



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

September 1, 2022

Specialist's Factual Report

METEOROLOGY

CEN22FA197

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A. ACCIDENT

Location: Broomfield, Colorado
Date: May 11, 2022
Time: 1235 mountain daylight time (1835 UTC¹)
Aircraft: Type – Cessna 172; Registration – N73670

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
Operational Factors Division (AS-30)
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 mountain daylight time (MDT) for May 11, 2022 (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: 39.922815° north latitude; 105.12902° west longitude at an elevation of about 5,465 feet.

This report provides information on the low-level wind conditions applicable to the accident time and location.

D. WEATHER INFORMATION

1.0 Surface Observations

An Automated Weather Observing System (AWOS) was located at Rocky Mountain Metro Airport (BJC²) which was in Denver, Colorado, and was within one mile of the accident location at an elevation of about 5,673 feet and had a magnetic variation of about 8° east. Augmented longline³ reports from the BJC AWOS during the times surrounding the accident time are presented here, and the observation closest in time to the accident time is highlighted by bold text.

¹ UTC – abbreviation for Coordinated Universal Time

² This report uses the 3-digit International Air Transport Association format for airport identification, which does not use the geographic designating digit (e.g., “K” for stations in the continental U.S. and “P” for U.S. stations in Alaska and the Pacific region) as found in the 4-digit International Civil Aviation Organization (ICAO) identifier format. Weather observations from airports in this report are referenced by their reporting station’s identifier (using ICAO format that includes the geographic designating digit), not by the airport at which the reporting station is located.

³ “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real

[1055 MDT] METAR KBJC 111655Z 19009G17KT 10SM FEW220 25/M06 A2994=
 [1158 MDT] METAR KBJC 111758Z 19014G21KT 10SM SCT240 28/M08 A2992=
[1238 MDT] METAR KBJC 111838Z 22013G23KT 10SM SCT240 29/M07 A2990
RMK AC ACCIDENT=
 [1259 MDT] METAR KBJC 111859Z 17015G27KT 10SM SCT240 29/M08 A2989 RMK
 AC ACCIDENT=

At 1238 MDT, the BJC AWOS reported a wind from 220° at 13 knots with gusts to 23 knots, visibility of 10 statute miles or greater, scattered clouds at 24,000 feet above ground level (agl), temperature of 29° Celsius (C) and dew point temperature of -7°C, altimeter setting of 29.90 inches of mercury; Remarks: aircraft accident.

One-minute BJC AWOS data (OMO) were provided by the Federal Aviation Administration and the OMO for times surrounding the accident time are presented below in “METAR” format. At 1235 MDT, the BJC AWOS reported a wind from 190° at 12 knots with gusts to 17 knots, wind variable between 161° and 231°, visibility of 10 statute miles or greater, clear skies, temperature of 28°C and dew point temperature of -7°C, altimeter setting of 29.90 inches of mercury; Remarks: automated station with a precipitation discriminator.

[1225 MDT] KBJC 111825Z AUTO 22010G16KT 10SM CLR 28/M07 A2991 RMK AO2
 [1226 MDT] KBJC 111826Z AUTO 21008G16KT 10SM CLR 28/M07 A2991 RMK AO2
 [1227 MDT] KBJC 111827Z AUTO 18008G16KT 151V221 10SM CLR 28/M07 A2990
 RMK AO2
 [1228 MDT] KBJC 111828Z AUTO 18006G16KT 10SM CLR 28/M07 A2991 RMK AO2
 [1229 MDT] KBJC 111829Z AUTO 21006G16KT 10SM CLR 28/M07 A2990 RMK AO2
 [1230 MDT] KBJC 111830Z AUTO 23005G16KT 10SM CLR 28/M07 A2990 RMK AO2
 [1231 MDT] KBJC 111831Z AUTO 22005G16KT 10SM CLR 28/M07 A2990 RMK AO2
 [1232 MDT] KBJC 111832Z AUTO 21008G16KT 171V241 10SM CLR 28/M07 A2990
 RMK AO2
 [1233 MDT] KBJC 111833Z AUTO 20008KT 171V231 10SM CLR 28/M07 A2990 RMK
 AO2
 [1234 MDT] KBJC 111834Z AUTO 19010G17KT 161V221 10SM CLR 28/M07 A2990
 RMK AO2

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.

