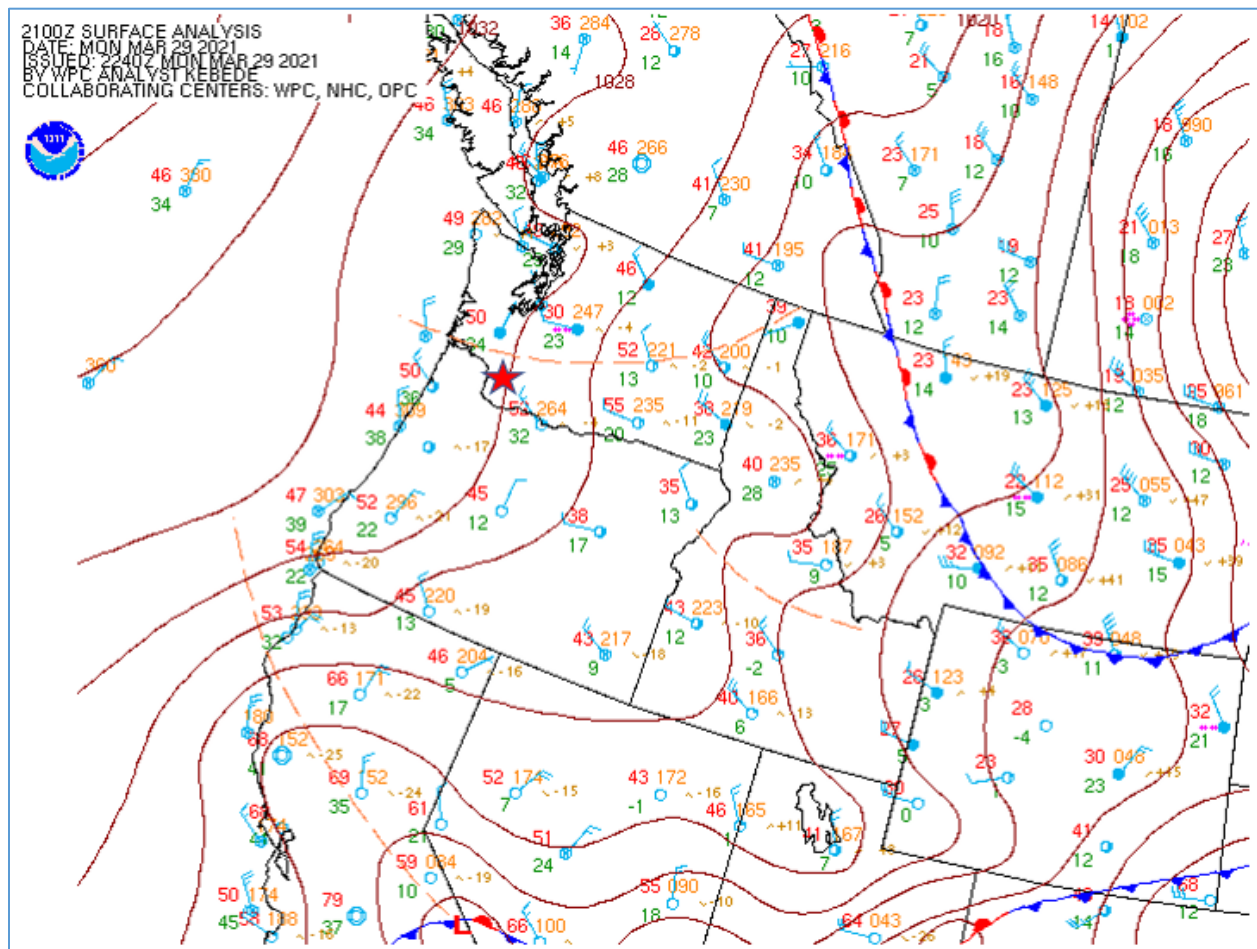


WPR21LA151 – Yacolt, WA

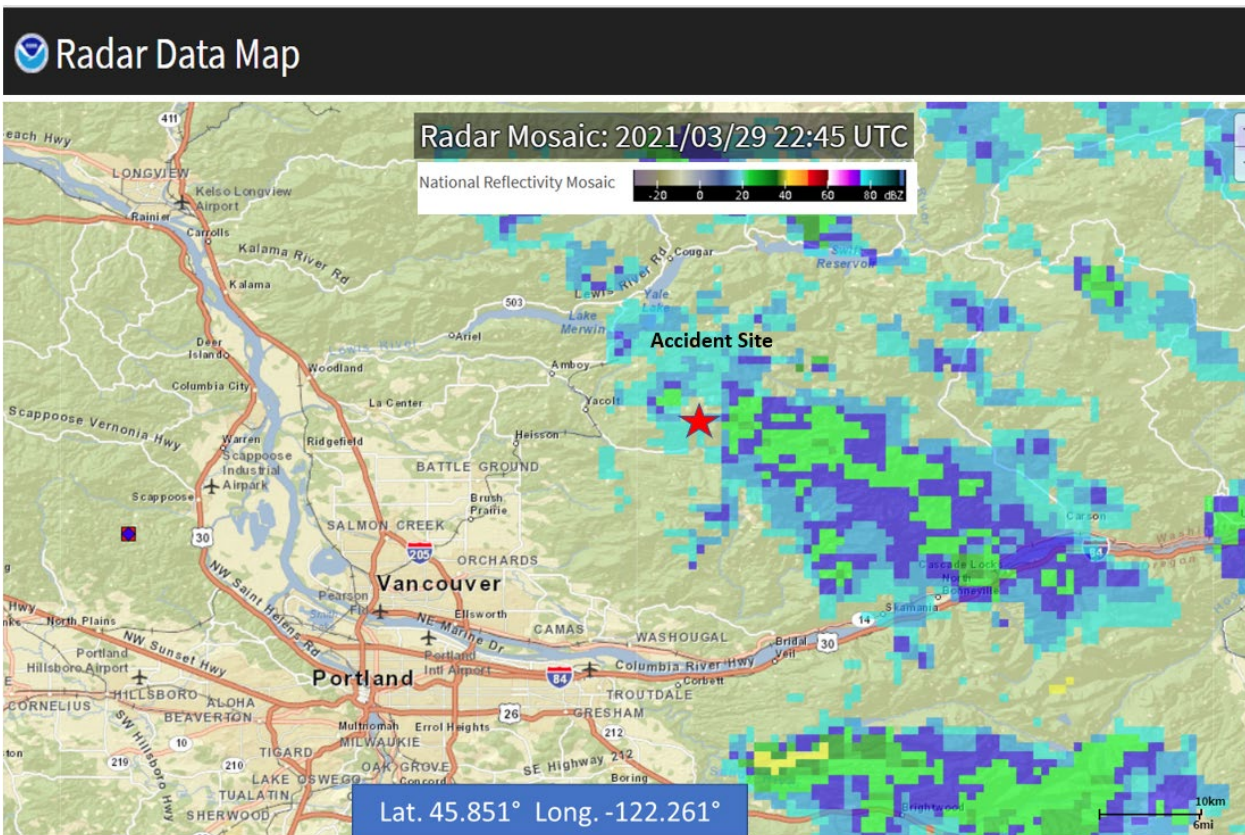
March 29, 2021 at 1547 PDT (2247Z)

Piper PA-28-140, N665FL

Synoptic conditions – the NWS northwest section of the Surface Analysis Chart for 1400 PDT (2100Z) is included as figure 1. The chart depicted a trough of low pressure extending from extreme northern Idaho southwestward across Washington and into the Pacific Ocean. The accident site was located ahead of the trough in area of westerly winds and overcast cloud cover. The closest station models surrounding the accident site depicted winds from the west to northwest at 5 to 15 knots, broken to overcast clouds, with temperatures near 50's Fahrenheit (F). An area of light continuous snow was depicted north of the accident site near Tacoma, Washington.



The NWS National Composite Radar Mosaic for 1545 PDT is included as figure 2. The composite radar image depicted the accident site within an area of echoes of 10 to 30 dBZ echoes.



Observations – The area was documented using standard Meteorological Aerodrome Reports (METAR) and Specials (SPECI) reports. Cloud heights are reported in height above ground level (agl) in the following section.

