



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Washington, D.C. 20594

August 9, 2019

### **Weather Study**

# **METEOROLOGY**

WPR19FA175

## 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  | Upper Air Data.....                                       | 5  |
| 3.0  | Satellite Imagery .....                                   | 6  |
| 4.0  | Weather Radar .....                                       | 8  |
| 5.0  | Pilot Reports.....                                        | 8  |
| 6.0  | Area Forecast Discussion.....                             | 9  |
| 7.0  | AIRMETs for IFR Conditions and Mountain Obscuration ..... | 9  |
| 8.0  | SIGMETs .....                                             | 10 |
| 9.0  | CWSU Products .....                                       | 10 |
| 10.0 | Graphical Forecasts for Aviation .....                    | 10 |

## **A. ACCIDENT**

Location: Avalon, California  
Date: June 17, 2019  
Time: about 1730 Pacific daylight time (about 0030 UTC<sup>1</sup> on June 18, 2019)  
Aircraft: R44 Robinson Helicopter; N7187D

## **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 Pacific daylight time (PDT) for June 17, 2019 (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).

Coordinates used for the accident location: 33.462778° north latitude, 118.574722° west longitude, at an elevation of about 1,330 feet.

## **D. WEATHER INFORMATION**

### **1.0 Surface Observations**

An Automated Surface Observing System was located at Catalina Airport (AVX<sup>2</sup>) in Avalon, California, which was located about 9 miles east-southeast of the accident location at an elevation of about 1,600 feet. Automated reports from KAVX during the times surrounding the accident time are presented here.

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<sup>1</sup> UTC – abbreviation for Coordinated Universal Time

<sup>2</sup> 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.

[1559 PDT] SPECI KAVX 172259Z AUTO VRB05KT 10SM OVC014 17/13 A2992  
RMK AO2 T01720128 \$=

[1651 PDT] METAR KAVX 172351Z AUTO VRB05KT 10SM BKN015 18/13 A2991  
RMK AO2 SLP118 T01780133 10183 20150 56004 \$=

**[1713 PDT] SPECI KAVX 180013Z AUTO 12006KT 10SM SCT016 18/13 A2991  
RMK AO2 T01780128 \$=**

[1751 PDT] METAR KAVX 180051Z AUTO 11004KT 10SM CLR 17/13 A2991 RMK  
AO2 SLP116 T01720128 \$=

At 1713 PDT, KAVX reported a wind from 120° at 6 knots, visibility of 10 statute miles or greater, scattered clouds at 1,600 feet above ground level (agl), temperature of 18° Celsius (C) and a dew point temperature of 13°C, altimeter setting of 29.91 inches of mercury; remarks: station with a precipitation discriminator, temperature of 17.8°C and dew point temperature of 12.8°C, maintenance needed on the system.

Weather observations augmented by a human observer were disseminated from Zamperini Field Airport (TOA) in Torrance, California, which was located about 23 miles north-northeast of the accident location at an elevation of about 100 feet. Weather observing equipment type located at TOA is unknown. Reports from KTOA during the times surrounding the accident time are presented here.

[1550 PDT] METAR KTOA 172250Z 28012KT 10SM SCT020 OVC030 19/14 A2989=

**[1650 PDT] METAR KTOA 172350Z 31006KT 10SM SCT023 BKN030 20/15  
A2989=**

**[1747 PDT] METAR KTOA 180047Z VRB06KT 10SM SCT030 21/13 A2988=**

At 1650 PDT, KTOA reported a wind from 310° at 6 knots, visibility of 10 statute miles or greater, scattered clouds at 2,300 feet agl, ceiling broken at 3,000 feet agl, temperature of 20°C and a dew point temperature of 15°C, altimeter setting of 29.89 inches of mercury.

At 1747 PDT, KTOA reported a variable wind at 6 knots, visibility of 10 statute miles or greater, scattered clouds at 3,000 feet agl, temperature of 21°C and a dew point temperature of 13°C, altimeter setting of 29.88 inches of mercury.

Weather observations augmented by a human observer were disseminated from San Clemente Island Naval Auxiliary Landing Field (NUC) on San Clemente Island, California, which was located about 27 miles south of the accident location at an elevation of about 180 feet. Weather observing equipment type located at NUC is unknown. Reports from KNUC during the times surrounding the accident time are presented here.

