



National Transportation Safety Board

**Office of Aviation Safety
Washington, D.C. 20594-2000**

April 2, 2012

ATTACHMENT 10 to the METEOROLOGICAL FACTUAL REPORT

ANC12IA024

Written statement provided by a forecaster at the ZAN CWSU:

NOAA/National Weather Service/Center Weather Service Unit

Anchorage, AK
30 March, 2012

Following is a report on weather and forecast weather conditions concerning the accident involving aircraft [.....] at Ted Stevens/Anchorage International Airport (ANC), Alaska. The accident occurred during the night of 05-06 March, 2012, at approximately 9:54 pm Alaska Standard Time (AST).

My name is Michael Richmond, and I am employed as a meteorologist at the Center Weather Service Unit, in Anchorage, Alaska. I was on duty as the forecaster during the period from 1:00 pm to 9:00 pm AST on 05 March, 2012. My duties included the issuance of Center Weather Advisories (CWA) and Meteorological Impact Statements (MIS) for adverse aviation weather, dissemination of Alaska Aviation Weather Unit (AAWU) SIGMETs for adverse aviation weather, dissemination of Volcanic Ash Advisories (VAA) or SIGMETs for volcanic ash impacting the Alaska Flight Information Region (FIR), entering Pilot Reports (PIREPs) recorded by air traffic controllers into the FAA-managed Aeronautical Information System Replacement (AISR) software, and a daily 3:00 pm stand-up weather briefing to the FAA center air traffic controller supervisors, and Traffic Management Unit (TMU) personnel. Part of which entails the preparation of graphics on our FAA-managed Weather and Radar Processing (WARP) workstation. These graphics are displayed throughout the center at all times, in each of the air traffic controller sector areas.

I arrived on duty a few minutes before 1:00 pm and was briefed on the current weather situation, and expected trends by the morning forecaster. This involved reviewing the current weather graphics on WARP, discussing any CWAs, MISs, SIGMETs, or VAAs in effect over or adjacent to the FIR, and any data/communications issues that are or may affect the forecast process. After this briefing, I quickly reviewed the current weather situation, and model data and guidance for our main issues at hand in/around Alaska at this time of the year, turbulence, low-level wind shear, and icing. Then quickly got to work preparing the graphics on the WARP work-station for the daily 3:00 pm AST stand-up briefing. There are a minimum of eight of these graphics to prepare (more if there are a number of CWAs, MISs, SIGMETs, or VAAs in effect), locations/times of advisories, areas and severities of turbulence/low-level wind shear and icing, hub terminal forecast conditions, a surface map, pilot report conditions, status (aviation hazard color codes) of volcanoes in and adjacent to the Alaska FIR, and a text local forecast for the Anchorage Bowl, which lists any public advisories/watches/warnings issued by the WFO Anchorage.

The weather situation at this time was one that I knew would be conducive to widespread light to moderate icing over much of the Gulf of Alaska coast, southwest Alaska, and south-central Alaska, including the Anchorage Bowl. Because an occluded frontal system stemming from a low in the central Bering Sea was in the process of moving through southwest and south-central Alaska, bringing widespread areas of light snow (Figures 1 and 2, 00GMT 06 MAR 2012 surface and 700 millibar analyses.). **In addition, the most representative upstream upper-air observation plot (skew-T), from King Salmon, AK, taken at 1200 GMT that morning, showed an elevated moisture layer from about 770 to 600 mb occurring in temperatures of -5C to -12C.** The 1200 GMT upper-air observation taken by the NWS office in Anchorage was not as representative, because the weather then over the Anchorage Bowl was by the time of my briefing preparation (2100-2300 GMT) already well to the north and east of the area. In addition, I looked at the latest pilot reports throughout the region and other guidance, to develop the forecast graphics (which are valid from 3pm to 11pm AST). Model guidance for icing is also available, and I did use this as well, in the forecast process. I used graphical guidance from a regional and upscaled MM5 model, run by the University of Alaska, Fairbanks Atmospheric Sciences Department, on the UAF supercomputer system, available at this web-site: <http://knik.iarc.uaf.edu/AtmGroup/rtwrf/ICING-dom1.htm> Unfortunately we do not have access to any archived model runs from this site, but perhaps an investigatory team may be able to retrieve that data.