Portland-Troutdale Airport (KTTD), Portland, Oregon, was the closest weather reporting facility to the accident site, located approximately xx miles south of the airport at an elevation of 39 ft. The airport had a Federal installed and maintained Automated Surface Observation System (ASOS), which was augmented by air traffic control personnel during normal operating hours. At the approximate time of the accident, the following condition were reported.

KTTD weather at 1553 PDT, wind from 080° at 4 knots, visibility 10 miles or more, scattered clouds at 4,700 ft agl, ceiling broken at 6,000 ft, broken at 8,000 ft, temperature 10° Celsius (C), dew point temperature 4° C, altimeter 30.36 inches of mercury (inHg). Remarks: automated station with a precipitation discriminator, rain ended at 1458 PDT, sea-level pressure 1028.0-hPa, hourly precipitation less than 0.01 inches, temperature 10.0° C, dew point temperature 3.9° C.

The raw observations reported surrounding the period from 1253 through 1653 PDT were as follows.

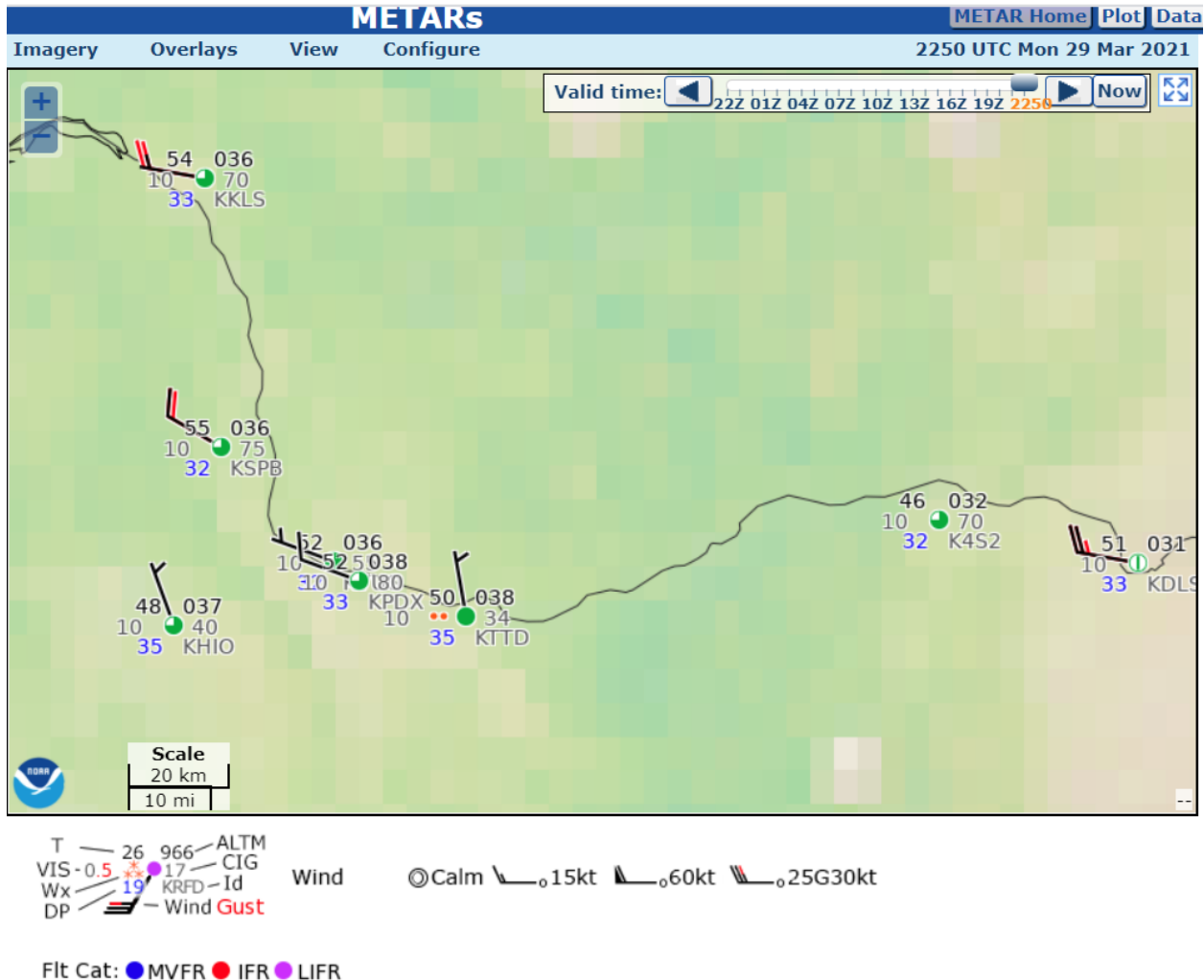
METAR KTTD 291953Z 23009KT 10SM SCT027 BKN035 OVC046 09/01 A3039 RMK AO2 RAB43E53 SLP291 P0000 T00890011=

