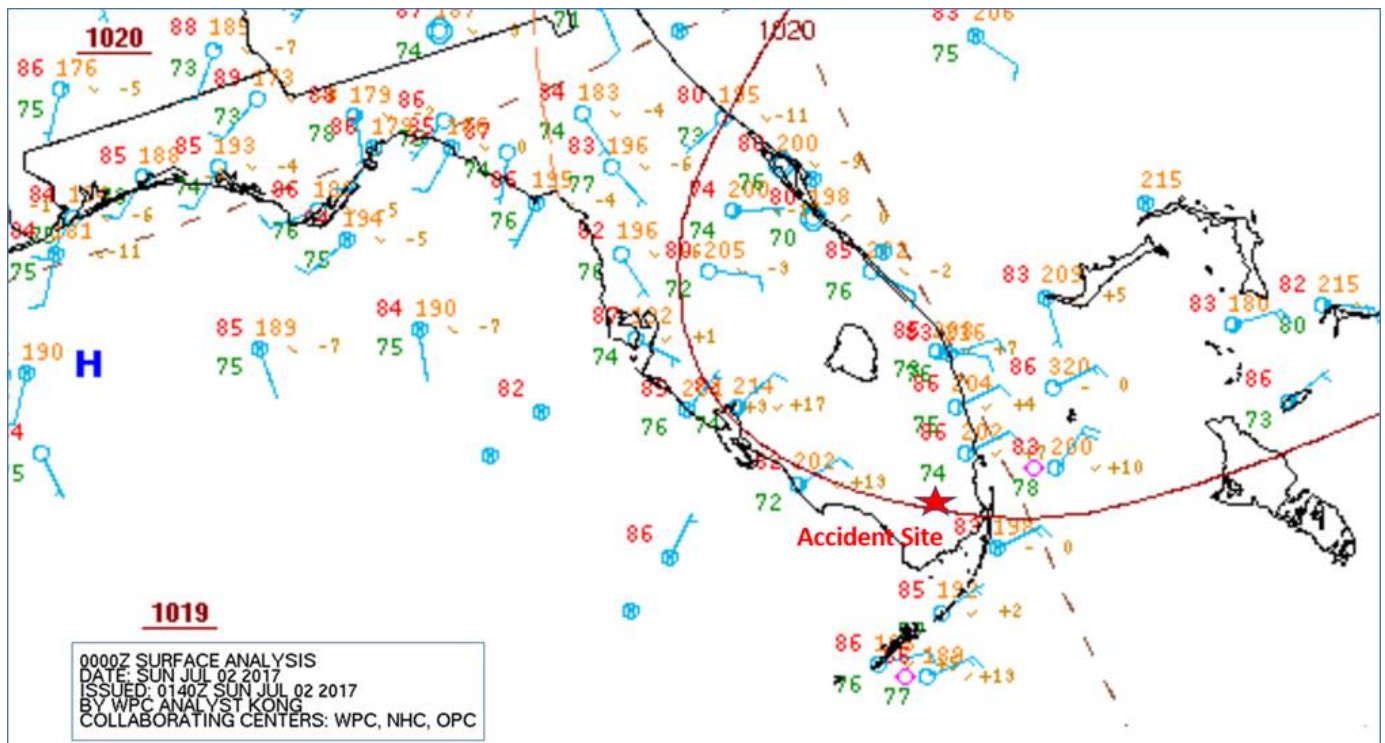


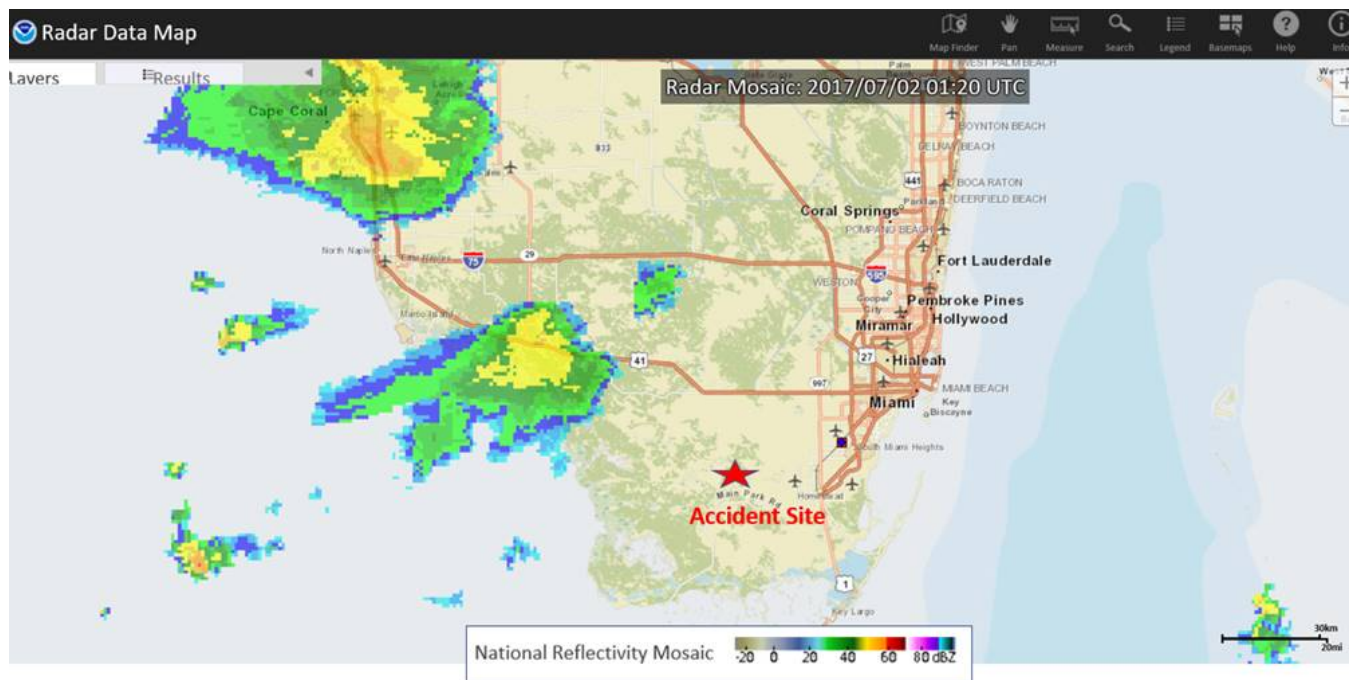
Weather Conditions across southern Florida on July 1, 2017

Synoptic Condition – the NWS southeast section of the Surface Analysis Chart valid from 2000 EDT (0000Z July 2, 2017) is included below and depicted a high pressure ridge extending over the area with easterly winds of 10 to 15 knots across south Florida associated with the tropical trade winds. No frontal or outflow boundaries associated from any thunderstorms were depicted across the region. The station models surrounding the site depicted east winds, scattered clouds, temperatures in the mid 80's degrees Fahrenheit (F), with dew point temperatures in the 70's° F.



A review of the NWS National Composite Radar Mosaic indicated several regions of echoes associated with convective rain showers and thunderstorms over the western portion of Florida. The echoes were nearly stationary and were dissipating with time.

No echoes were identified within 20 miles of the accident site. A close up review of the Miami WSR-88D was also performed and depicted non-meteorological targets or bugs and birds over the region during the period and no identifiable boundaries.



Observations – the closest weather reporting location to the accident site was from Kendall-Tamiami Executive Airport (KTMB), Miami, FL, located approximately 20 NM east-northeast of the accident site at an elevation of 10 feet. The airport had an Automated Surface Observation System (ASOS) and reported the following conditions in the hour prior to the accident:

KTMB special weather observation at 2020 EDT, wind from 080° at 7 knots, visibility 10 miles or more, a few clouds at 300 feet agl, temperature 28° C, dew point 24° C, altimeter 30.13 inches of mercury (Hg).

KTMB weather observation at 2053 EDT, wind from 090° at 8 knots, visibility 10 miles or more, scattered clouds at 2,500 feet agl, temperature 29° C, dew point 24° C, altimeter 30.14 inches of Hg.

