westward over northern Georgia and Alabama, and Tennessee. A cold front was depicted north of the high extending from Virginia into Tennessee. The accident site was located in the cool airmass between the two fronts and south of the high-pressure ridge. The station models surrounding the accident site depicted northeasterly winds of 10 knots or less, broken to overcast cloud cover, with temperatures in the mid to upper 50's to low 60's degrees Fahrenheit, with several stations over northern and western Georgia, Northern Alabama, western South Carolina, and Tennessee reporting light rain.

A close-up of the National Composite Radar Mosaic for 1430 EDT over the area is included as figure 2 with the accident site marked by a red star. Several scattered areas of echoes were depicted over northern Georgia, with the accident site and the destination airport KWDR located within an area of echoes of 30 dBZ or less.

Observations - The area surrounding the accident site was documented using official Aviation Routine Weather Reports (METAR) and Aviation Selected Special Weather Reports (SPECI). Cloud heights are reported above ground level (agl) in the following section, and the magnetic variation was estimated at 6° west based on the latest sectional chart for the area.

The accident airplane's planned destination was Barrow County Airport (KWDR), Winder, Georgia, which was located 15 ½ miles west-northwest of the accident site, at an elevation 934 ft. The airport had an Automated Weather Observation System (AWOS), which issued observation by radio on 118.575 VHF, and disseminated observations longline every 20-minutes to users nationally.

MVFR *METAR KWDR 261415Z AUTO 00000KT 10SM BKN020 OVC025 13/09 A3014 RMK AO2 LTG DSNT W=*
MVFR *METAR KWDR 261435Z AUTO 00000KT 10SM OVC018 13/10 A3015 RMK AO2=*
MVFR *METAR KWDR 261455Z AUTO 00000KT 10SM -RA OVC018 12/10 A3016 RMK AO2=*
MVFR *METAR KWDR 261515Z AUTO 00000KT 10SM -RA BKN014 OVC020 12/11 A3016 RMK AO2=*
MVFR *METAR KWDR 261535Z AUTO 04003KT 10SM -DZ BKN014 OVC019 12/11 A3016 RMK AO2=*
MVFR *METAR KWDR 261555Z AUTO 04006KT 10SM -DZ SCT008 OVC018 12/11 A3016 RMK AO2=*
IFR *METAR KWDR 261615Z AUTO 05007KT 005V075 10SM -RA BKN008 OVC018 12/11 A3016 RMK AO2=*
IFR *METAR KWDR 261635Z AUTO 06003KT 10SM -DZ OVC008 12/10 A3016 RMK AO2=*
IFR *METAR KWDR 261655Z AUTO 00000KT 10SM OVC008 12/10 A3015 RMK AO2=*
IFR *METAR KWDR 261715Z AUTO 06003KT 10SM OVC008 12/10 A3015 RMK AO2=*
IFR *METAR KWDR 261735Z AUTO 00000KT 10SM -RA OVC008 12/10 A3015 RMK AO2=*
IFR *METAR KWDR 261755Z AUTO 00000KT 7SM -RA OVC008 12/11 A3015 RMK AO2 LTG DSNT SE=*
IFR ***METAR KWDR 261815Z AUTO 00000KT 10SM OVC008 12/11 A3015 RMK AO2 LTG DSNT SE=***
Accident 1828Z
IFR ***METAR KWDR 261835Z AUTO 07004KT 10SM OVC006 12/11 A3014 RMK AO2=***
IFR *METAR KWDR 261855Z AUTO 00000KT 10SM OVC008 12/11 A3014 RMK AO2=*
IFR *METAR KWDR 261915Z AUTO 07003KT 10SM OVC008 12/11 A3014 RMK AO2=*
IFR *METAR KWDR 261935Z AUTO 00000KT 10SM OVC008 12/11 A3013 RMK AO2=*

No TAFs issued for the station.

Athens/Ben Epps Airport (KAHN), Athens, Georgia, was located about 7 miles northeast of the accident site and

about 17 miles east of KWDR, at an elevation of 812 ft. The airport had an ASOS system and whose observations were augmented by tower personnel. The following conditions were reported at the time of the accident.

Special weather observation for KAHN at 1359 EDT, wind from 050° at 10 knots gusting to 17 knots, visibility 10 miles or more, ceiling broken at 1,200 ft agl, overcast at 2,100 ft, temperature 56° F (13° C), dew point temperature 52° F (11° C), and altimeter setting 30.13 inHg. Remarks: automated station with a precipitation discriminator, temperature 13.3° C, dew point 11.1° C.

The general flight conditions and raw observations in standard METAR format were as follows from about 0800 through 1600 EDT.

VFR METAR KAHN 261151Z 07009KT 10SM BKN033 OVC047 12/09 A3012 RMK AO2 SLP197 T01220089 10144 20122 53006=
MVFR SPECI KAHN 261209Z 06009KT 10SM BKN029 OVC095 13/09 A3011 RMK AO2 T01280089=
MVFR METAR KAHN 261251Z 07008G17KT 10SM OVC028 13/09 A3011 RMK AO2 SLP196 T01330089=
VFR SPECI KAHN 261310Z 08008KT 10SM FEW020 OVC033 14/09 A3011 RMK AO2 T01390089=
MVFR SPECI KAHN 261330Z 07008KT 10SM BKN020 OVC036 14/09 A3011 RMK AO2 T01390089=
MVFR METAR KAHN 261351Z 08009KT 10SM OVC019 14/09 A3010 RMK AO2 SLP192 T01390089=
MVFR METAR KAHN 261451Z 05007KT 10SM OVC018 14/09 A3012 RMK AO2 SLP200 T01390094 53003=
MVFR METAR KAHN 261551Z 03005KT 7SM -RA OVC018 13/11 A3013 RMK AO2 RAB27 SLP203 P0001 T01330106=
IFR SPECI KAHN 261630Z 02006G15KT 2SM RA BR FEW010 OVC019 12/11 A3013 RMK AO2 VIS 1 1/4V3 P0008 T01220106=
MVFR SPECI KAHN 261639Z 02007KT 5SM -RA BR FEW010 OVC021 13/11 A3013 RMK AO2 P0010 T01280111=
MVFR SPECI KAHN 261646Z 02008KT 8SM -RA SCT009 OVC020 13/11 A3013 RMK AO2 P0010=
MVFR METAR KAHN 261651Z 02006KT 9SM SCT011 OVC020 13/11 A3013 RMK AO2 RAE47 SLP202 P0010 T01280111=
MVFR SPECI KAHN 261659Z 02007KT 10SM BKN011 OVC020 13/11 A3013 RMK AO2 T01280111=
MVFR SPECI KAHN 261737Z 06013KT 10SM SCT010 OVC021 13/11 A3012 RMK AO2 T01330111=
MVFR METAR KAHN 261751Z 04010KT 10SM SCT010 OVC021 13/11 A3013 RMK AO2 SLP201 60011 T01330111 10144 20122 58002=
MVFR SPECI KAHN 261759Z 05010G17KT 10SM BKN012 OVC021 13/11 A3013 RMK AO2 T01330111=
Accident 1828Z
MVFR METAR KAHN 261851Z 05011KT 10SM BKN013 OVC022 13/11 A3011 RMK AO2 SLP197 T01330106=
MVFR METAR KAHN 261951Z 07010KT 10SM OVC012 13/11 A3010 RMK AO2 SLP194 T01330106=

