

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ANC23FA003

METEOROLOGY

Specialist's Factual Report

April 18, 2023

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A. ACCIDENT

Location: Mokuleia, Hawaii

Date: 5 November 2022

Time: 0811 Hawaii standard time (1811 UTC¹)

Aircraft: Type - Airborne Windsports; Registration - N444EZ

B. METEOROLOGY INVESTIGATOR

Mike Richards

Senior Meteorologist

Office of Aviation Safety

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 Hawaii standard time for 5 November 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: 21.579707° north latitude; 158.23777° west longitude, at an elevation near msl.

This report provides low-altitude wind information for the accident region.

D. WEATHER INFORMATION

1.0 Surface Observations

Unofficial meteorological reporting station DLGH1 (data courtesy of MesoWest²) was located about 2 miles east of the accident site at an elevation of about 100 feet. Type, calibration, maintenance, and siting standards of this instrument, as well as the overall quality of the data, are not known. Reporting of wind parameters³ from DLGH1 during the times surrounding the accident time are presented here (values have been rounded to nearest whole number and magnitudes have been converted to knots):

¹ UTC - abbreviation for Coordinated Universal Time

² <https://mesowest.utah.edu>

³ W_Mag=average wind magnitude (knots); W_Dir=average wind direction (true); G_Mag=gust wind magnitude (knots)

<u>Time</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
0549	0	---	7
0649	0	---	3
0749	0	---	3
0849	6	059°	11
0949	7	060°	13
1049	5	083°	14

Unofficial meteorological reporting station MKGH1 (data courtesy of MesoWest) was located about 3 miles southeast of the accident site at an elevation of about 1,750 feet. Type, calibration, maintenance, and siting standards of this instrument, as well as the overall quality of the data, are not known. Reporting of wind parameters from MKGH1 during the times surrounding the accident time are presented here (values have been rounded to nearest whole number and magnitudes have been converted to knots):

<u>Time</u>	<u>W Mag</u>	<u>W Dir</u>	<u>G Mag</u>
1558	4	063°	17
1658	5	093°	16
1758	7	040°	13
1858	3	067°	18
1958	2	179°	11
2058	5	032°	12

An automated weather reporting station was located at Wheeler Army Airfield (PHHI) which was in Wahiawa, Hawaii, about 13 miles southeast of the accident location at an elevation of about 845 feet and had a magnetic variation of about 9.5° east. Automated longline⁴ reports from the PHHI station during times surrounding the accident time are presented here.

[0555] METAR PHHI 051555Z AUTO 09006KT 10SM BKN190 24/17 A3010 RMK AO2 SLP181 T02440171 \$=

[0655] METAR PHHI 051655Z AUTO 13003KT 10SM FEW022 SCT028 BKN038 BKN200 24/17 A3011 RMK AO2 SLP186 T02390174 \$=

⁴ "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 many 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.

**[0755] METAR PHHI 051755Z AUTO 07007KT 10SM FEW200 SCT220
25/17 A3013 RMK AO2 SLP192 T02460173 10246 20237 52013
\$=**

[0855] METAR PHHI 051855Z AUTO 10009KT 10SM FEW049 BKN210 26/18
A3014 RMK AO2 SLP195 T02610180 \$=

At 0755, the PHHI station reported a wind from 070° at 7 knots, visibility 10 statute miles or greater, few clouds at 20,000 feet above ground level (agl), scattered clouds at 22,000 feet agl, temperature of 25° Celsius (C) and dew point temperature of 17°C, altimeter setting of 30.13 inches of mercury; Remarks included: station with a precipitation discriminator, sea level pressure of 1019.2 hectopascals (hPa), temperature of 24.6°C and dew point temperature of 17.3°C, 6-hour maximum temperature of 24.6°C, 6-hour minimum temperature of 23.7°C, 3-hour pressure increase of 1.3 hPa.