[1556 PDT] METAR KNUC 172256Z 23007KT 10SM FEW015 OVC020 18/12 A2992  
RMK AO2 SLP129 T01780122 \$=

**[1656 PDT] METAR KNUC 172356Z 24007KT 10SM OVC018 18/12 A2991 RMK  
AO2 SLP126 T01780117 10183 20150 58009 \$=**

**[1756 PDT] METAR KNUC 180056Z 24006KT 10SM OVC019 17/11 A2990 RMK  
AO2 SLP123 T01720111 \$=**

At 1656 PDT, KNUC reported a wind from 240° at 7 knots, visibility of 10 statute miles or greater, ceiling overcast at 1,800 feet agl, temperature of 18°C and a dew point temperature of 12°C, altimeter setting of 29.91 inches of mercury; remarks included: station with a precipitation discriminator, sea level pressure of 1012.6 hectopascals (hPa), temperature of 17.8°C and dew point temperature of 11.7°C, maintenance needed on the system.

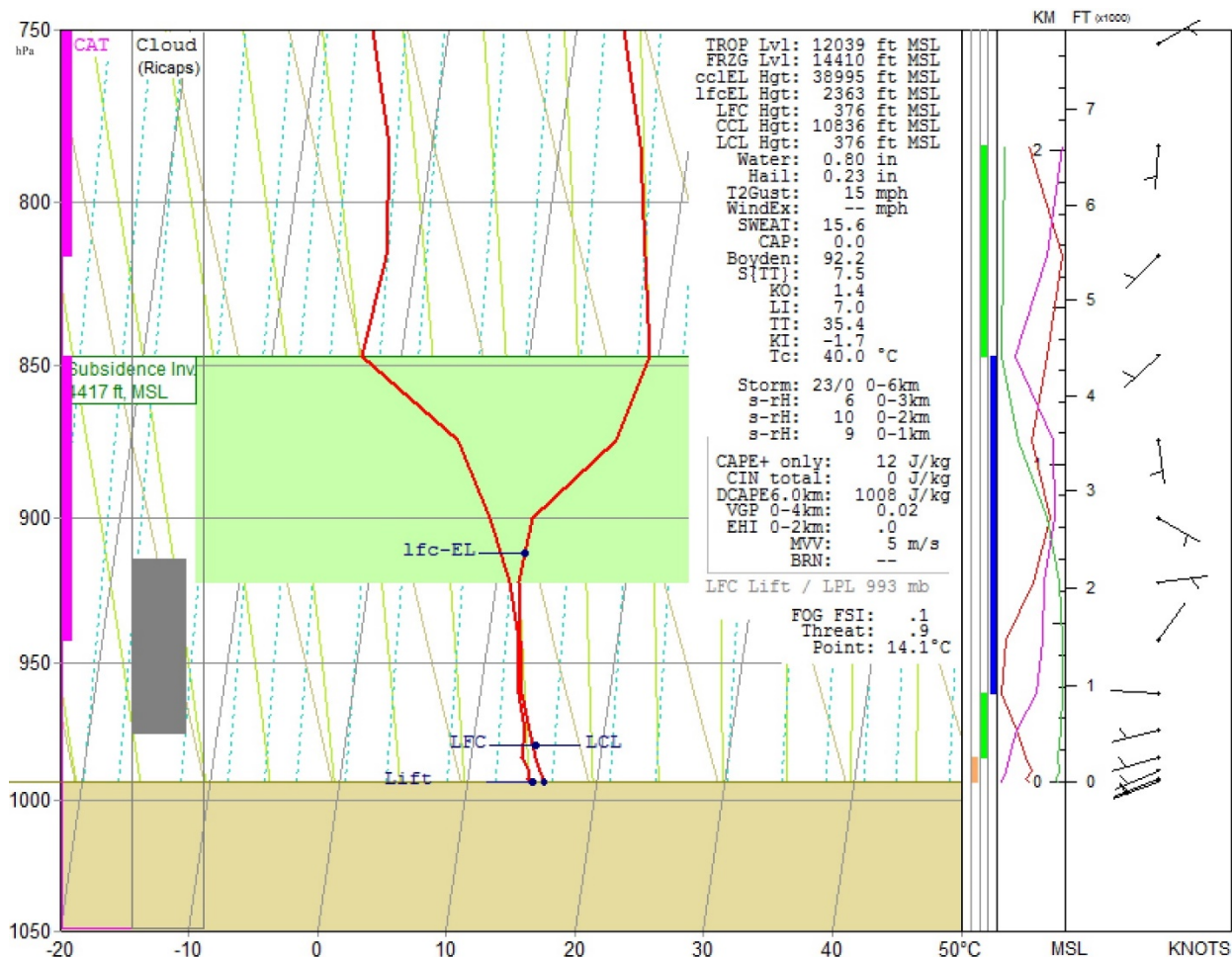
At 1756 PDT, KNUC reported a wind from 240° at 6 knots, visibility of 10 statute miles or greater, ceiling overcast at 1,900 feet agl, temperature of 17°C and a dew point temperature of 11°C, altimeter setting of 29.90 inches of mercury; remarks: station with a precipitation discriminator, sea level pressure of 1012.3 hPa, temperature of 17.2°C and dew point temperature of 11.1°C, maintenance needed on the system.