Based on all these factors, I indicated on my WARP icing graphic, areas of moderate icing over much south-central, and southwest Alaska. I don't remember the specific flight levels I put on this graphic, and unfortunately, these are not archived. But in a situation like this, we look at cloud base heights, observed and forecast, upper-air observations, and most significantly, pilot reports, to develop our forecast. It would probably have been something like FL030-120 (flight level 3,000 to 12,000 feet).

At this point, the criteria for the CWSU to issue a Center Weather Advisory (CWA) for severe icing should be described. The forecaster on duty has a flow-chart to follow, to aid in this process, which is:

CWSU PANC Icing Decision Tree

- 1) Is severe icing forecasted?
 - If yes, continue to 4.
 - If no, continue to 2.

- 2) Is severe icing reported?
 - If yes, continue to 3.
 - If no, stop.

- 3) Is Aircraft size medium or bigger?
 - If yes, continue to 4.
 - If no, stop

- 4) Is it between 5:30am & 7pm and within 2 hours of event?
 - If yes, issue a CWA.
 - If no, continue to 5.

- 5) Is it >7pm and expected to continue past 9pm, start overnight, or start the next morning ?
 - If yes, issue an MIS.
 - If no, issue a CWA.

Based on this, the fact that there were no PIREPs of severe icing anywhere in the Alaska FIR, my data analysis and forecast process, and review of the AAWU's products (AIRMETs/SIGMETs/graphics of icing, turbulence, etc.), I felt a CWA for severe icing was not warranted during our evening forecast period (3 pm-11pm AKST).

30-45 minutes after the 3:00 pm AST stand-up briefing, the 0000 GMT upper-air observation from Anchorage (figure 4) became available, and I noted that there were two layers conducive to light to moderate rime icing. A deeper upper-level layer between 650-750 millibars, and a shallower lower layer around 880-930 millibars.

Pilot reports around south-central Alaska during the remaining hours of my shift (which ran until 0600 GMT) were supportive of the current forecast graphic and guidance I provided to the FAA center here:

ANC UA /OV ANC180025/TM 0155/FL060/TP PA31/SK TOP085/TA M09/IC CONT LGT RIME/RM CWSU ZAN=

ANC UA /OV ANC270005 /TM 0205 /FL060 /TP MD11 /TA M12 /IC MOD RIME 060-100=

ANC UA /OV TED300020/TM 0209/FL050/TP B737/TA N14/IC LGT RIME/RM LGT RIME ICING DURING DESCENT 070-024=

MRI UA /OV 47AK-MRI /TM 0237 /FL022 /TP C172 /TB CONT LGT OCNL MOD SFC-022 /IC NEG /RM COND WORSE N OF 47AK

ANC UA /OV TED250012/TM 0242/FL035/TP B190/TA N8/IC LGT MXD/RM LGT MXD ICE DURING DESCENT FROM
SOUTHWEST OF ANC 045-035=

ANC UA /OV TED 020012/TM 0250/FL100/TP B737/IC LGT /RM DURG CLIMB 050-100=

ANC UA /OV TED 341024/TM 0310/FL090/TP DH8A/SK TOPS 090/TA N12/IC MOD RIME/RM DURING CLIMB 060-090=

ANC UA /OV TED300020/TM 0336/FL050/TP B737/TA N 13/IC LGT RIME/RM DURING DESCENT 080-050=

ENA UA /OV ENA019023/TM 0357/FL040/TP C208/TA M08/IC LGT RIME 037-040/RM CWSU ZAN=

ANC UA /OV ANC360020 /TM 0449 /FL050 /TP B737 /TA M14 /IC MOD RIME 100-050 /RM DURD=

The lowest reported elevation was 2400 feet. After the 3:00 pm AST stand-up briefing, our duties as CWSU forecasters include monitoring current and expected aviation weather, updating the WARP graphics as needed, and advising TMU personnel and controller supervisors of any significant changes. As well as coordinating with the AAWU and Alaska WFOs if there are any significant changes or differences in our forecast products. I made sure to keep my graphics updated, to reflect the current and short-term forecast icing and turbulence conditions over the FIR.