The raw observations surrounding the period were as follows:

METAR KTMB 012353Z 09010KT 10SM CLR 29/23 A3012 RMK AO2 SLP200 T02890233 10333 20289 53007=

SPECI KTMB 020020Z 08007KT 10SM FEW003 28/24 A3013 RMK AO2 T02830239=

METAR KTMB 020053Z 09008KT 10SM SCT025 29/24 A3014 RMK AO2 SLP206 T02890239= Accident 0118Z

METAR KTMB 020153Z 09008KT 10SM CLR 28/23 A3015 RMK AO2 SLP209 T02830233=

METAR KTMB 020253Z AUTO 11010KT 10SM FEW027 FEW042 29/24 A3015 RMK AO2 SLP208 T02890239 50008=

METAR KTMB 020353Z AUTO 11009KT 10SM CLR 29/23 A3013 RMK AO2 SLP201 T02890233=

Homestead Air Force base (KHST), Homestead, FL, was also located 20 miles east of the accident site at an elevation of 6 feet. The airport reported the following conditions surrounding the period:

METAR KHST 012358Z AUTO 07006KT 10SM CLR 29/25 A3011 RMK AO2 LTG DSNT NW SLP199 T02870250 10321 20287 52005 \$=

METAR KHST 020058Z AUTO 08006KT 10SM CLR 29/25 A3014 RMK AO2 SLP210 T02850246 \$=

Accident 0118Z

METAR KHST 020158Z AUTO 08006KT 10SM CLR 28/24 A3014 RMK AO2 SLP210 T02810243 \$=

METAR KHST 020258Z AUTO 09010KT 10SM FEW026 29/24 A3014 RMK AO2 SLP210 T02860243
50009 \$=

METAR KHST 020358Z AUTO 10008KT 10SM CLR 28/25 A3012 RMK AO2 SLP203 T02810246 \$=

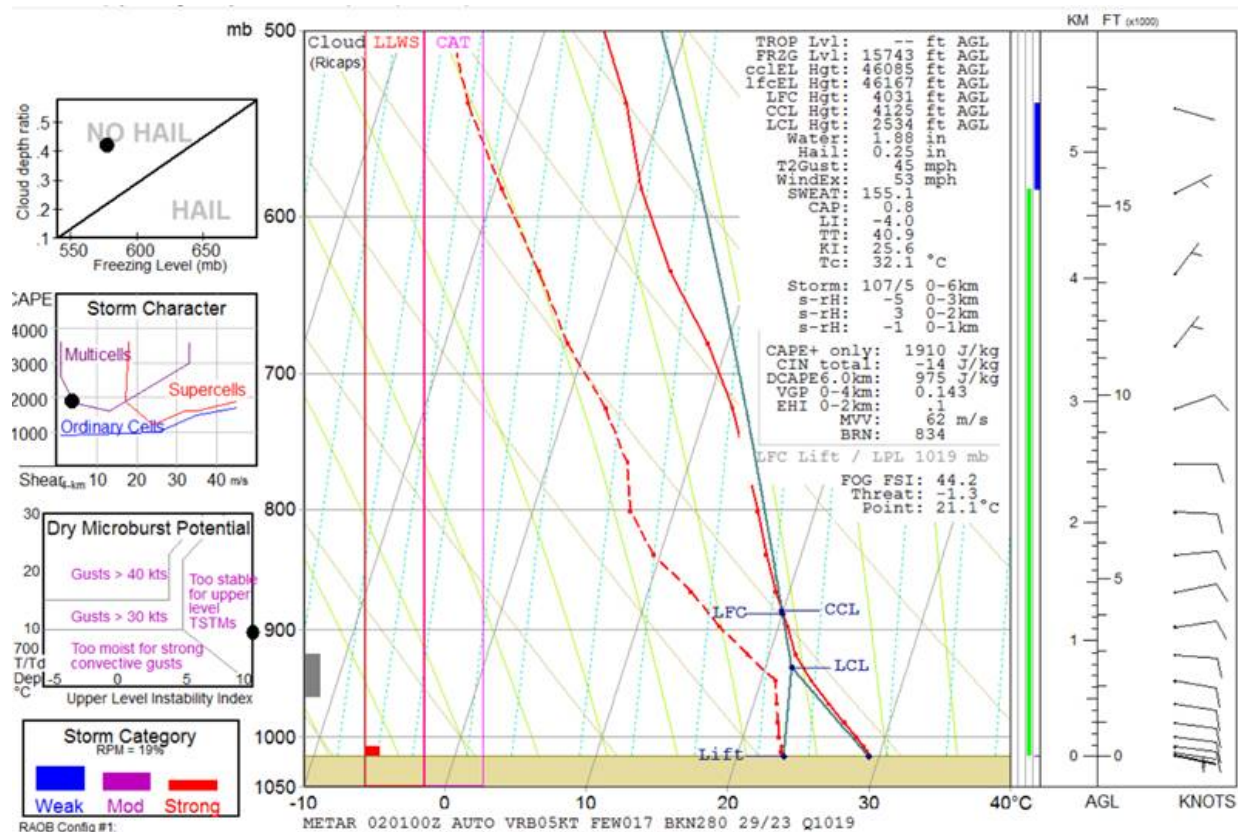
Terminal Aerodrome Forecast (TAF) valid at the time of the flight was as follows:

TAF KTMB 012320Z 0200/0224 10010KT P6SM FEW030 SCT250

FM020200 VRB02KT P6SM FEW025 SCT250

FM021400 10010KT P6SM VCSH SCT035 SCT060=

Sounding – the Miami 2000 EDT sounding was reviewed and a High resolution Rapid Refresh (HRRR) numerical model for 2100 EDT over the accident site. The HRRR sounding on a skew T log P diagram follows.



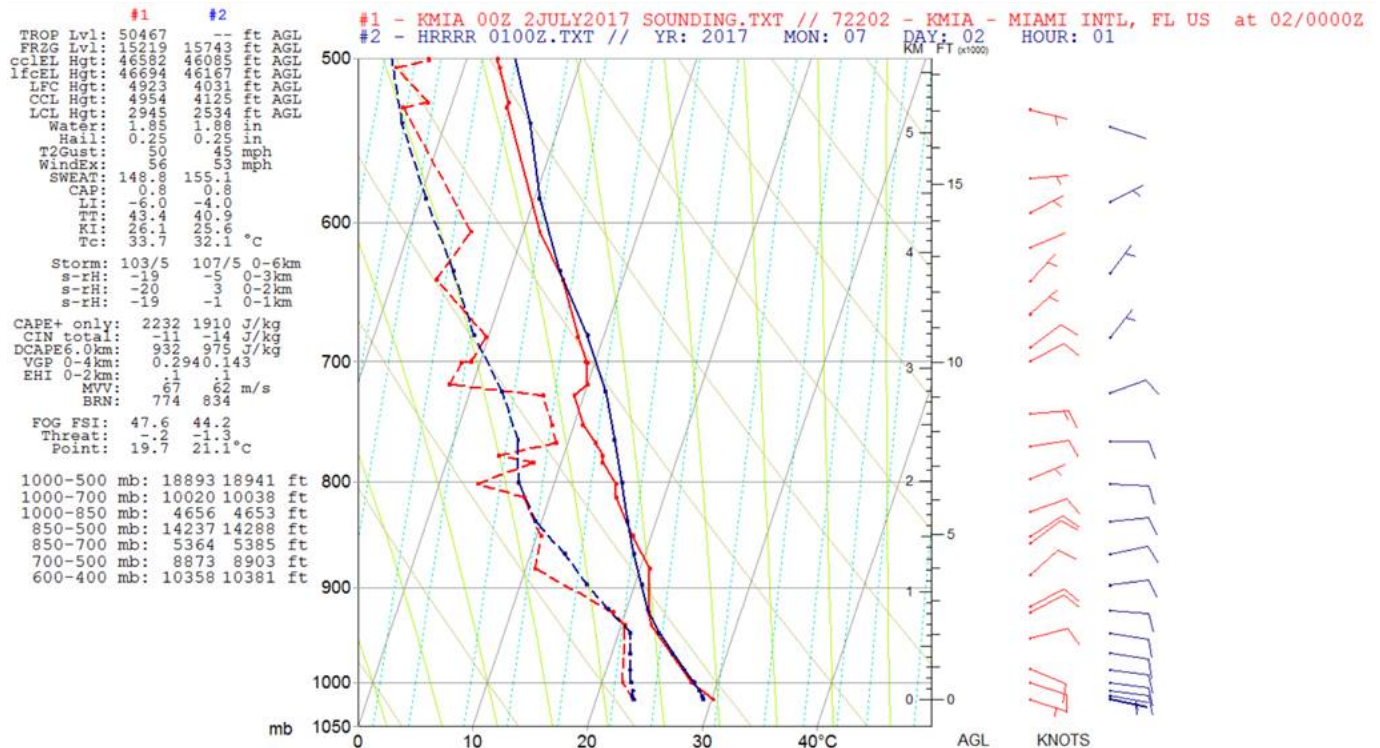
The HRRR model sounding over the accident site indicated a surface temperature of 29.3° C, a dew point of 23.3° C, with a relative humidity of 70%. The lifted condensation level was at 2,500 feet agl, the level of free convection at 4,00 feet agl, and the convective condensation level at 4,100 feet agl. The sounding indicated a relative humidity greater than 80% supporting scattered low clouds between 1,500 and 3,000 feet. The precipitable water value was 1.88 inches. The freezing level was identified at 15,700 feet. The HRRR sounding was characterized as conditionally unstable with a Lifted Index of -4 and a K-