[1235 MDT] KBJC 111835Z AUTO 19012G17KT 161V231 10SM CLR 28/M07 A2990 RMK AO2

[1236 MDT] KBJC 111836Z AUTO 21012G17KT 171V231 10SM CLR 28/M07 A2990 RMK AO2

[1237 MDT] KBJC 111837Z AUTO 22012G17KT 10SM CLR 28/M07 A2990 RMK AO2

[1238 MDT] KBJC 111838Z AUTO 22013G17KT 10SM CLR 28/M07 A2990 RMK AO2

[1239 MDT] KBJC 111839Z AUTO 23013G17KT 10SM CLR 28/M07 A2990 RMK AO2

[1240 MDT] KBJC 111840Z AUTO 21014G17KT 171V241 10SM CLR 28/M07 A2990 RMK AO2

[1241 MDT] KBJC 111841Z AUTO 19015KT 10SM CLR 28/M07 A2990 RMK AO2

[1242 MDT] KBJC 111842Z AUTO 18015KT 10SM CLR 28/M07 A2990 RMK AO2

[1243 MDT] KBJC 111843Z AUTO 18017G24KT 10SM CLR 28/M07 A2990 RMK AO2

[1244 MDT] KBJC 111844Z AUTO 18018G24KT 10SM CLR 28/M07 A2990 RMK AO2

[1245 MDT] KBJC 111845Z AUTO 18015G24KT 10SM CLR 28/M07 A2990 RMK AO2

2.0 Pilot Reports

The following longline-disseminated pilot reports⁴ (PIREPs) disseminated between 1000 and 1500 MDT and were applicable within 50 miles of the accident location below 10,000 feet.

BJC UA /OV BJC/TM 1658/FL6500/TP KITFOX/RM MOD-SEV TURB 4 MILES N OF BJC

DEN UA /OV DEN270015/TM 1700/FL090/TP UNKN/TB MOD 090-080

APA UA /OV APA/TM 1829/FL065/TP C172/RM LLWS +/- 5 KTS

APA UUA /OV APA350004/TM 1925/FL075/TP C25B/RM LLWS +/-10KTS ON FINAL RY17L ALL THE WAY TO FLARE

⁴ These do not include pilot reports only broadcast via radio.

3.0 HRRR Model Sounding

A High-Resolution Rapid Refresh (HRRR) model⁵ sounding (figure 1) for near the accident site⁶ at 1300 MDT using an elevation of 5,465 feet was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory and analyzed by the RAwinsonde OBservation (RAOB) program. The wind in the lowest 2,000 feet agl was between 10-15 knots from about 215°. The lower atmosphere was dry with a dew point depression of 38°C at 2,000 feet agl and 30°C at 3,000 feet agl. RAOB identified light low-level wind shear (LLWS) close to the surface.