10-meter agl average wind magnitudes (knots) and wind directions (true) retrieved from the Weather Research and Forecasting (WRF) model from across the accident region at 0800 were obtained from the Pacific Islands Ocean Observing System (PacIOOS) and are presented in Figure 1.⁵ Wind parameters for very near the accident site⁶ were extracted from these WRF data and are presented here (values rounded to nearest whole number):

<u>Time</u>	<u>W Mag</u>	<u>W Dir</u>
0500	7	079°
0600	6	070°
0700	5	074°
0800	6	075°
0900	8	080°
1000	11	081°

⁵ Further information may be found here: <https://www.pacioos.hawaii.edu/weather/model-wind-hawaii/>

⁶ Data retrieved from coordinates: 21.5794°N, 158.2309°W

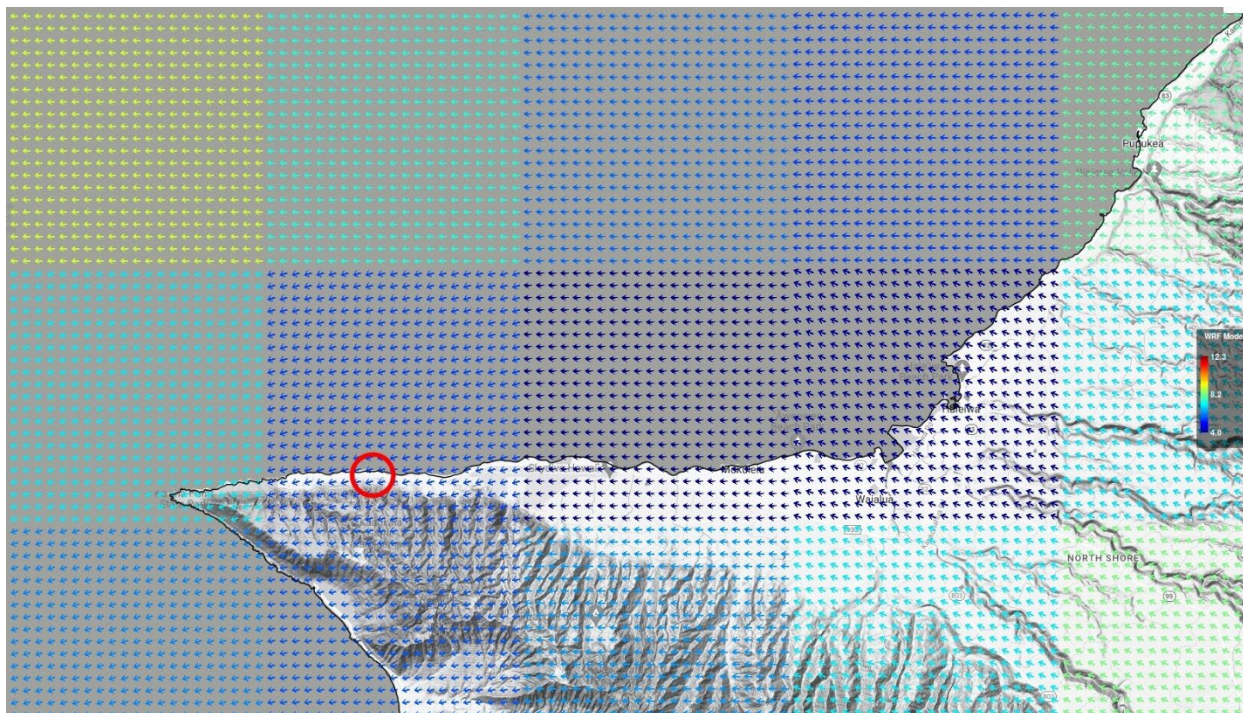


Figure 1 - WRF 10-meter wind data from the PacIOOS. Accident location is identified by the red circle.

2.0 GDAS Sounding

A Global Data Assimilation System (GDAS)⁷ sounding for near the accident site⁸ at 0800 was retrieved from the National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory and analyzed by the RAwinsonde OBservation (RAOB) program. Average wind magnitudes and wind direction as interpolated by RAOB for every 250 feet between the surface and 5,000 feet are presented here:

<u>Height</u>	<u>W Mag</u>	<u>W Dir</u>
0	14	085°
250	15	085°
500	17	086°
750	17	087°
1000	17	088°
1250	17	089°
1500	18	090°

⁷ The Global Data Assimilation System (GDAS) is the system used by the Global Forecast System (GFS) model to place observations into a gridded model space for the purpose of starting, or initializing, weather forecasts with observed data.