## **2.0 Upper Air Data**

A High-Resolution Rapid Refresh (HRRR) model<sup>3</sup> sounding for the accident site at 1700 PDT (figure 1) was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. The sounding revealed that a temperature inversion was present between about 2,000 and 4,400 feet msl. The relative humidity was greater than 90 percent below about 2,400 feet and the Rawinsonde OBservation Program (RAOB) projected broken cloud conditions from about 500 through 2,100 feet msl. The wind below 4,000 feet msl was light and variable, with the wind in the lowest 1,000 feet predominately from the west.

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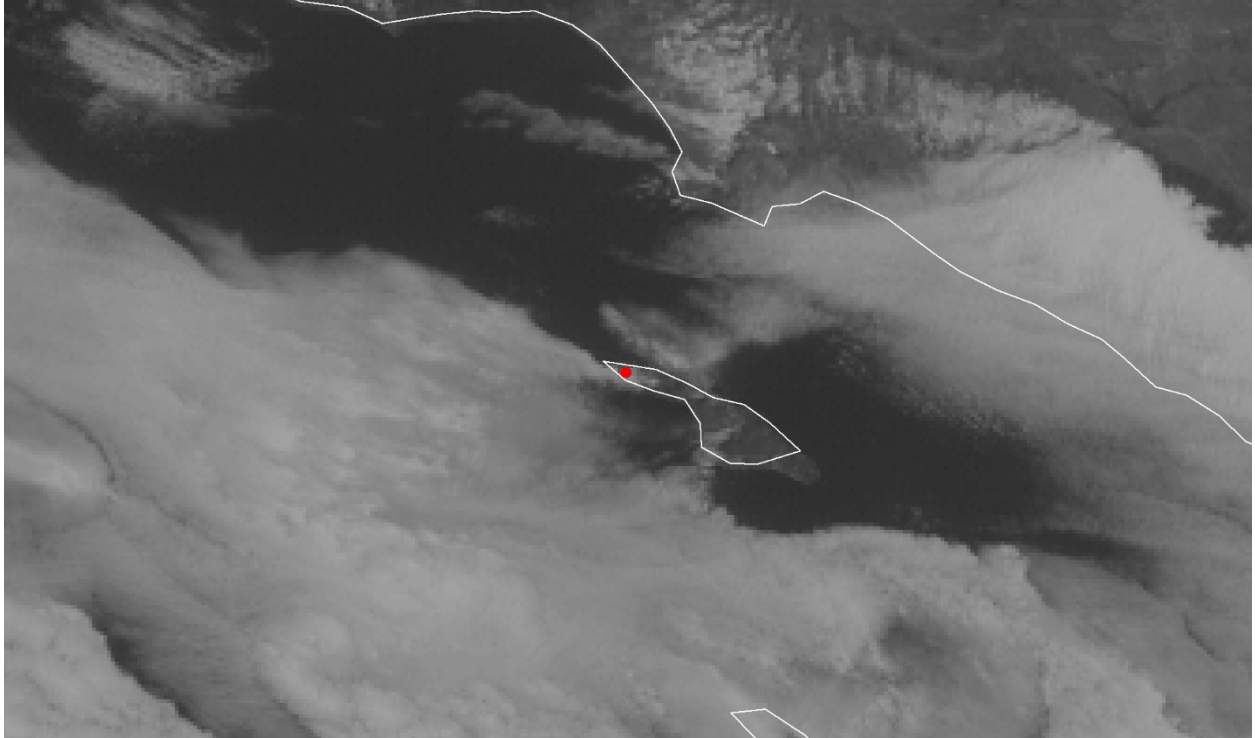
<sup>3</sup> The HRRR is a NOAA real-time three-kilometer resolution, hourly-updated, cloud-resolving, convection-allowing atmospheric model, initialized by three-kilometer grids with three-kilometer radar assimilation. Radar data is assimilated in the HRRR every 15 minutes over a one-hour period.