The weather during the remainder of my shift (until 0600 GMT) was uneventful throughout the Alaska FIR. No volcanic or weather-related CWSU advisories were in effect, or required issuance. The surface observations from local airports (ANC International-PANC, and Merrill Field-PAMR), and two upstream ones (Kenai-PAEN, and Iliamna-PAIL) during the last six hours of my shift (00-06 GMT), and for six hours afterward, are given below:

PANC	AA	2012-03-05	2353Z	FEW003	BKN035	OVC060	5	S-	15	9	340	05	995	77	6
PANC	AP	2012-03-06	0051Z	FEW003	BKN017	OVC047	4	S-	16	9	040	04	990	73	9
PANC	AA	2012-03-06	0053Z	FEW003	BKN017	OVC047	4	S-	15	9	020	05	990	77	6
PANC	AA	2012-03-06	0153Z	FEW003	BKN017	OVC050	5	S-	14	9	360	04	989	80	6
PANC	AA	2012-03-06	0253Z	BKN020	OVC044		5	S-	14	9	340	05	986	80	5
PANC	AA	2012-03-06	0353Z	SCT021	OVC038		3	S-	14	9	350	03	985	80	14
PANC	AP	2012-03-06	0401Z	SCT021	OVC038		1 1/2	S-	14	9	000	00	985	80	14
PANC	AP	2012-03-06	0414Z	SCT021	OVC038		2 1/2	S-F	14	10	350	04	985	84	6
PANC	AA	2012-03-06	0453Z	SCT018	OVC040		3	S-	15	10	020	03	982	80	15
PANC	AP	2012-03-06	0536Z	FEW009	SCT018	OVC040	3	S-	16	10	340	04	983	77	9
PANC	AA	2012-03-06	0553Z	FEW009	SCT020	OVC050	7	S-	14	10	350	04	982	84	6
PANC	AA	2012-03-06	0653Z	FEW013	SCT020	OVC044	9		14	10	350	04	980	84	6
PANC	AP	2012-03-06	0741Z	FEW005	BKN011	OVC019	3	S-F	14	10	340	06	980	84	4
PANC	AA	2012-03-06	0753Z	FEW006	BKN011	OVC019	2	ZL-F	15	12	010	03	980	88	15
PANC	AA	2012-03-06	0853Z	SCT006	BKN011	OVC019	1 1/2	ZL-F	16	12	000	00	979	84	16
PANC	AP	2012-03-06	0944Z	FEW006	SCT011		1	S-F	16	12	000	00	980	84	16
PANC	AA	2012-03-06	0953Z	FEW006	SCT011		1	S-F	16	13	000	00	980	88	16
PANC	AA	2012-03-06	1053Z	FEW008	OVC018		1	S-F	16	12	000	00	981	84	16
PANC	AP	2012-03-06	1136Z	FEW008	OVC018		2	S-F	16	12	000	00	982	84	16
PAMR	AA	2012-03-05	2353Z	BKN025	OVC047		6		16	10	360	03	996	77	16
PAMR	AA	2012-03-06	0053Z	BKN025	OVC047		6		16	10	340	03	989	77	16
PAMR	AA	2012-03-06	0153Z	OVC055			10		15	10	340	05	990	80	6
PAMR	AA	2012-03-06	0253Z	OVC047			10		15	10	360	05	986	80	6
PAMR	AA	2012-03-06	0353Z	OVC070			8	S-	15	11	010	04	985	84	8
PAMR	AA	2012-03-06	0453Z	OVC050			9	S-	15	11	010	03	983	84	15
PAMR	AP	2012-03-06	0548Z	SCT009	BKN020	OVC050	2	S-F	16	10	060	03	982	77	16
PAMR	AA	2012-03-06	0553Z	SCT009	BKN020	OVC050	7	S-	15	11	000	00	982	84	15
PAMR	AP	2012-03-06	0638Z	FEW009	SCT020	OVC044	9		16	10	340	03	981	77	16
PAMR	AP	2012-03-06	0650Z	FEW009	BKN020	OVC044	10		16	12	000	00	980	84	16
PAMR	AA	2012-03-06	0653Z	FEW009	BKN020	OVC044	10	S-	16	12	000	00	980	84	16
PAMR	AP	2012-03-06	0750Z	FEW009	BKN020	OVC040	7	ZL-	16	10	330	03	980	77	16
PAMR	AA	2012-03-06	0753Z	FEW009	BKN020	OVC040	6	ZL-F	15	12	000	00	980	88	15
PAMR	AP	2012-03-06	0847Z	FEW008	BKN015	OVC036	2 1/2	S-F	16	12	000	00	979	84	16
PAMR	AA	2012-03-06	0848Z	FEW008	BKN015	OVC036	2 1/2	S-F	15	12	330	03	979	88	15
PAMR	AA	2012-03-06	0853Z	OVC015			2 1/2	S-F	15	12	330	03	979	88	15
PAMR	AP	2012-03-06	0909Z	OVC015			1 3/4	S-F	16	12	000	00	980	84	16
PAMR	AA	2012-03-06	0953Z	OVC017			1 1/4	S-F	16	12	000	00	980	84	16