5-min METARS

METAR KAHN 261900Z AUTO 05008KT 10SM BKN012 OVC022 13/11 A3012
METAR KAHN 261855Z AUTO 05008KT 10SM BKN013 OVC022 13/11 A3012
KAHN 261851Z 05011KT 10SM BKN013 OVC022 13/11 A3011 RMK AO2 SLP197 T01330106
METAR KAHN 261850Z AUTO 04011G16KT 10SM BKN013 OVC022 13/11 A3011
METAR KAHN 261845Z AUTO 06010KT 10SM BKN013 OVC020 13/11 A3012
METAR KAHN 261840Z AUTO 05008KT 10SM BKN013 OVC020 13/11 A3012
METAR KAHN 261835Z AUTO 06010KT 10SM BKN013 OVC022 13/11 A3012
METAR KAHN 261830Z AUTO 07010KT 10SM BKN012 OVC022 13/11 A3012
Accident 1828Z
METAR KAHN 261825Z AUTO 06010KT 10SM BKN012 OVC022 13/11 A3012
METAR KAHN 261820Z AUTO 05012KT 10SM BKN012 OVC021 13/11 A3012
METAR KAHN 261815Z AUTO 07012KT 10SM BKN012 OVC021 13/11 A3012
METAR KAHN 261810Z AUTO 06011G16KT 10SM BKN012 OVC021 13/11 A3012
METAR KAHN 261805Z AUTO 04008KT 10SM BKN012 OVC021 13/11 A3012
METAR KAHN 261800Z AUTO 05010KT 10SM BKN012 OVC021 13/11 A3012

AMD TAF KAHN 261356Z 2614/2712 08009KT P6SM OVC020
FM261530 06009KT P6SM -SHRA BKN025
FM261700 06012KT P6SM BKN025
FM270600 06009KT P6SM BKN015=

TAF KAHN 261721Z 2618/2718 05008KT P6SM VCSH OVC025
TEMPO 2618/2620 4SM -SHRA BR OVC015

FM262200 04010KT P6SM SCT020 BKN035
FM270000 05010KT P6SM BKN020
FM270200 06009KT P6SM BKN018
FM270800 05007KT P6SM BKN007
FM271700 10008KT P6SM BKN010=

A depiction of the NWS Aviation Weather Center's METAR display for 1430 EDT with the approximate accident site marked and the general flight categories reported at the surrounding stations is depicted in figure 3.

Sounding - A High-Resolution Rapid Refresh (HRRR) numerical model was obtained from the NOAA Air Resources Laboratory website for the closest grid point to the accident site for 1400 EDT. The model sounding was then plotted on a standard Skew T log P diagram using the RAOB Analysis software and is included as figure 4. The HRRR sounding over the accident site for 1400 EDT indicated an elevation of 728 ft with a near surface temperature of 15.1 C (59 F), a dew point temperature o 12.5 C (54.5 F), with a density altitude of 854 ft. The lifted condensation level (LCL) and level of free convection (LFC) were identified at 1,079 ft agl, with the convective condensation level at 4,562 ft agl. The sounding was saturated from the LCL through 15,000 ft, with the freezing level identified at about 10,000 ft. The precipitable water content was 1.05 inches. The Lifted Index was 2.9 and the K-Index was 29.6 and indicated a conditionally unstable atmosphere supporting rain showers.

The HRRR wind profile indicated a surface wind from 040 at 8 knots, with winds veering to the south and southwest above 4,000 ft with increasing winds speeds with height and continuing to veer to the west. The mean 0 to 6 kilometer (or 18,000 ft) wind was from 265° at 20 knots.

A table of the HRRR sounding data of height, pressure, temperature, dew point temperature, relative humidity, wind direction and speed, and RAOB derived Clear Air Turbulence (CAT) and Low-Level Wind Shear (LLWS) potential below 8,000 ft were as follows.

Height (ft msl)	Pres (hPa)	T (C)	Td (C)	RH (%)	Wind (dir/kts)	CAT (FAA)	LLWS (FAA)	
728		994	15.1	12.5	84 041/ 8			
756		993	14.6	11.6	82 041/ 8			LIGHT
840		990	14.0	11.9	87 041/ 10			
980		985	13.5	11.2	86 043/ 10			
1262	975	12.7	11.0	89	044/ 11			
1660	961	11.5	10.7	95	045/ 11			
2150	944	10.5	9.6	94	051/ 10	LGT		
2765	923	9.7	8.6	93	081/ 7	MDT		
3454	900	9.6	7.7	88	144/ 8	MDT		
4253	874	9.0	7.3	89	182/ 11	MDT		
5138	846	8.2	6.3	88	210/ 13	LGT		
6115	816	6.6	4.0	83	229/ 15	LGT		
7258	782	4.4	-0.1	73	240/ 17	LGT		

Satellite Imagery - Animation attached.

Weather Radar Imagery - the closest NWS Atlanta Weather Surveillance Radar 1988 Doppler (WSR-88D) is attached below for 1421 and 1427 EDT (figures 5 and 6) with the flight track overlaid for the period in magenta. The track of N123CD enters into an area of echoes of 10 to 25 dBZ, when the aircraft abruptly spirals into the ground.