SPECI KTTD 292021Z 23009KT 8SM -RA SCT017 BKN029 OVC046 09/03 A3039 RMK AO2 RAB05 P0000 T00890033=
SPECI KTTD 292037Z 24009G15KT 10SM FEW015 SCT034 BKN065 10/03 A3038 RMK AO2 RAB05E27 P0000 T01000033=

METAR KTTD 292053Z 24011KT 10SM FEW035 FEW060 11/03 A3038 RMK AO2 RAB05E27 SLP287 P0000 60001

T01060028 58010=
METAR KTTD 292153Z 35007KT 10SM -RA BKN034 OVC060 10/02 A3038 RMK AO2 RAB50 SLP286 P0000
 T01000017=
Accident 2247Z
METAR KTTD 292253Z 08004KT 10SM SCT047 BKN060 BKN080 10/04 A3036 RMK AO2 RAE2158 SLP280 P0000
 T01000039=
 METAR KTTD 292353Z 32003KT 10SM FEW050 SCT065 BKN080 11/01 A3035 RMK AO2 SLP278 60001 T01060011
 10111 20067 58008=

A depiction of the METAR observations for 1550 PDT over the area is depicted in figure 3.

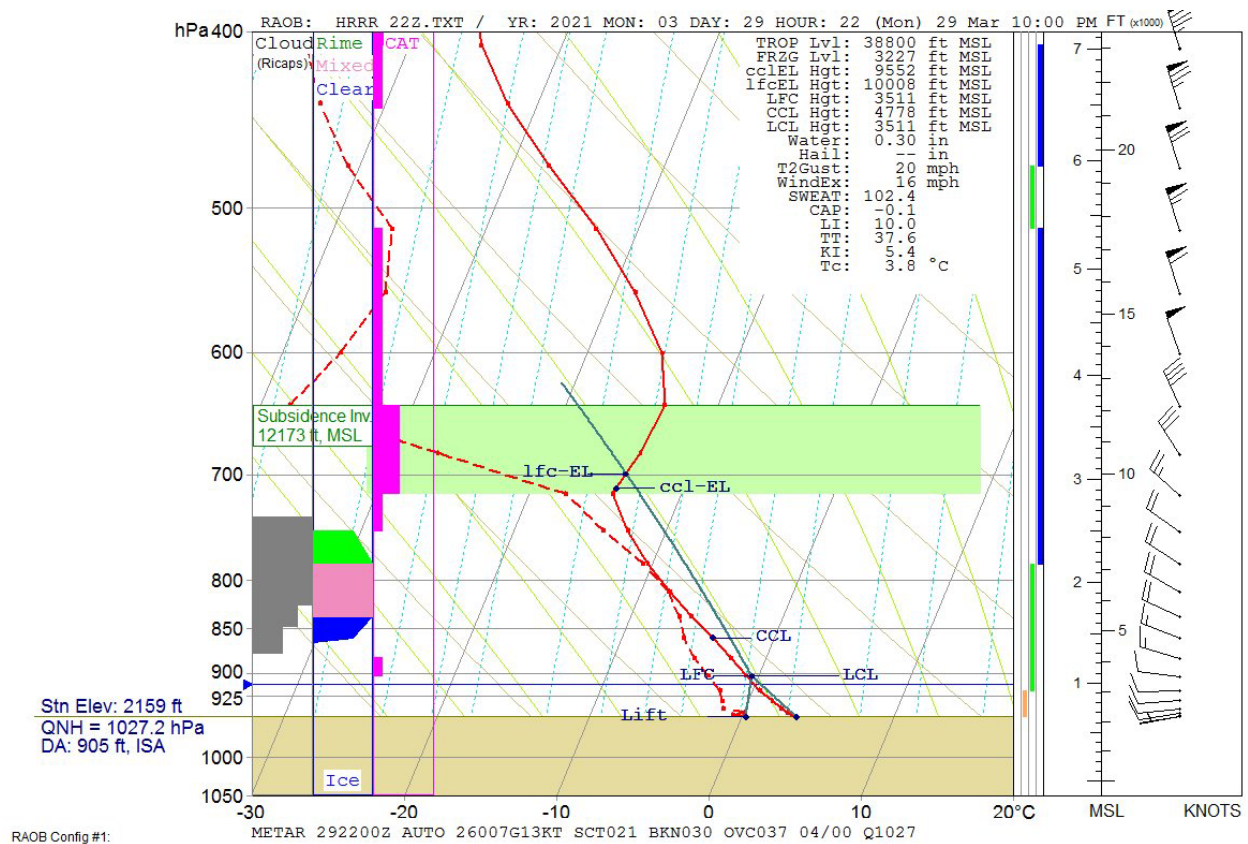


Pilot Reports – over the general route of flight:

VUO UA /OV BTG180012/TM 1828/FL095/TP SR20/SK SKC/TA M07/WV 34121KT/TB NEG
PDX UA /OV PDX140025/TM 1841/FL080/TP L35/TA 00/IC MOD RIME/RM 080-040 DURD
 RDM UA /OV RDM/TM 1900/FL120/TP CRJ2/TA UNKN/TB LGT 120-SFC/IC NEG/RM DURD
 HIO UA /OV HIO310007/TM 2017/FLDURGD/TP C25C/SK BKN031
 ELN UA /OV ELN270020/TM 2018/FL110/TP C172/SK TOP110/RM -ZSE
PDX UA /OV PDX080015/TM 2025/FL060/TP B739/TA M05/IC MOD RIME/RM 060-030 DURD

UAO UA /OV UAO/TM 2109/FL035/TP C25C/SK SCT/BKN035-TOPUNKN/RM DURD RY17
 EUG UA /OV EUG340015/TM 2141/FL040/TP E120/TA M05/IC LGT RIME 040-070