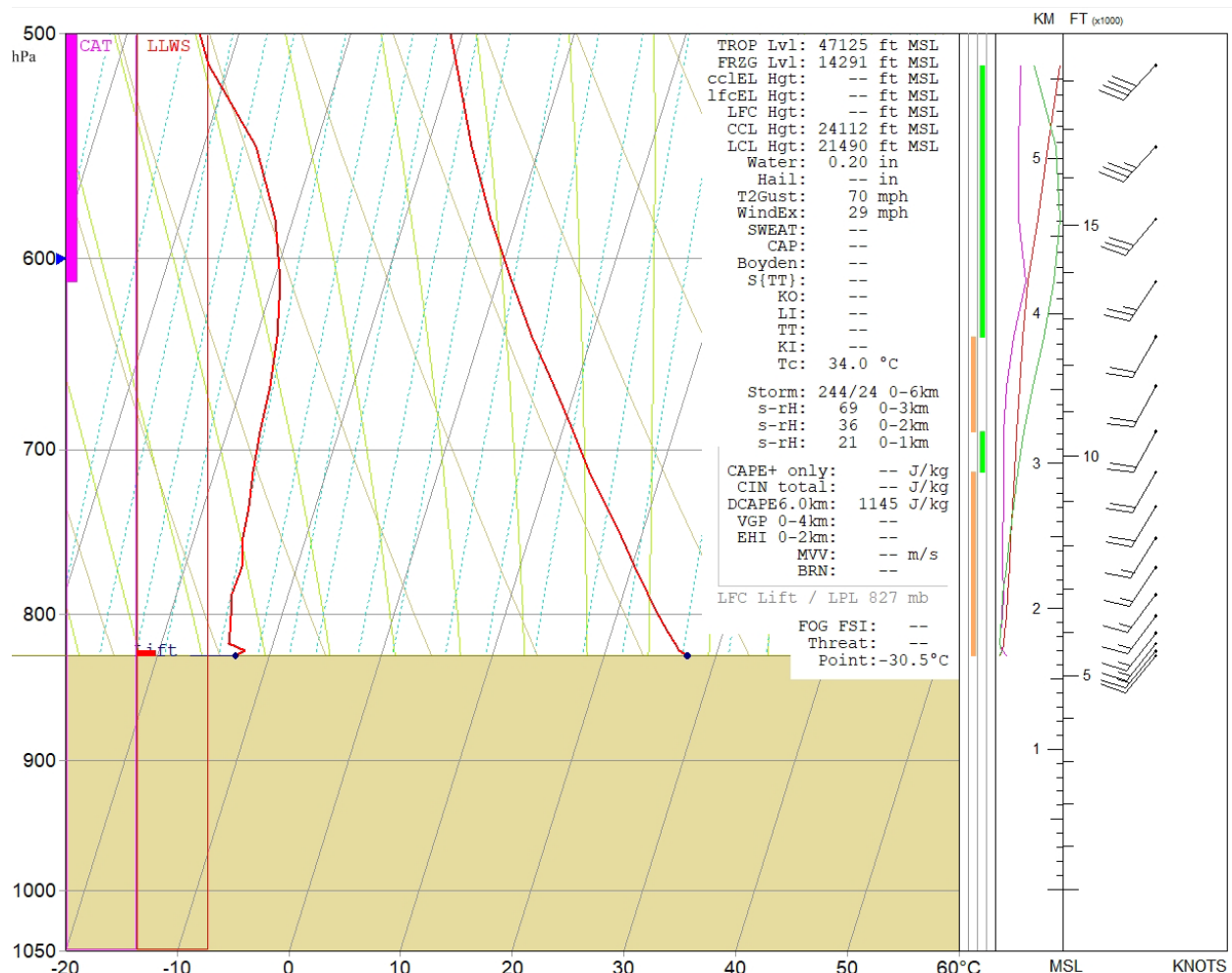


Figure 1 – HRRR model sounding data in SkewT/LogP format for 1300 MDT near the accident site, surface to 500 hectopascals.

⁵ 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.

⁶ Coordinates used for the model were 39.92, -105.13.

4.0 Area Forecast Discussion

The National Weather Service (NWS) Boulder, Colorado, Weather Forecast Office issued the following Aviation section of an Area Forecast Discussion at 1115 MDT.

FXUS65 KBOU 111715

AFDBOU

Area Forecast Discussion

National Weather Service Denver/Boulder CO

1115 AM MDT Wed May 11 2022

.UPDATE...

Issued at 1006 AM MDT Wed May 11 2022

.AVIATION...(For the 18Z TAFS through 18Z Thursday afternoon)

Issued at 1110 AM MDT Wed May 11 2022

Winds will be the greatest operational impact today with VFR conditions. Winds will increase out of the southwest with speeds up to 25kt then increase after 18z up to 32kts for DEN and APA with BJC topping out around 25kts. Winds will shift more westerly after 14z and be due west after 16z with gusting up to 32kts. Winds will continue to gust in the 20 to 30kt range through Thursday afternoon for all terminals.

5.0 SIGMETs

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

6.0 G-AIRMETs TANGO

A Graphical-Airmen's Meteorological Information (G-AIRMET) is a graphical advisory of weather that may be hazardous to aircraft but is less severe than SIGMETs. They are only valid at specific time "snapshots". G-AIRMETs are issued at discrete times with valid times three hours apart for a period of up to 12 hours into the future (i.e., 00-, 03-, 06-, 09- and 12-hour forecasts). They are issued at 0300 UTC, 0900 UTC, 1500 UTC and 2100 UTC (with updates issued as necessary).

G-AIRMET TANGO advisories for moderate turbulence below FL180⁷ and low-level wind shear (LLWS) were issued at 0845 MDT and were valid for the accident location at 0900 MDT. A G-AIRMET TANGO advisory for moderate turbulence below FL180 was issued at 0845 MDT and was valid for the accident location at 1200 MDT.

⁷ Flight Level (FL) - a standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the international standard pressure datum of 1013.25 hPa (29.92 inches of mercury), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above msl or agl.

7.0 Graphical Forecasts for Aviation

The Graphical Forecasts for Aviation (GFA) are intended to provide the necessary aviation weather information to give users a complete picture of the weather that might impact flight in the continental United States. Hourly model data and forecasts, including information on clouds, flight category, precipitation, icing, turbulence, wind, and other output from the NWS are available, however only certain imagery are archived by the NWS.