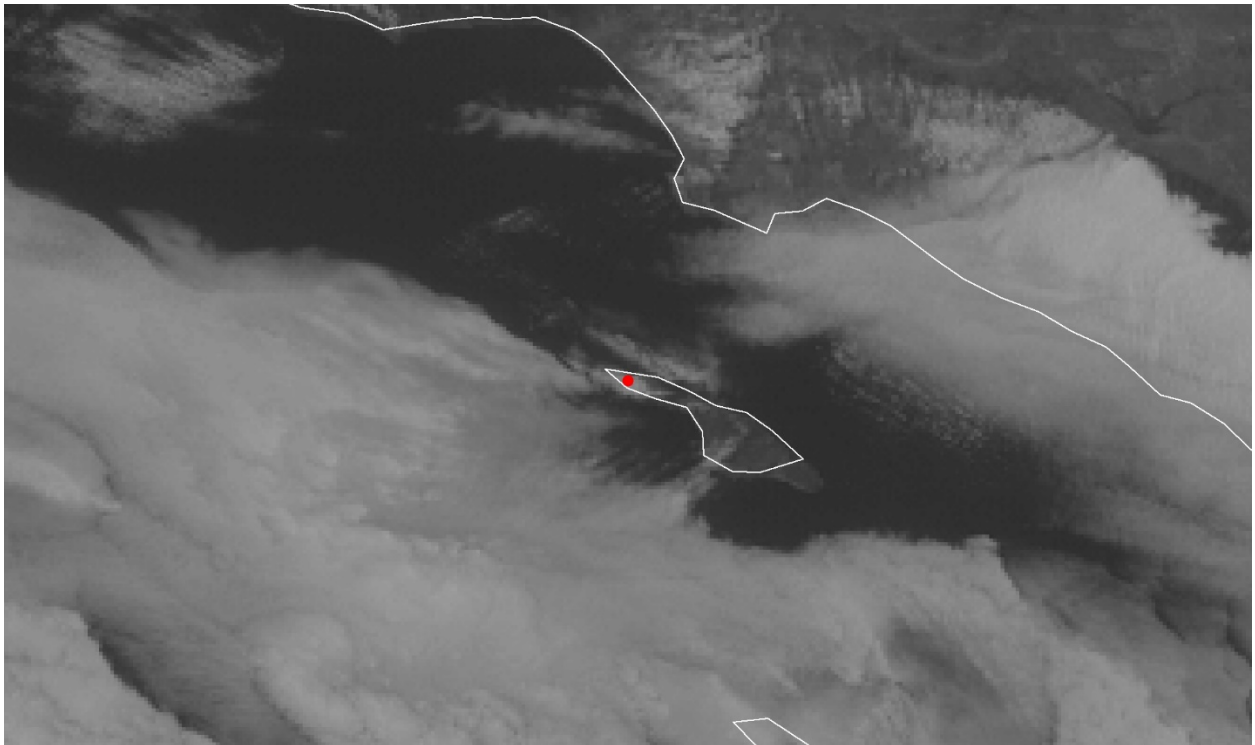
**Figure 1** – HRRR model sounding data in SkewT/LogP format for 1700 PDT at the accident site, surface to 750 hPa.