NWS Forecasts and Advisories

Graphic Forecast for Aviation (GFA) - the NWS GFA 3-hour Surface and Cloud forecasts issued 1200 EDT and valid for 1400 EDT are included as figures 7 and 8 respectively. The forecasts depicted an area of low visibilities over northern Georgia with a change of rain showers, while the cloud forecast indicated scattered to broken clouds with bases near 4,500 ft msl with tops near 12,000 ft. G-AIRMETs for mountain obscuration and icing conditions above 10,000 ft (not a factor) were also depicted. The GFA cloud forecast missed the MVFR to IFR conditions ceilings over the area.

In flight Weather Advisories - The NWS had no SIGMETs, Convective SIGMETs, or Center Weather Advisories current during the period surrounding 1200-1430 EDT. NWS did have G-AIRMET current for IFR and mountain obscuration conditions (figure 9).

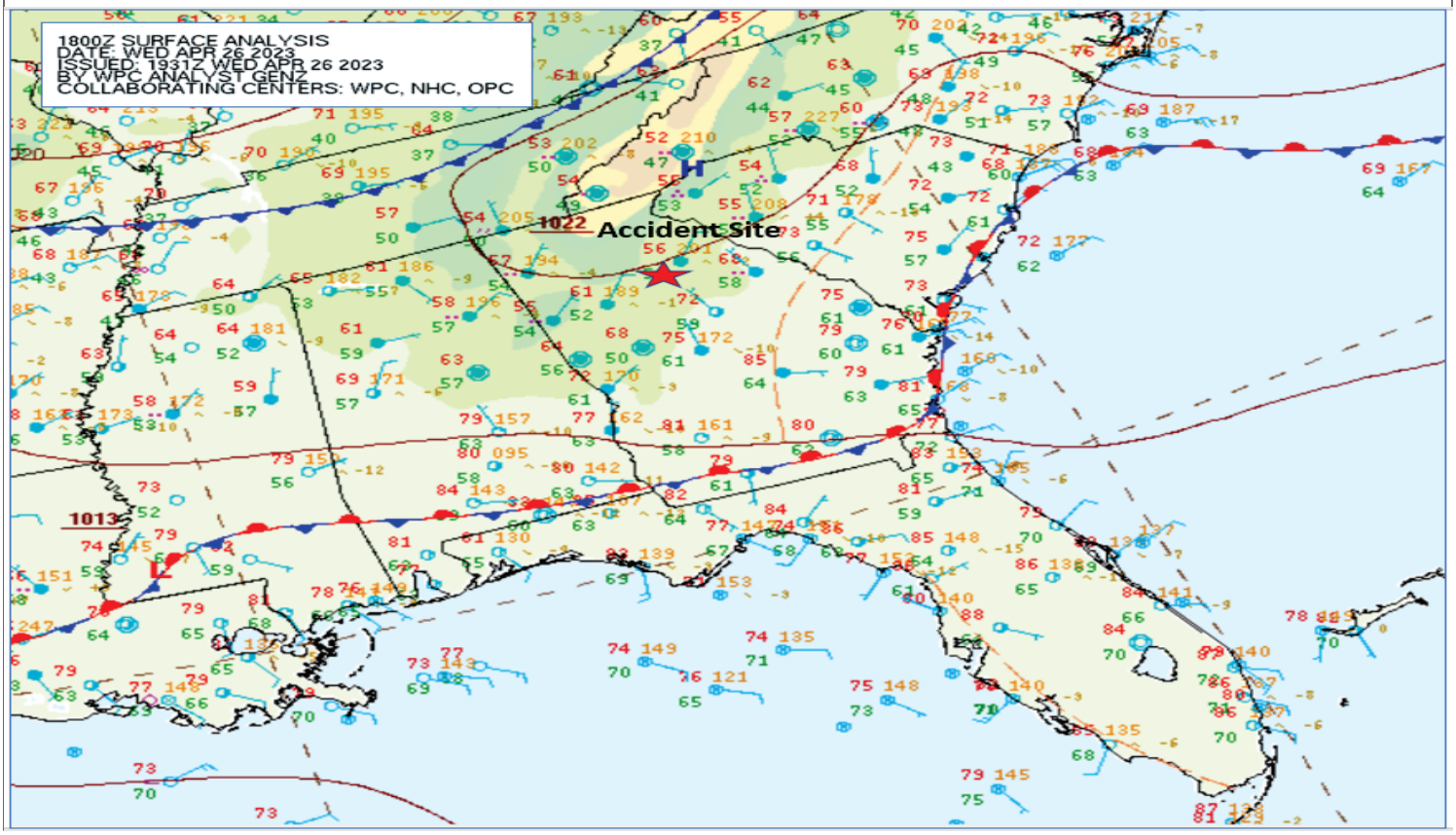
Astronomical Conditions - The astronomical conditions for April 26, 2023 for Winder, Oconee County, Georgia was as follows.

	Local	UTC
Morning civil twilight	06:25	10:25
Sunrise	06:52	10:52
Sunset	20:13	00:13
Evening civil twilight	20:40	00:40