Index of 25.6, the Convective Available Potential Energy (CAPE) value was 1,910 J/kg and supported week multicellular type thunderstorms.

The wind profile indicated a surface wind from 100 at 5 knots, with winds from the east with little directional variation with height. The mean 0 to 6 kilometer or 18,000 feet wind was from 080 at 6 knots. The wind profile did not identify any strong vertical wind shears supporting any significant turbulence below 10,000 feet. The sounding data was as follows:

Height (ft-MSL)	Pres (mb)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS	Icing - Type (AFGWC method)
0	1019	29.3	23.3	70	103 / 5			
29	1018	29.3	23.2	70	103 / 5		LIGHT	
116	1015	29.1	23.0	70	100 / 7		LIGHT	
290	1009	28.7	22.9	71	98 / 9			
552	1000	28.0	22.5	72	98 / 10			
963	986	26.8	22.1	75	98 / 10			
1498	968	25.3	21.6	80	100 / 9			
2162	946	23.5	21.0	86	100 / 9			
2899	922	21.8	18.4	81	95 / 8			
3683	897	20.6	15.8	74	82 / 8			
4647	867	19.0	13.0	68	77 / 10			
5673	836	17.5	9.5	59	84 / 10			
6870	801	15.9	6.9	55	93 / 12			
8185	764	14.0	5.6	57	90 / 11			
9669	724	11.8	2.8	54	69 / 9			
11382	680	8.6	-1.3	50	36 / 7			

A comparison of the MIA sounding is below.



Satellite Imagery – the GOES-13 infrared image at 2115 EDT at 4X magnification with a standard MB temperature enhancement curve depicted two large cumulonimbus cloud system west and northwest of the accident site over the Gulf Coast of western Florida. The accident site was immediately east of the edge of the cloud shield and in the vicinity of some low stratiform to stratocumulus type clouds with a radiative cloud top temperature of 281° Kelvin or 7.84° C, which corresponded to clouds near 11,600 feet.

There were a few reports of light turbulence or chop reported surrounding the period.

Area Forecast – the NWS Aviation Weather Center (AWC) issued the following forecast for Florida during the period:

FAUS42 KPCI 011745
FA2W
-MIAC FA 011745
SYNOPSIS AND VFR CLDS/WX
SYNOPSIS VALID UNTIL 021200
CLDS/WX VALID UNTIL 020600...OTLK VALID 020600-021200
NC SC GA FL AND CSTL WTRS E OF 85W
.
SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.
.
SYNOPSIS...SEVERAL MID/UPR LVL IMPULSES WILL CONT ACRS THE DEEP S THRU OTLK.
OTRW..UPR LVL TROF ERN GREAT LAKES-OH VLY-CNTRL MID S
WILL CONT NEWD THRU PD AND APCH NE US-NEW ENGLAND 04-06Z AND CONT NE THRU OTLK.
WRM MOIST AMS THRUT. WK ANTICYCLONIC FLOW THRUT.
TROF LEE APPALACHIANS THRU CNTRL FL THRU OTLK. OTRW..CDFNT WRN OH-WRN MID S WILL
APCH CNTRL ME-ERN NEW ENGLAND-E CNTRL US CSTL
WTRS-SE VA-NRN NC 09-12Z.
.
FL
PNHDL...SCT040 SCT CI. ISOL -TSRA/-SHRA. CB TOP FL430. BECMG 0305 SCT025 SCT040. OCNL
VIS 3-5SM BR. ISOL -SHRA/-TSRA. OTLK...MVFR BR.
NRN PEN..SCT035 SCT050 BKN CI. WDLY SCT -TSRA/-SHRA. CB TOP FL430. OTLK...VFR SHRA
TSRA.
**CNTRL-SRN PEN...SCT040-060 SCT-BKN120 LYRD FL260. WDLY SCT -SHRA/-TSRA. CB TOP
FL430. BECMG 0204 SCT035 BKN CI. ISOL SHRA. OTLK...VFR.**

Inflight Weather Advisories – The NWS AWC had a Convective SIGMET current for the area west of the accident site for an area of thunderstorms and is below approximately 1 ½ prior to the accident. The advisory did not extend over the accident site.

There were no Center Weather Advisories issued by the Miami (KZMA) Center Weather Service Unit current at the time, no Weather Watches, and no AIRMETs were current for Florida for IFR, turbulence, or icing conditions outside of cumulonimbus clouds.

[illegible]

SIGE

CONVECTIVE SIGMET 94E

VALID UNTIL 0155Z

FL AND CSTL WTRS

FROM 40E PIE-50NE RSW-20SW RSW-40E PIE

AREA TS MOV LTL. TOPS ABV FL450.