### 3.0 Satellite Imagery

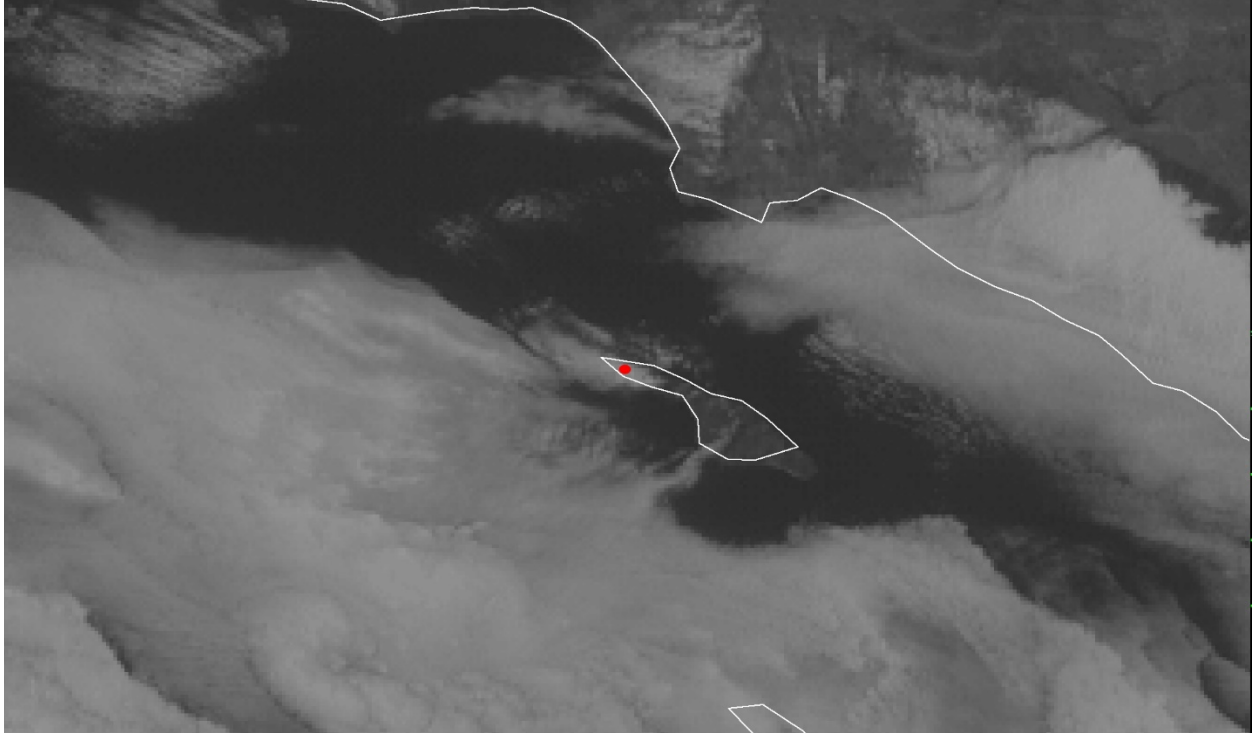
Geostationary Operational Environmental Satellite (GOES)-17 visible (0.64 $\mu$ m) and infrared (10.3 $\mu$ m) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Visible imagery from 1701, 1716 and 1731 PDT are presented in figures 2, 3 and 4, respectively. This imagery identified cloudy conditions across the accident region, including over the northwest portion of Santa Catalina Island where the accident occurred. It should be noted that much of the rest of the island was not under cloud cover during these times. Infrared imagery was reviewed and brightness temperatures over and near the northwestern portion of Santa Catalina Island ranged between 12°C and 16°C. Because the HRRR model sounding produced a near-isothermal temperature profile below about 2,700 feet, and because of a relatively deep temperature inversion immediately above this level, cloud top estimates based on satellite-retrieved brightness temperatures could not be made with confidence.



**Figure 2** – GOES-17 visible imagery from 1701 PDT. Accident location denoted by red circle. This image has not been corrected for any parallax error.



**Figure 3** – GOES-17 visible imagery from 1716 PDT. Accident location denoted by red circle. This image has not been corrected for any parallax error.