Preliminary Analysis

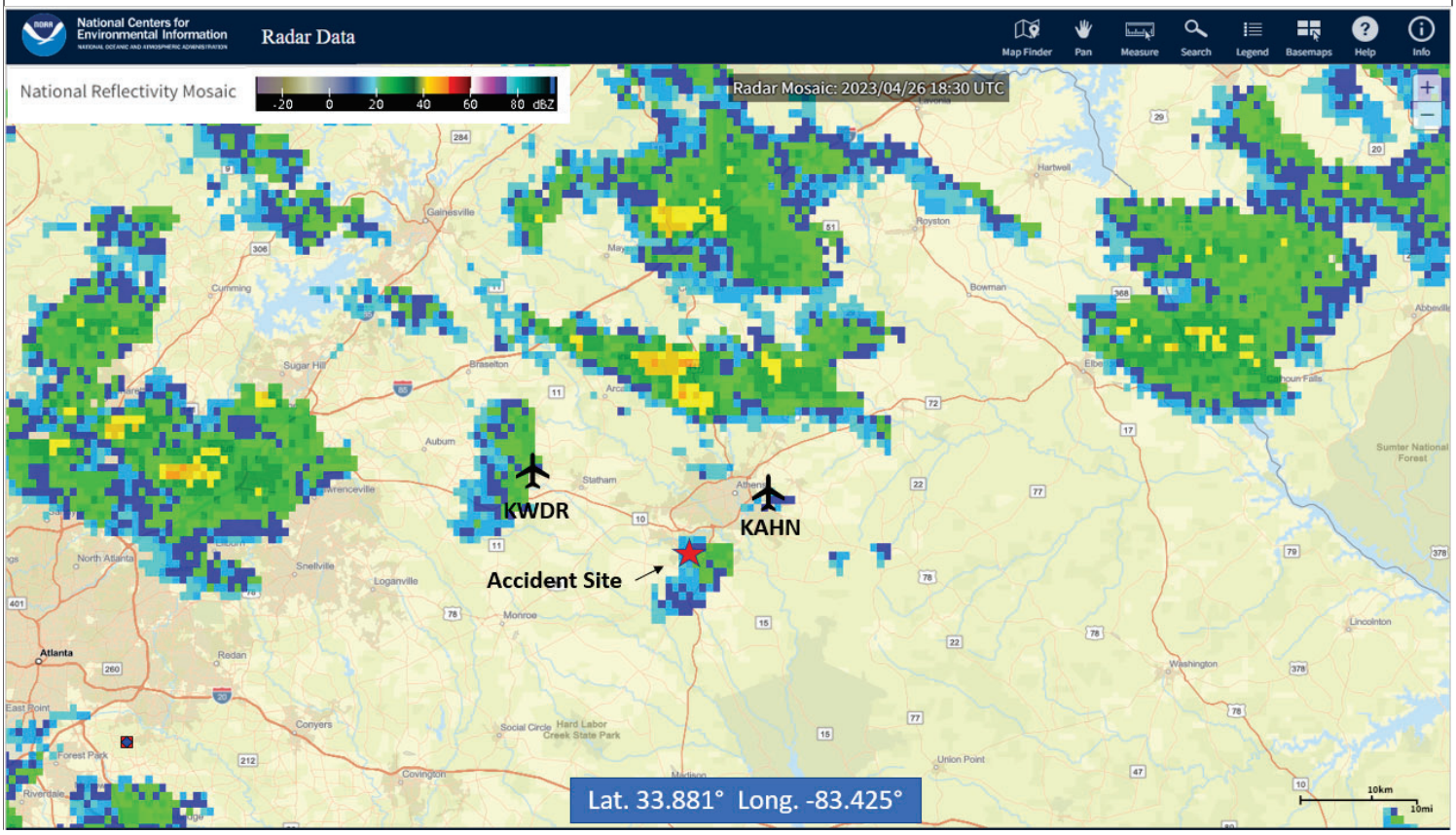
Additional Details

Figure 1



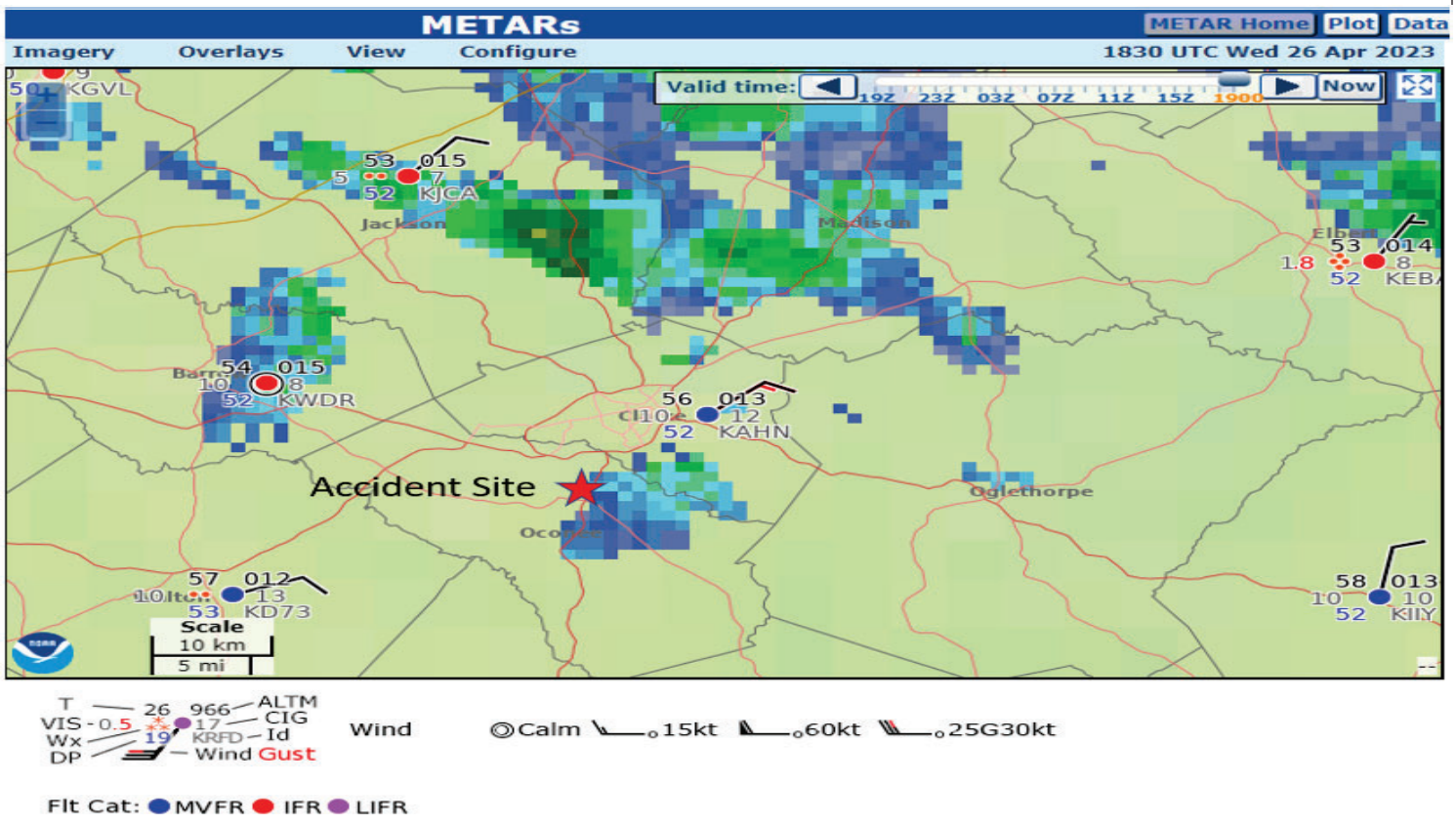
Caption | Southeast section of the NWS Surface Analysis Chart for 1400 EDT with the approximate accident site marked by the red star.