 HIO UA /OV HIO/TM 2143/FL045/TP C510/TB LGT CHOP / 045/RM DURD RY31L BASES 045 WITH LGT CHOP
 SPB UA /OV BTG340010/TM 2149/FL105/TP C152/SK OVC030-TOP070/TA M10/WV 30040KT/TB NEG/IC NEG

Sounding – A High Resolution Rapid Refresh (HRRR) numerical model was run over the approximate accident site and plotted on a standard Skew T log P diagram is included as figure 4.



The HRRR sounding for 1500 PDT indicated an elevation of 2,159 ft, a near surface temperature of 4° C, a dew point temperature of 0° C, with an approximately relative humidity of 75%. The lifted condensation level (LCL) and level of free convection (LFC) was determined to be at 1,325 ft agl (3,511 ft msl), and convective condensation level (CCL) at 2,619 ft agl (4,778 ft msl). The sounding indicated a relative humidity greater than 80% between the CCL or approximately 3,000 ft through 8,000 ft supporting broken to overcast clouds. The freezing level was identified at 3,227 ft msl and supported icing in clouds. A temperature inversion was noted between 9,000 through 12,000 ft due to subsidence but remained below freezing. The atmosphere was characterized as stable with a lifted index of 10.0, and supported stratus to nimbostratus type clouds.

The HRRR wind profile indicated a westerly surface wind with wind veering clockwise with height to the north-northwest. At 8,000 ft the accident airplanes cruising level the wind was from approximately 340° at 20 knots with a temperature of -12° C.