⁸ Coordinates used for the model were latitude: 21.58; longitude: -158.24.

1750	18	092°
2000	18	093°
2250	17	096°
2500	17	099°
2750	16	102°
3000	16	105°
3250	15	108°
3500	15	110°
3750	15	110°
4000	16	110°
4250	16	109°
4500	16	109°
4750	17	108°
5000	17	107°

3.0 Terminal Aerodrome Forecasts

At 0500 a Terminal Aerodrome Forecasts (TAF) was issued for PHHI that forecasted for the accident time: a variable wind 6 knots, visibility unlimited, ceiling broken at 2,500 feet agl, altimeter setting of 30.03 inches of mercury.

*TAF PHHI 051500Z **0515/0621 VRB06KT 9999 BKN025 QNH3003INS**
 TEMPO 0520/0603 12012G18KT 8000 -SHRA FEW010 BKN020
 OVC045
 BECMG 0606/0607 VRB06KT 9000 -DZ SCT020 BKN030 QNH3006INS
 BECMG 0612/0613 VRB06KT 9999 NSW SCT040 QNH3005INS
 TX28/0523Z TN24/0515Z=*

4.0 Area Forecast Discussion

The National Weather Service (NWS) Honolulu, Hawaii, Weather Forecast Office (WFO) issued the following Aviation section of an Area Forecast Discussion at 0407, applicable for the Hawaiian Islands.

*FXHW60 PHFO 051407 AAA
 AFDHFO
 Area Forecast Discussion...UPDATED
 National Weather Service Honolulu HI
 407 AM HST Sat Nov 5 2022
 .AVIATION...*

A high pressure system far northeast of the Hawaiian Islands will keep moderate to breezy trade winds in the forecast through tonight. An upper level low northwest of Kauai will slowly lift northward with more typical trade wind showers in the forecast with brief periods of MVFR conditions possible, mainly over N through E sections of each island. Isolated thunderstorms will continue to develop near Kauai this morning.

AIRMET Sierra remains in effect for tempo mountain obscuration for N thru E sections of Kauai above 020 due to clouds and showers. These conditions will likely diminish later this morning.

AIRMET Tango remains in effect for moderate low level turbulence affecting all Hawaiian Islands below 090 over and immediately S through NW of mountains. This low level turbulence will likely continue into tonight. Upper level moderate turbulence also remains in effect from Oahu eastward to the Big Island from FL250-400. This upper level turbulence will diminish later this morning.

5.0 Area Forecast

The NWS Honolulu, Hawaii, WFO issued the following information in an Area Forecast at 0535, which provided forecast wind information applicable to all the Hawaiian Islands.

HNLC FA 051535

SYNOPSIS AND VFR CLD/WX

SYNOPSIS VALID UNTIL 061000

CLD/WX VALID UNTIL 060400...OUTLOOK VALID 060400-061000

SEE AIRMET SIERRA FOR IFR CLD AND MTN OBSC.

TS IMPLY SEV OR GREATER TURB SEV ICE LOW LEVEL WS AND IFR COND.

NON MSL HGT INDICATED BY AGL OR CEILING.

SYNOPSIS...MODERATE TO LOCALLY BREEZY TRADE WINDS WILL CONTINUE THROUGH TONIGHT. PERIODS OF SHOWERS WILL FAVOR WINDWARD AND MOUNTAIN AREAS, MAINLY IN THE OVERNIGHT TO EARLY MORNING HOURS. ISOLATED THUNDERSTORMS MAY DEVELOP NEAR KAUAI THROUGH THE EARLY MORNING HOURS.

*SFC WIND OVER MTN RIDGES...THRU VALLEYS AND IN CHANNELS...
E 20-25KT.*

Submitted by:

Mike Richards
Senior Meteorologist