Figure 2



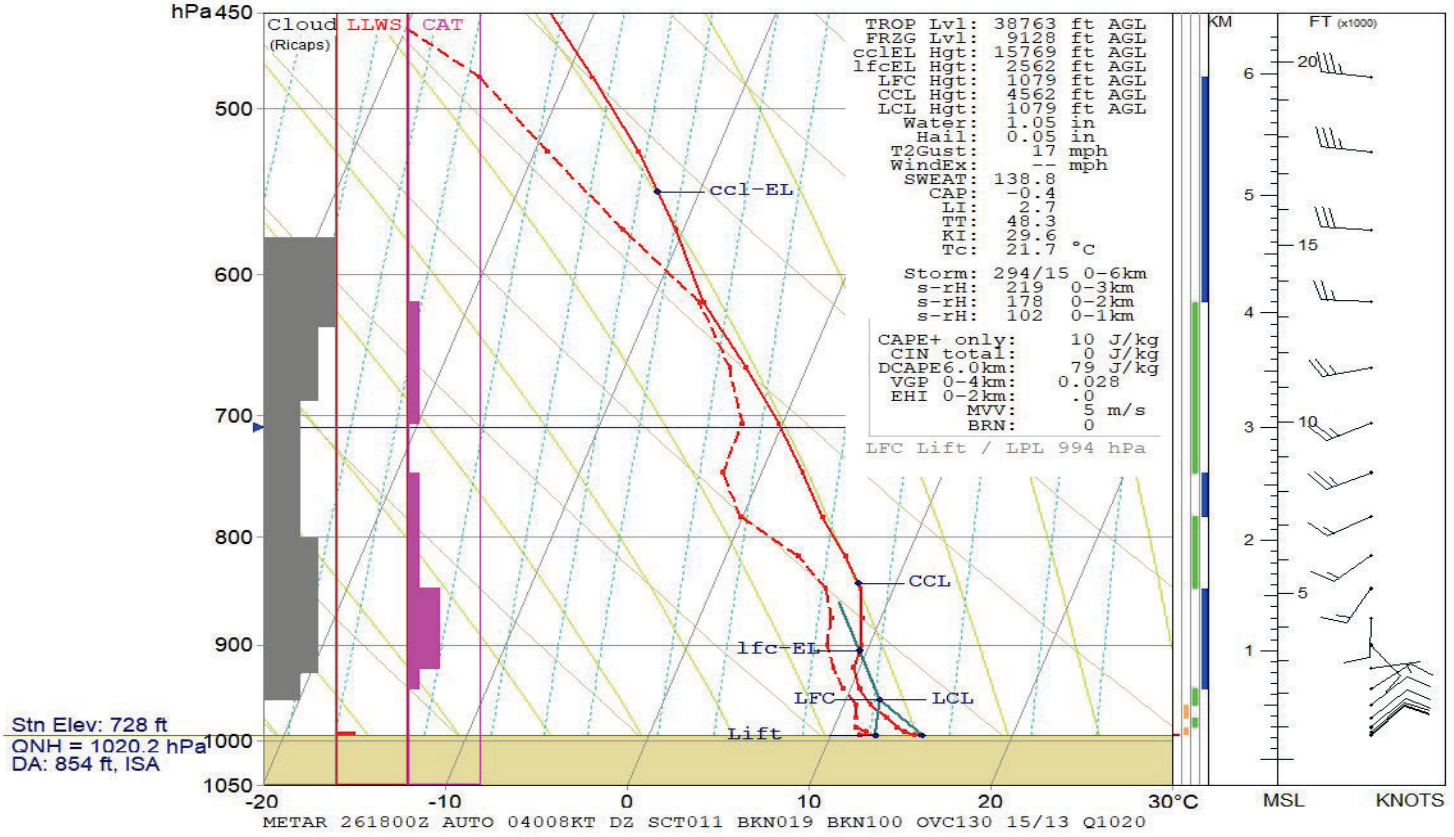
Caption | National Composite Radar Mosaic for 1430 EDT with the closest airports KWDR and KATH, and the accident site marked.