**Figure 4** – GOES-17 visible imagery from 1731 PDT. Accident location denoted by red circle. This image has not been corrected for any parallax error.

#### 4.0 Weather Radar

A review of weather radar imagery surrounding the time of the accident did not reveal any pertinent echoes.

#### 5.0 Pilot Reports

Publicly disseminated pilot reports<sup>4</sup> (PIREP) made within 40 miles of the accident location between 1600 and 1900 PDT are presented here.

*SNA UA /OV LGB270003/TM 0038/FL030/TP B737/SK TOP030*

At 1738 PDT, a Boeing 737 at 3,000 feet 3 miles west of Long Beach Airport in Long Beach, California, reported cloud tops at 3,000 feet.

*TOA UA /OV TOA/TM 0135/FL023/TP BL17/SK BKN023/RM BASES 2 W OF TOA  
BKN023 TOPS 028*

At 1835 PDT, a Bellanca Viking at 2,300 feet over TOA reported broken clouds at 2,300 feet with cloud bases two miles west of TOA as broken at 2,300 feet with cloud tops at 2,800 feet.

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<sup>4</sup> Pilot reports publicly-disseminated only over radio were not captured.

## 6.0 Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1729 PDT by the National Weather Service (NWS) Weather Forecast Office in Los Angeles/Oxnard, California. Presented here is the “Aviation” section of that AFD.

*FXUS66 KLOX 180029*

*AFDLOX*

*Area Forecast Discussion*

*National Weather Service Los Angeles/Oxnard CA*

*529 PM PDT Mon Jun 17 2019*

*.AVIATION...18/0028Z.*

*At 0015Z at KLAX...The marine layer was 3000 feet deep. The top of the inversion was around 4500 feet with a temperature of 18 C.*

*High confidence in TAFs. Strong onshore flow pattern and deep marine layer resulted in delayed burnoff of low clouds this afternoon, with some coastal areas continuing to see cigs as of 00z. Low clouds and fog expected to spread into most coastal/valley areas overnight, however marine layer depth not expected to be quite as deep as this morning. With weak low level offshore wind influence across the interior, look for better clearing on Tuesday afternoon, especially valleys.*

*KLAX...High confidence in TAF. MVFR cigs expected to prevail across most of the forecast period. There is a 30 percent chance of clouds burning off on Tuesday afternoon.*

*KBUR...High confidence in TAF. With deep marine layer pattern in place, expecting low clouds to quickly redevelop later this evening. Higher probability of clouds burning off by late morning or early afternoon on Tuesday.*

## 7.0 AIRMETs for IFR Conditions and Mountain Obscuration

At 1345 PDT, the NWS Aviation Weather Center issued the following Airmen’s Meteorological Information (AIRMET) advisories for IFR conditions<sup>5</sup> and mountain obscuration. The AIRMET for IFR conditions was active for the accident location at the accident time. The AIRMET for mountain obscuration was active for the mainland California coast near Santa Catalina Island but was not active for the island.

*WAUS46 KPCI 172045*

*WA6S*

*-SFOS WA 172045*

*AIRMET SIERRA UPDT 5 FOR IFR AND MTN OBSCN VALID UNTIL 180300*

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<sup>5</sup> Instrument Flight Rule (IFR) conditions - ceiling less than 1,000 feet agl and/or visibility less than three statute miles.

*AIRMET IFR...CA AND CSTL WTRS  
FROM 20SW ENI TO 20W RZS TO 30N MZB TO 20S MZB TO 220SW MZB TO  
130WSW PYE TO 20SW ENI  
CIG BLW 010/VIS BLW 3SM BR/FG. CONDS CONTG BYD 03Z THRU 09Z.*

*AIRMET MTN OBSCN...WA OR  
FROM 20NNW SEA TO 40N BTG TO 40NNW ONP TO 30SSW HQM TO 40SSE TOU  
TO 20NNW SEA  
MTNS OBSC BY CLDS. CONDS CONTG BYD 03Z THRU 09Z.*