VALID UNTIL 0155Z

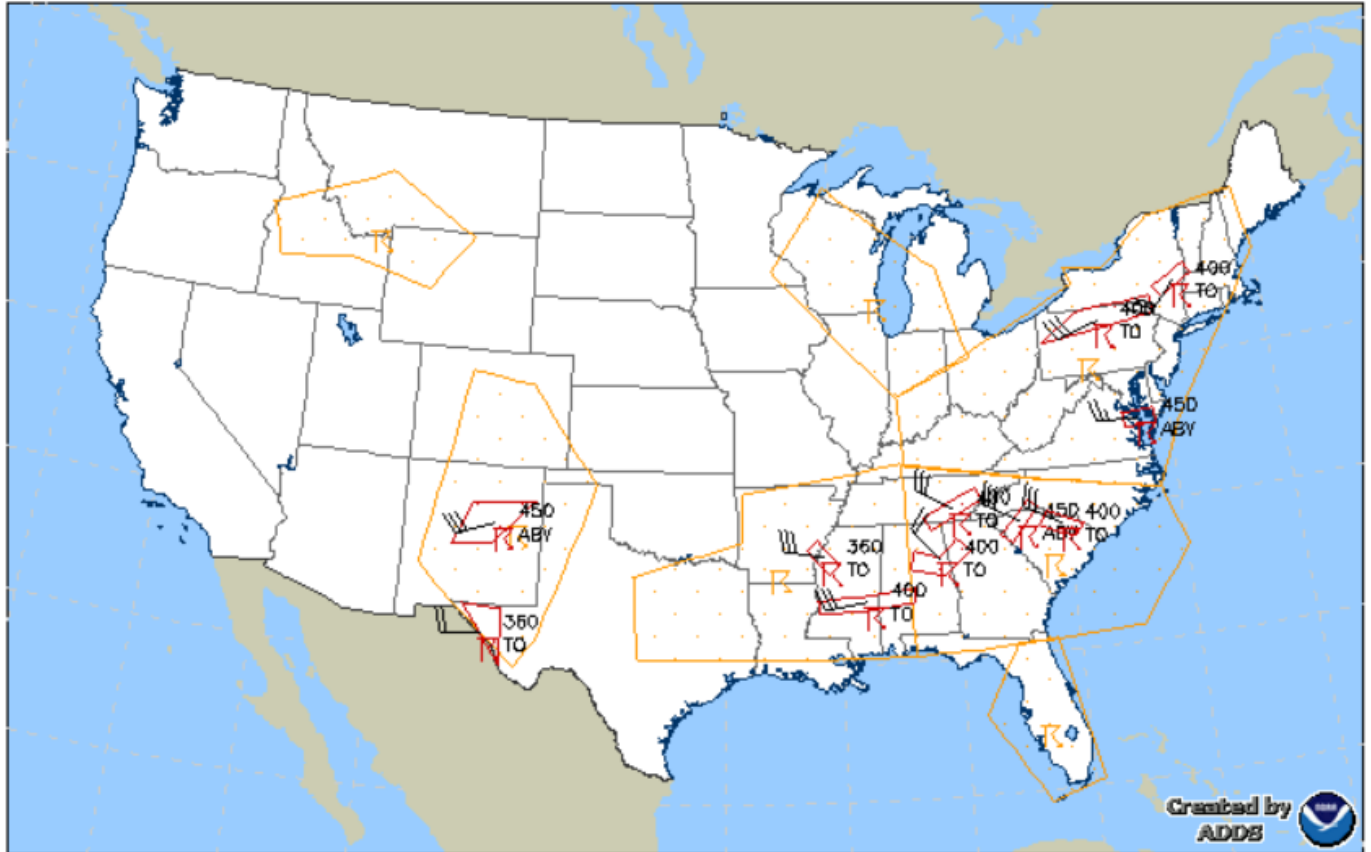
FL AND CSTL WTRS

FROM 30SE RSW-40W MIA-40N EYW-50SSW RSW-30SE RSW

AREA TS MOV LTL. TOPS ABV FL450.\

The advisories over Florida were not reissued at 2055 EDT (0055Z) and were left to expire at 2155 EDT.

chart created at 0055 UTC Sun 02 Jul 2017
SIGMETs expire at or before 0255z/2nd



Winds and Temperature Aloft Forecast (FD) – the following winds aloft forecast was current during the period over the area:

*WINDS ALOFT FORECASTS
DATA BASED ON 011800Z
VALID 020000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000*

<i>FT</i>	<i>3000</i>	<i>6000</i>	<i>9000</i>	<i>12000</i>	<i>18000</i>	<i>24000</i>	<i>30000</i>	<i>34000</i>	<i>39000</i>
<i>MIA</i>	<i>1007</i>	<i>0508+17</i>	<i>0809+11</i>	<i>0706+07</i>	<i>1105-07</i>	<i>0414-17</i>	<i>022131</i>	<i>032342</i>	<i>042854</i>
<i>EYW</i>	<i>0912</i>	<i>0608+18</i>	<i>0106+12</i>	<i>9900+08</i>	<i>9900-07</i>	<i>0709-16</i>	<i>062032</i>	<i>051942</i>	<i>063254</i>

The wind forecast for Miami indicated for 3,000 feet a wind from 100° at 7 knots, and at 6,000 ft from 050° at 8 knots with a temperature of 11 C.

Astronomical Conditions – the United States Naval Observatory website provided the following astronomical conditions for Miami, Dade County, FL on July 1, 2017:

<u>Sun</u>	
Beginning civil twilight	0607 EDT
Sunrise	0633 EDT
Sun transit	1325 EDT

Sunset	2016 EDT
End civil twilight	2042 EDT
<i>Accident</i>	<i>2118 EDT</i>

<u>Moon</u>	
Moonset	0130 EDT
Moonrise	1402 EDT
Moon transit	2006 EDT
<i>Accident</i>	<i>2118 EDT</i>
Moonset	0205 EDT July 2, 2017

At the time of the accident the Sun was more than 15° below the horizon at an azimuth of 300°. The Moon was 54° above the horizon at an azimuth of 213°, the phase was a waxing gibbous with 60% of the Moon's visible disk illuminated as illustrated below.