Terminal Aerodrome Forecast (TAF) – the NWS issued the following TAFs for KTTD during the period.

TAF KTTD 291736Z 2918/3018 23005KT P6SM VCSH FEW030 BKN045 OVC070

TEMPO 2918/2921 -SHRA BKN025 BKN030 OVC040

FM292100 27008KT P6SM VCSH BKN060

FM300000 30010KT P6SM BKN070

FM300600 00000KT P6SM SCT070

FM301600 00000KT P6SM FEW070=

AMD TAF KTTD 291909Z 2919/3018 23010G20KT P6SM VCSH FEW030 BKN045 OVC070

TEMPO 2919/2921 -SHRA BKN025 BKN030 OVC040

FM292100 27008KT P6SM VCSH BKN060

FM300000 30010KT P6SM BKN070

FM300600 00000KT P6SM SCT070

FM301600 00000KT P6SM FEW070=

The Amended Forecast current for the period of the accident expected winds from 270° at 8 knots, visibility 6 miles or more with showers in the vicinity, ceiling broken at 6,000 ft agl.

Winds Aloft Forecast – The winds and temperature aloft forecast current for the route was as follows.

WINDS ALOFT FORECASTS

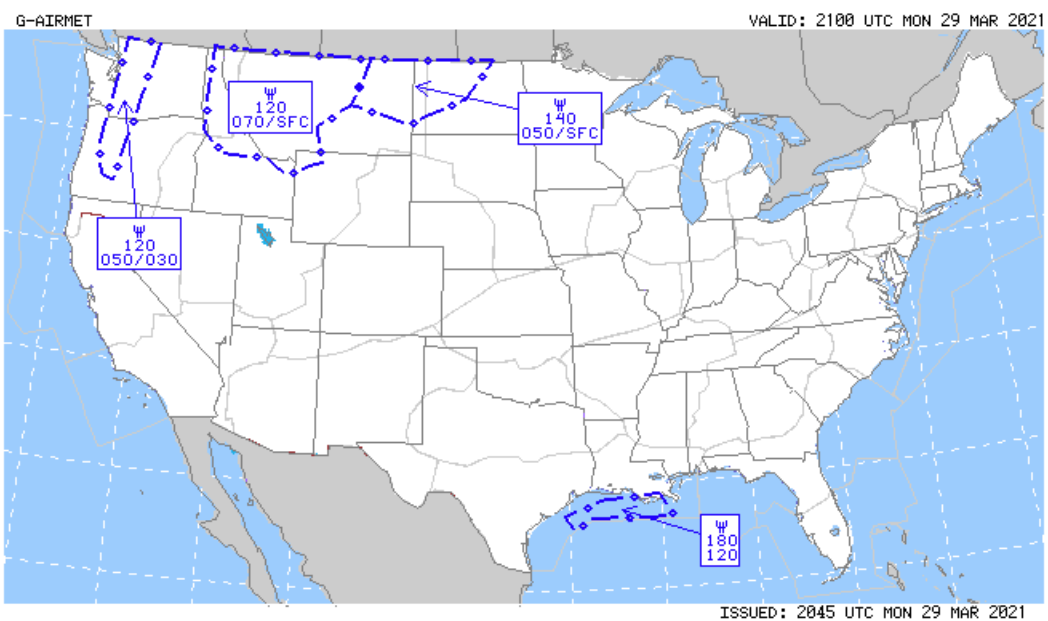
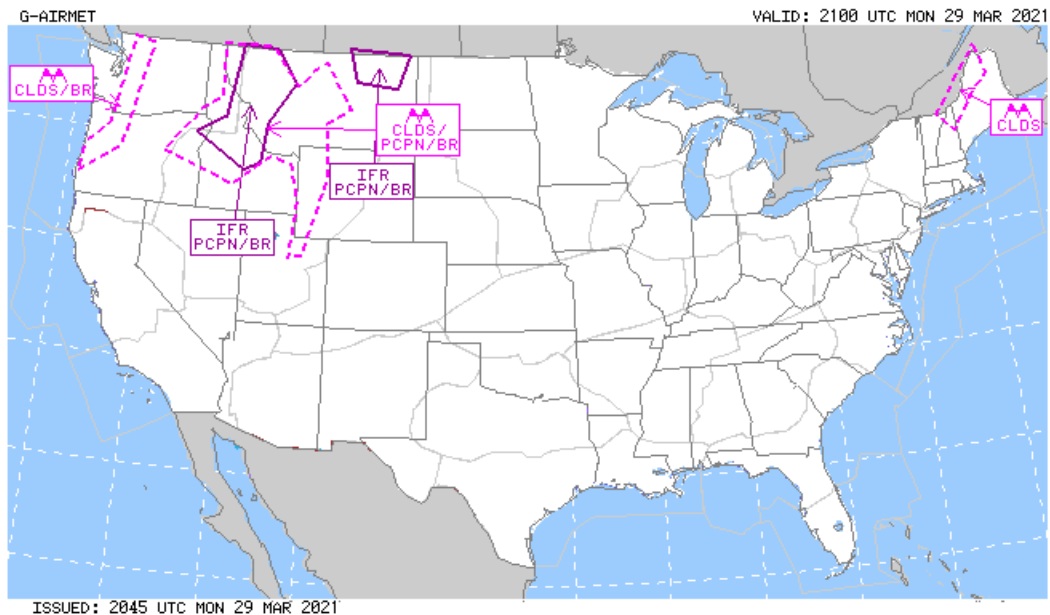
DATA BASED ON 291800Z