Figure 3



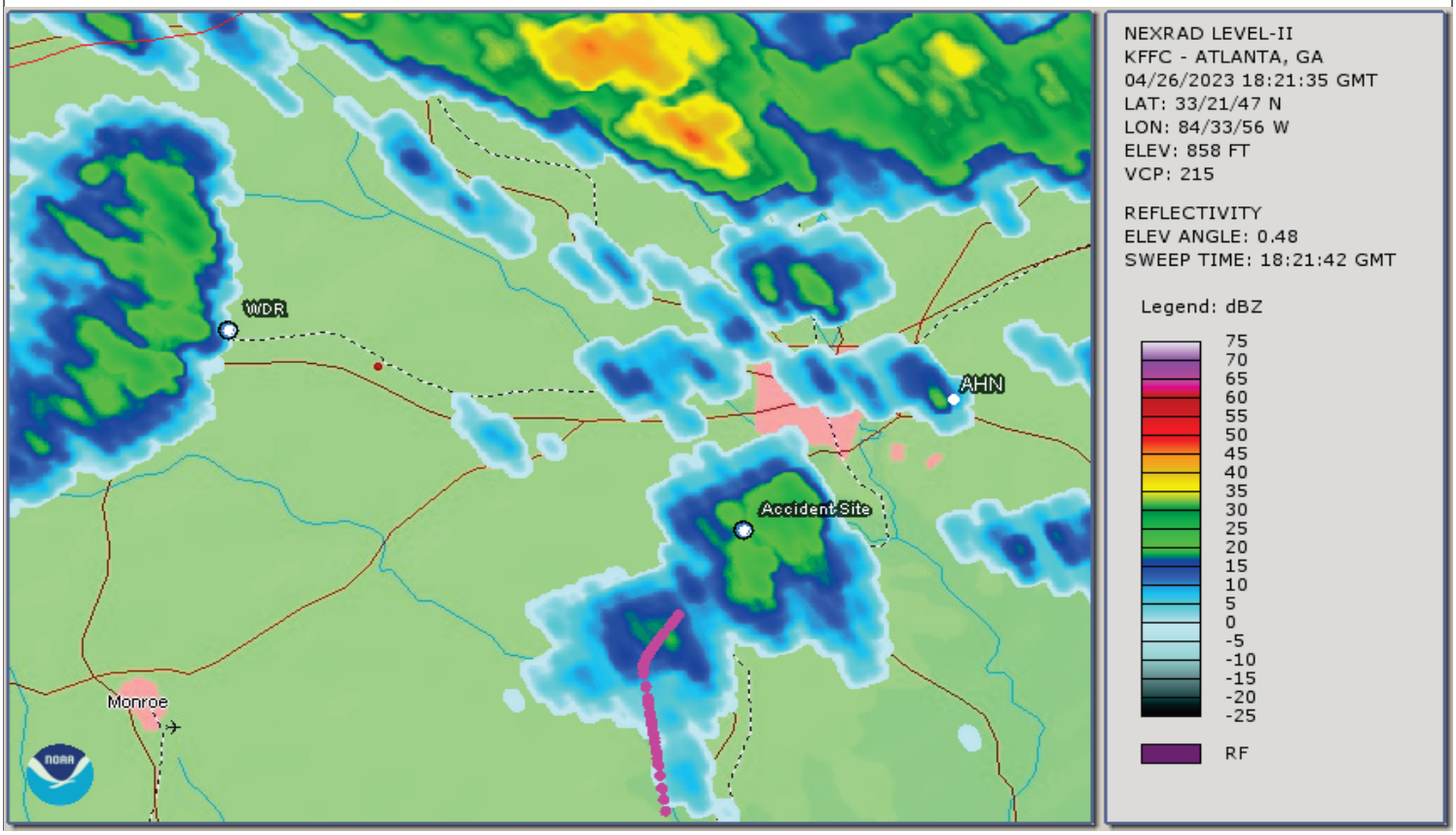
Caption NWS Aviation Weather Center METAR display for 1430Z with accident site and radar overlaid.

Figure 4



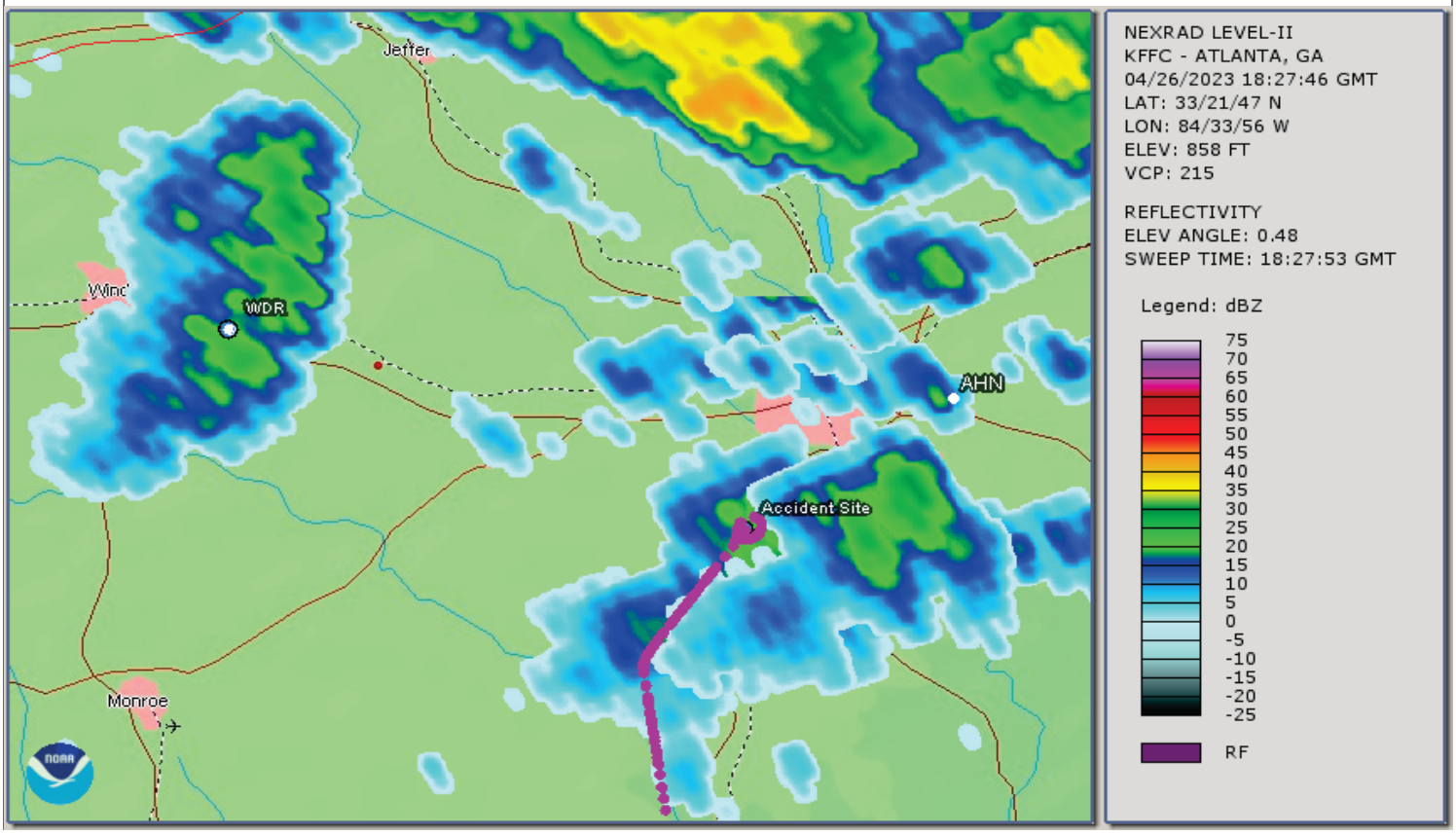
Caption High-Resolution Rapid Refresh (HRRR) numerical model sounding over the nearest grid point to the accident site for 1400 EDT.