## **8.0 SIGMETs**

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

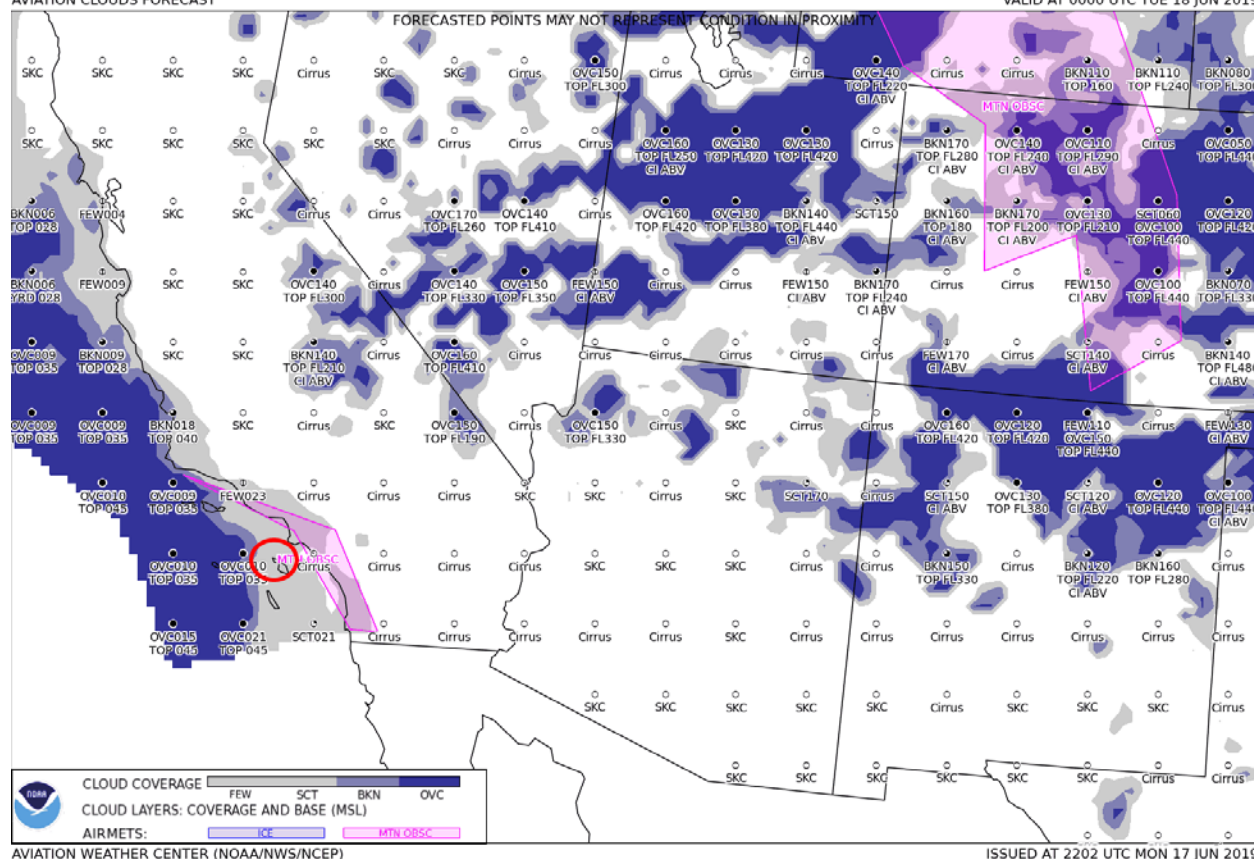
## **9.0 CWSU Products**

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

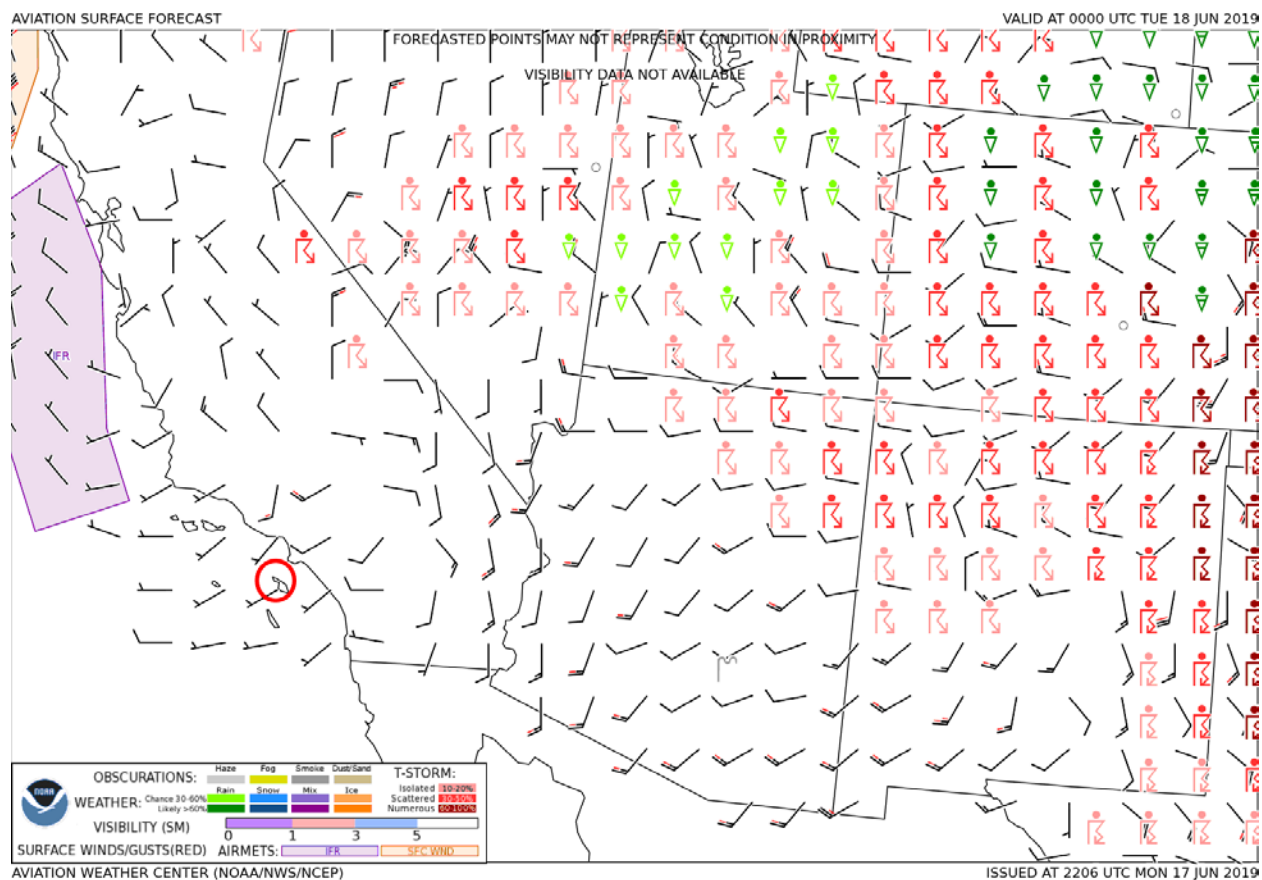
## **10.0 Graphical Forecasts for Aviation**

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 images (figures 5 and 6) depict GFA forecast information on sky condition, icing, mountain obscuration, IFR condition and surface wind AIRMETs, surface visibility, surface wind, precipitation, and other obscurations and hazards, valid for the times surrounding the accident.



**Figure 5** – GFA forecast imagery depicting sky condition and icing and mountain obscuration AIRMETs. Issued about 1500 PDT and valid for 1700 PDT. This GFA forecast imagery depicted a few to scattered sky condition over the accident site with cloud bases and tops immediately to the west of the accident site of overcast at 1,000 feet and 3,500 feet, respectively. An AIRMET for mountain obscuration was identified to the east of the accident site. The accident location was within the red circle.



**Figure 6** – GFA forecast imagery depicting IFR conditions and surface wind AIRMETs, surface visibility, surface wind, precipitation, and other obscurations and hazards. Issued about 1500 PDT and valid for 1700 PDT. This GFA forecast imagery depicted a surface visibility of greater than 5 statute miles and a southwest surface wind of 5 knots around the accident location. The accident location was within the red circle.

Submitted by:

Mike Richards  
 Senior Meteorologist

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