VALID 300000Z FOR USE 2000-0300Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
RDM		3117-04	3321-13	3434-13	3461-24	3486-36	852545	841954	830159
PDX	2813	3116-07	3423-10	3438-12	3469-24	3495-34	852146	842154	841262
YKM	3120	3121-06	3423-13	3428-18	3459-27	3472-40	841548	841854	339557
AST	3223	3219-07	3430-08	3439-11	3473-22	3497-33	841246	840855	840663
SEA	9900	3111-08	3322-12	3438-15	3469-25	3491-37	842846	842955	840962

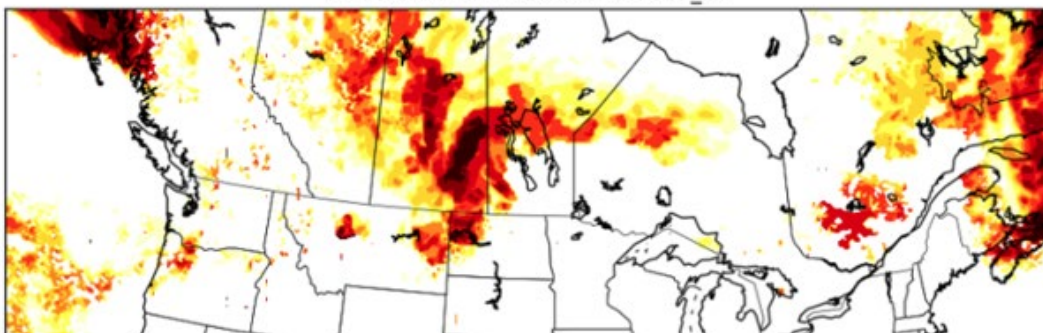
The Portland station (PDX) expected a wind at 3,000 ft from 280° at 13knots, at 6,000 ft wind from 310° at 16 knots with a temperature of -7° C, and at 9,000 ft from 340° at 23 knots with a temperature of -10° C.

Inflight Weather Advisories – The NWS Aviation Weather Center had AIRMET Zulu current over the area for occasional moderate icing conditions from the freezing level, estimated at 3,000 ft to 12,000 ft, and AIRMET Sierra for mountain obscuration conditions. Figures 5 and 6.