PAMR	AA	2012-03-06	1053Z	OVC016		1	S-F	16	12	000	00	981	84	16
PAMR	AP	2012-03-06	1138Z	OVC022		2	1/2 S-F	16	12	190	03	983	84	16
PAMR	AA	2012-03-06	1153Z	BKN020	OVC026	2	1/2 S-F	16	13	000	00	982	88	16
PAEN	AA	2012-03-05	2353Z	OVC045		6	S-F	15	11	020	07	995	84	4
PAEN	AP	2012-03-06	0026Z	FEW042	OVC049	1	3/4 S-F	16	10	030	06	993	77	6
PAEN	AA	2012-03-06	0053Z	OVC040		2	S-F	15	11	030	06	992	84	5
PAEN	AP	2012-03-06	0101Z	OVC040		1	3/4 S-F	16	10	040	05	991	77	7
PAEN	AP	2012-03-06	0124Z	OVC038		4	S-F	16	10	030	05	991	77	7
PAEN	AA	2012-03-06	0153Z	OVC032		10		15	12	020	06	989	88	5
PAEN	AP	2012-03-06	0234Z	OVC032		1	3/4 S-F	16	10	020	07	989	77	5
PAEN	AA	2012-03-06	0253Z	BKN027	OVC033	1	1/4 S-F	14	11	020	07	987	88	3
PAEN	AA	2012-03-06	0353Z	OVC030		4	S-F	14	12	020	05	987	92	5
PAEN	AP	2012-03-06	0422Z	OVC028		8	S-	14	12	010	05	986	92	5
PAEN	AA	2012-03-06	0453Z	OVC028		10		14	11	040	06	985	88	4
PAEN	AA	2012-03-06	0553Z	OVC024		10		14	11	030	06	985	88	4
PAEN	AA	2012-03-06	0653Z	OVC022		10		14	11	050	04	982	88	6
PAEN	AA	2012-03-06	0753Z	OVC018		10		14	11	030	04	982	88	6
PAEN	AA	2012-03-06	0853Z	OVC021		10		14	12	000	00	982	92	14
PAEN	AA	2012-03-06	0953Z	OVC017		10		14	12	000	00	982	92	14
PAEN	AA	2012-03-06	1053Z	OVC015		10		14	12	000	00	984	92	14
PAEN	AP	2012-03-06	1118Z	OVC013		10		14	12	000	00	983	92	14
PAEN	AA	2012-03-06	1153Z	OVC011		10		14	12	060	03	982	92	14
PAIL	AA	2012-03-02	2353Z	OVC013		10		20	15	240	15G21	949	81	5
PAIL	AP	2012-03-03	0009Z	OVC015		10	BS-	19	16	250	16G22	950	88	4
PAIL	AA	2012-03-03	0053Z	SCT017	OVC039	10	BS-	20	14	250	14G20	951	77	6
PAIL	AP	2012-03-03	0134Z	BKN013	OVC039	6	S-F	19	12	250	10G17	953	74	7
PAIL	AP	2012-03-03	0145Z	SCT013	OVC041	6	S-F	19	12	240	13G19	953	74	5
PAIL	AA	2012-03-03	0153Z	BKN013	OVC041	5	S-F	19	14	240	11	954	80	6
PAIL	AP	2012-03-03	0208Z	BKN013	OVC041	3	S-BS-	18	12	240	11	954	77	5
PAIL	AP	2012-03-03	0213Z	OVC013		2	S-F	18	12	230	13	954	77	4
PAIL	AP	2012-03-03	0233Z	OVC013		3	S-F	18	12	240	11	955	77	5
PAIL	AA	2012-03-03	0253Z	OVC013		4	S-F	17	12	240	10	956	80	4
PAIL	AP	2012-03-03	0301Z	OVC015		4	S-F	18	12	240	13G20	956	77	4
PAIL	AP	2012-03-03	0324Z	SCT015	OVC043	6	S-F	18	10	240	11	958	70	5
PAIL	AA	2012-03-03	0353Z	OVC043		5	S-F	17	11	240	10	958	77	4
PAIL	AA	2012-03-03	0453Z	OVC045		9	S-	17	11	250	07	961	77	7
PAIL	AA	2012-03-03	0553Z	OVC047		7	S-	16	11	270	06	964	80	6
PAIL	AA	2012-03-03	0653Z	OVC045		5	S-F	16	12	250	03	966	84	16
PAIL	AA	2012-03-03	0753Z	OVC034		5	S-F	15	11	210	05	968	84	6
PAIL	AA	2012-03-03	0853Z	OVC048		10		13	9	230	08	970	84	1
PAIL	AA	2012-03-03	0953Z	BKN033		9	S-	11	7	260	05	973	83	1
PAIL	AP	2012-03-03	1011Z	BKN025		5	S-F	10	7	250	06	974	87	-1
PAIL	AP	2012-03-03	1036Z	FEW026	OVC037	8	S-	10	7	260	07	975	87	-2
PAIL	AA	2012-03-03	1053Z	OVC050		10	P	12	4	300	11	975	70	-3
PAIL	AA	2012-03-03	1153Z	OVC035		3	S-	11	3	310	14			