The following image (Figure 2) depict GFA forecast information on instrument flight rule (IFR)⁸ condition and surface wind G-AIRMET advisories, surface visibility, surface wind, precipitation, and other obscurations and hazards, and was issued about 1000 MDT and valid for 1200 MDT. This GFA forecast imagery depicted surface visibility as greater than 5 statute miles at the accident location. A wind barb identifying a sustained wind of 10 knots from the south-southeast with gusts to 20 knots was located to the northwest of the accident location, and a wind barb identifying a sustained wind of 15 knots from the south-southwest with gusts to 25 knots was located to the southwest of the accident location. A G-AIRMET for surface wind was active to the south of the accident location.

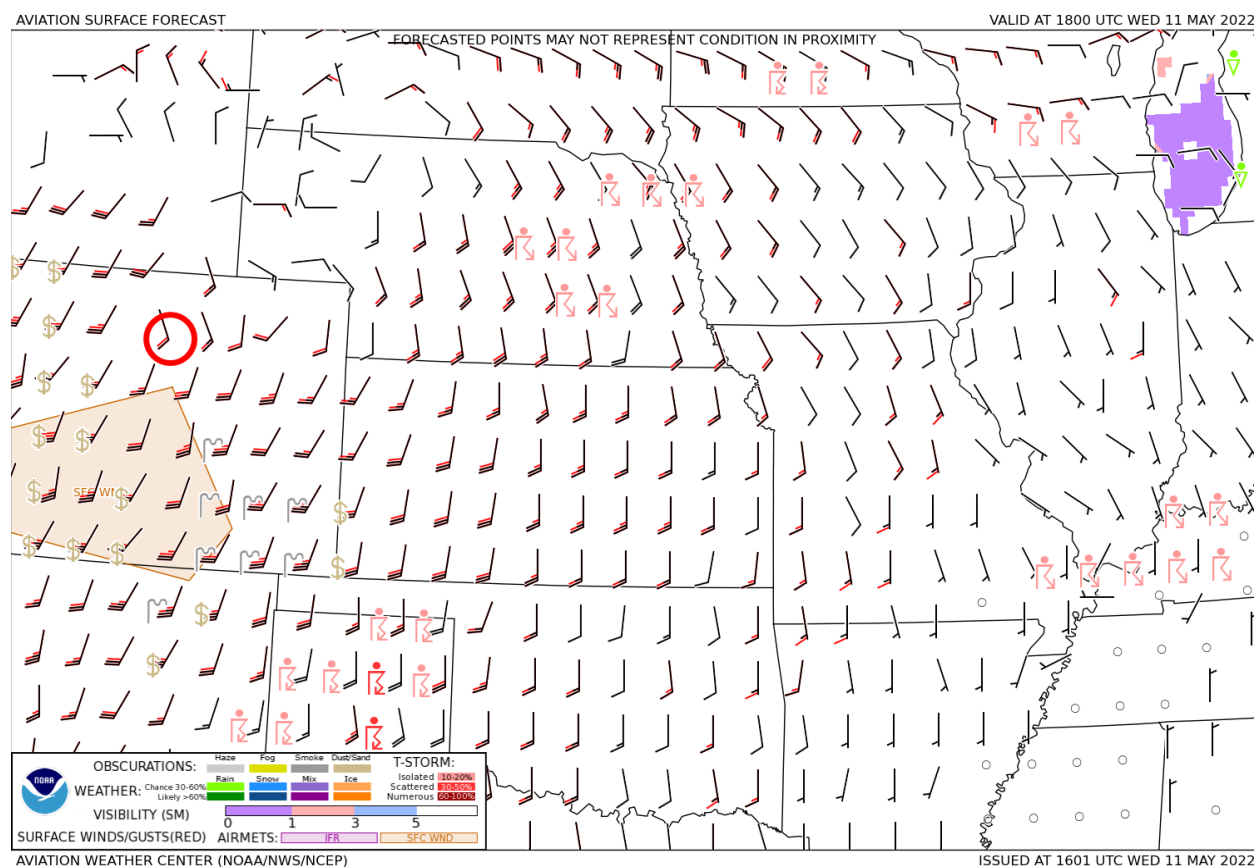


Figure 2 – GFA forecast imagery depicting IFR conditions and surface wind G-AIRMETs, surface visibility, surface wind, precipitation, and other obscurations and hazards. Issued about 1000 MDT and valid for 1200 MDT. The accident location is located within the red circle.

⁸ IFR conditions - Ceilings less than 1,000 feet agl and/or visibility less than three statute miles.

8.0 CWSU Products

There were no Center Weather Advisories or Meteorological Impact Statements issued by the NWS Center Weather Service Unit (CWSU) at the Denver Air Route Traffic Control Center that were active for the accident location at the accident time.

Submitted by:

Mike Richards
Senior Meteorologist