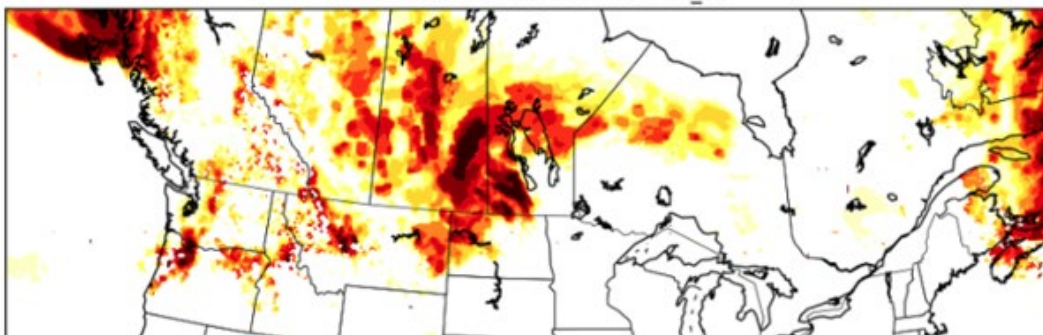


Current Icing Procut (CIP) – The NWS AWC Current icing Product (CIP) for 1600 PDT was retrieved from the NWS during the period. The Icing Probability indicated a greater than 75% probability of icing conditions above 4,000 ft msl over the route with near 85% probability of icing between 6,000 and 8,000 ft, with the CIP Icing Severity indicated that moderate icing was likely on the route between 6,000 and 8,000 ft.

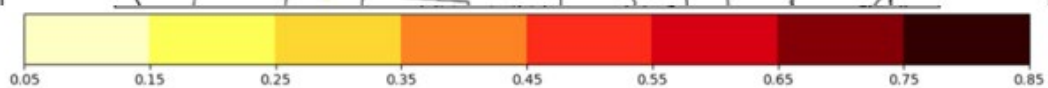
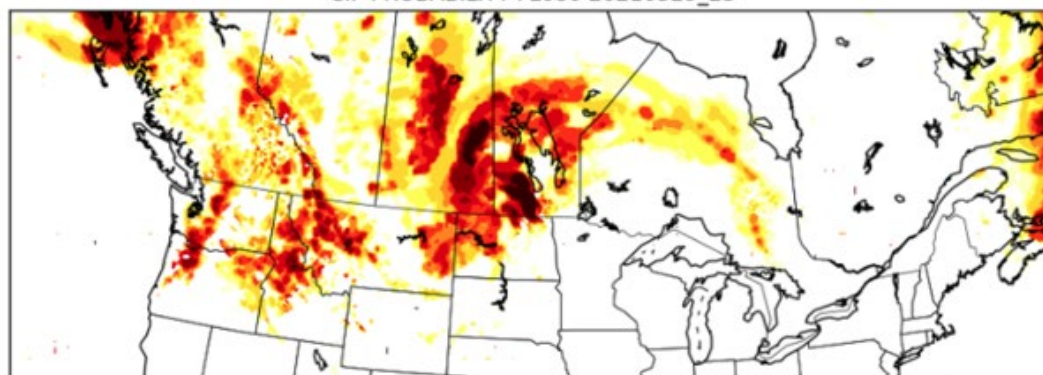
CIP PROBABILITY FL040 20210329_23



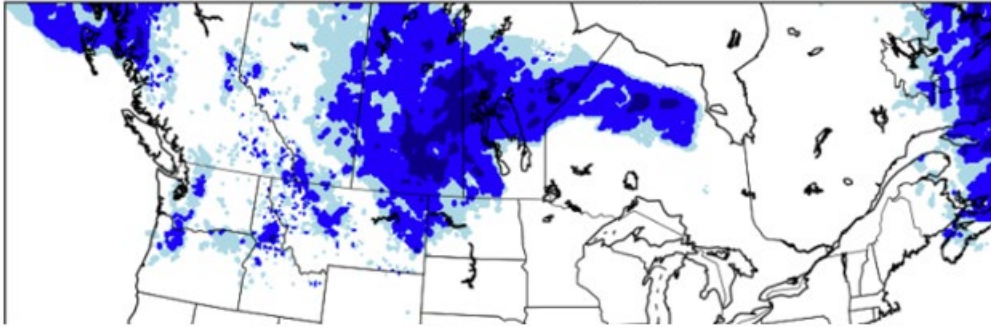
CIP PROBABILITY FL060 20210329_23



CIP PROBABILITY FL080 20210329_23



CIP SEVERITY FL060 20210329_23



CIP SEVERITY FL080 20210329_23