Figure 5



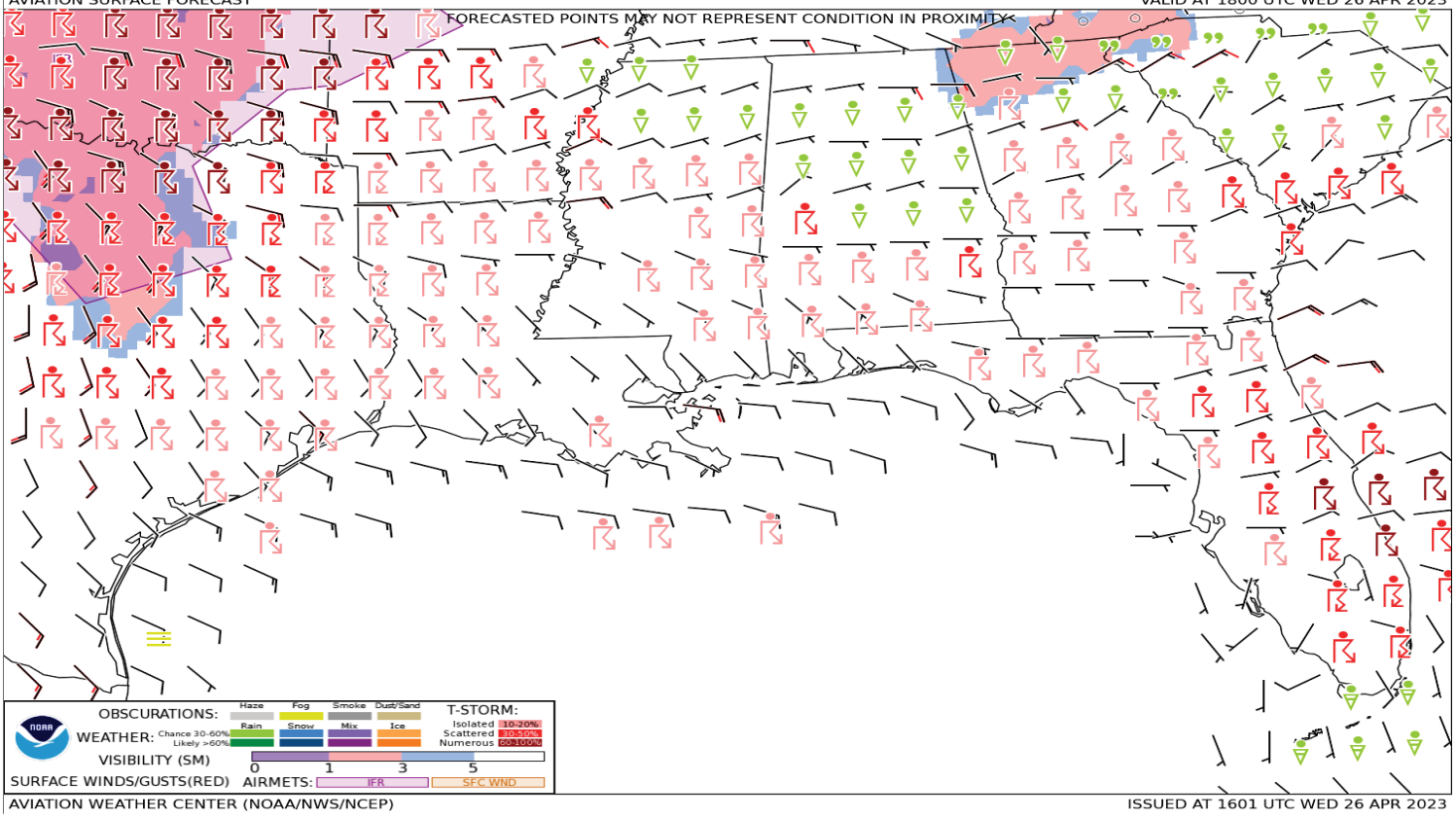
Caption NWS Atlanta (KFFC) WSR-88D 0.48 degree base reflectivity image for 1421 EDT with flight track overlaid in magenta.

Figure 6



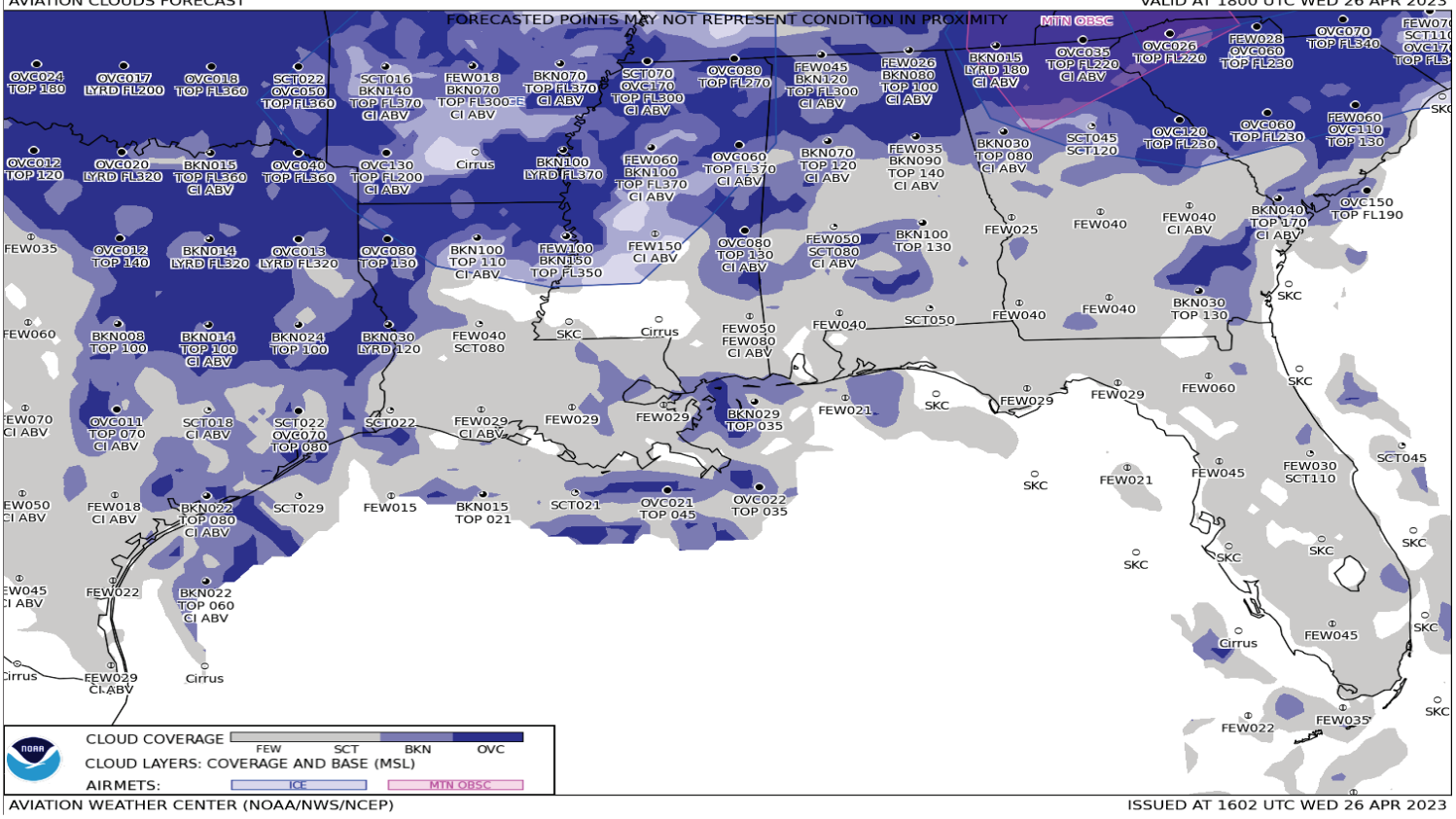
Caption NWS Atlanta (KFFC) WSR-88D 0.48 degree base reflectivity image for 1427 EDT with flight track overlaid in magenta.

Figure 7



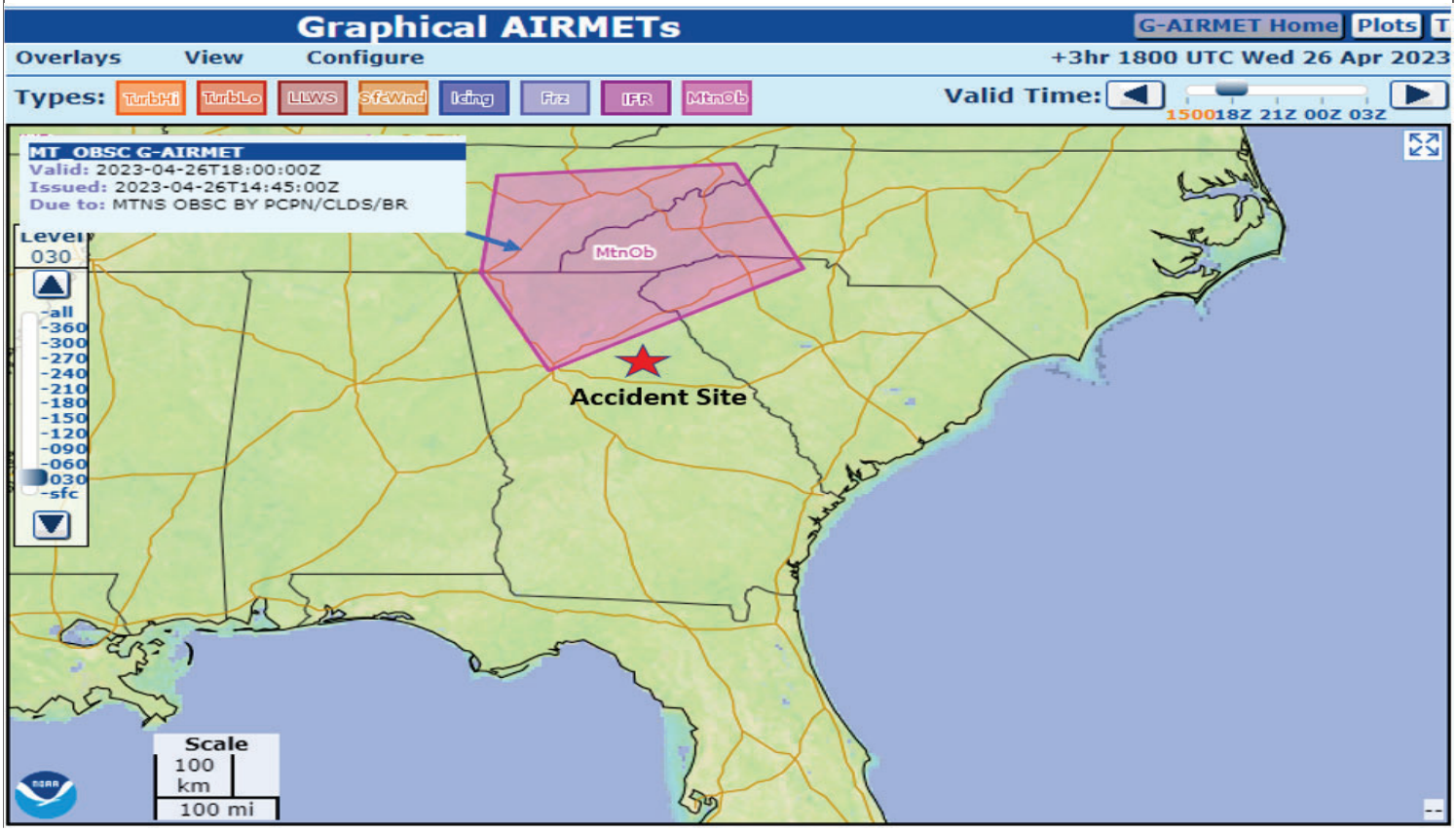
Caption: Graphic Forecast for Aviation (GFA) 3-hour Surface Forecast valid for 1400 EDT.

Figure 8



Caption: Graphic Forecast for Aviation (GFA) 3-hour Cloud Forecast valid for 1400 EDT.

Figure 9



Caption NWS Aviation Weather Center's G-AIRMET display for 1430 EDT. AIRMET for mountain obscuration conditions current over northern Georgia, Carolina's and Tennessee.

Figure 10

Caption