It was cloudy with light snow falling at most of the sites, through 0600 GMT, with no freezing precipitation reported. I finished my shift at 9:00 pm AKST (0600 GMT) after making sure all my graphics were current and representative. TMU personnel usually depart their workstations, adjacent to ours, around 7:00 pm AST. I ensured they had the latest information as well, before their shifts ended. Between 7:00 and 9:00 pm AST, a designated controller supervisor remains in charge of the center air traffic unit, and it is this person whom we coordinate with, if there are any changes or updates needed to our current forecasts/graphics, or advisories issued or disseminated. After my shift ended, driving home the short four miles of my commute, I noted that it was cloudy, and the light snow had ended (only 1.0 inch had occurred that day at ANC with a 0.05 liquid equivalent). I did not observe any freezing drizzle; my residence is on the far eastern edge of Anchorage, at the base of the Chugach Mountains.

It wasn't until I reported for my evening shift the next day, 06 March, that I became aware of the aircraft incident involving the severe icing. I was surprised that this occurred, and naturally very glad that it was not any worse than it could have been.

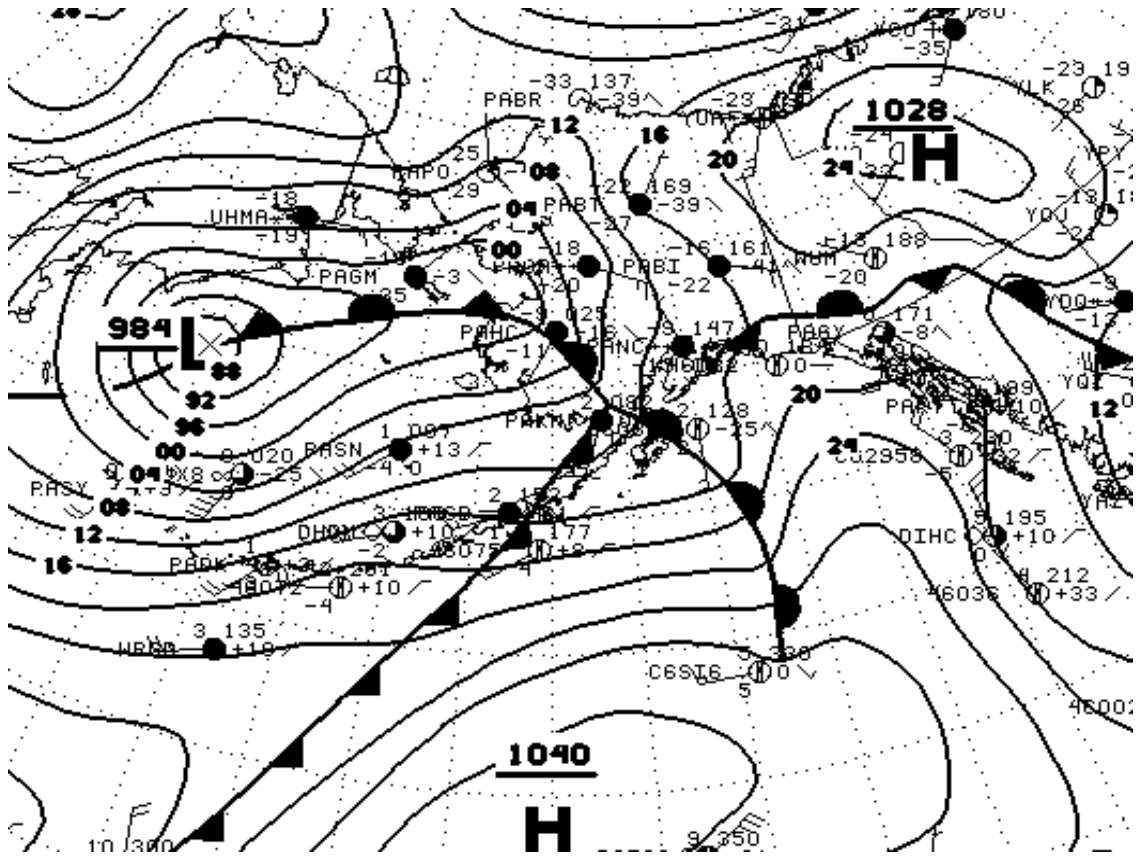


Figure 1, 0000 GMT 06 March 2012 AK surface analysis

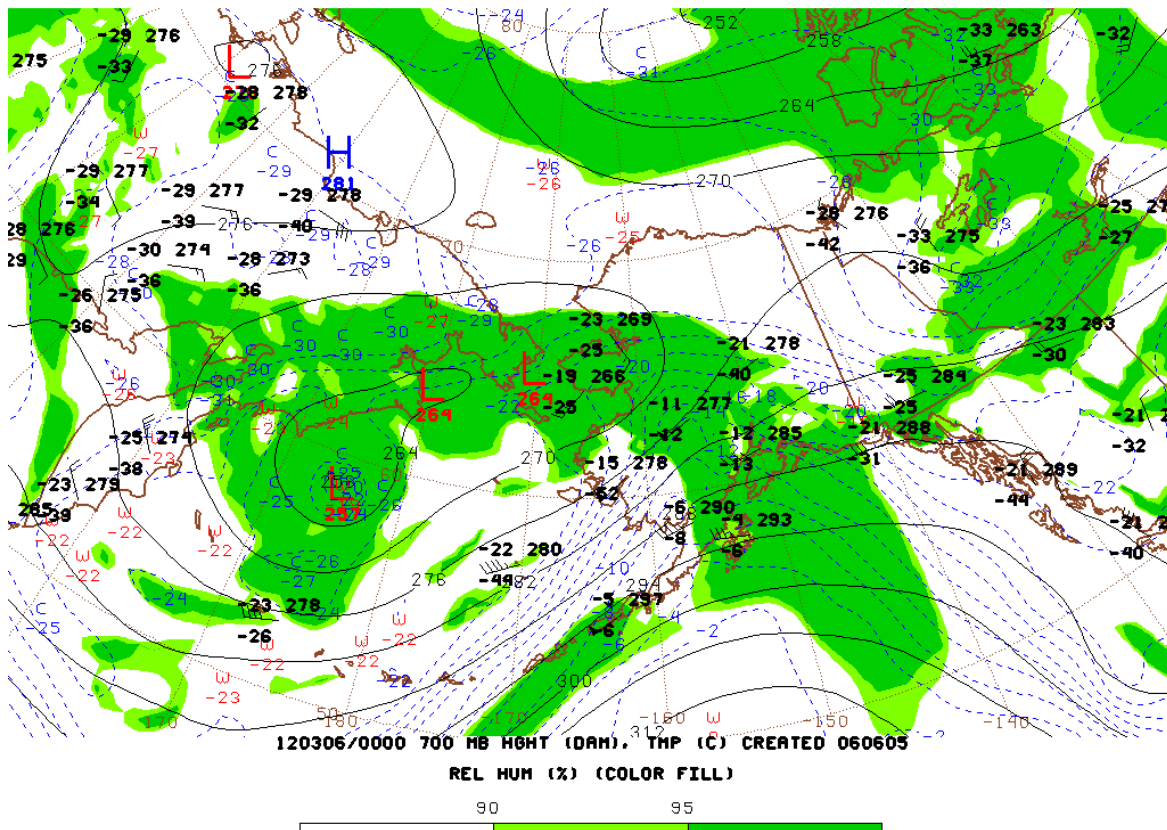
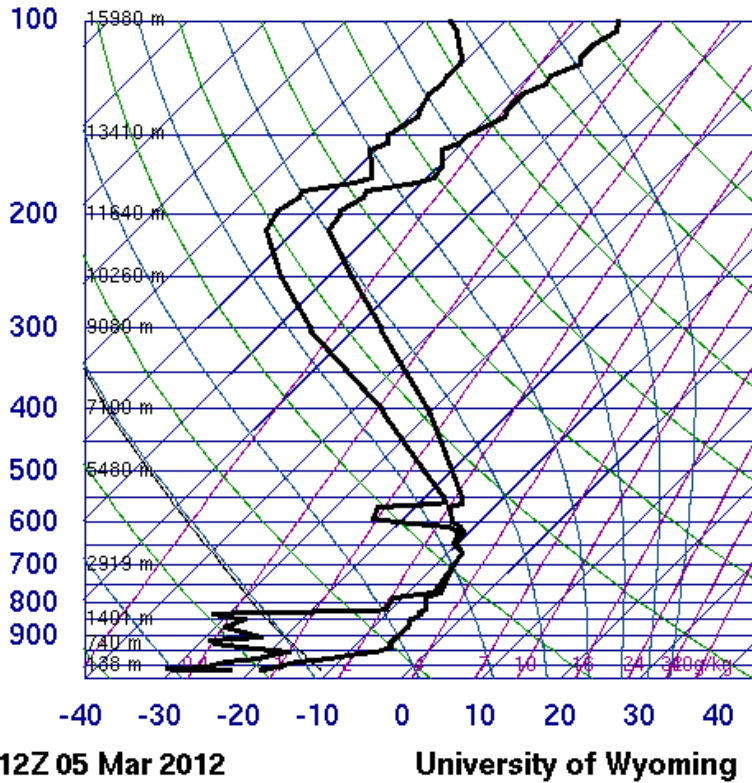


Figure 2, 0000 GMT 06 March, 2012 AK 700 millibar analysis.

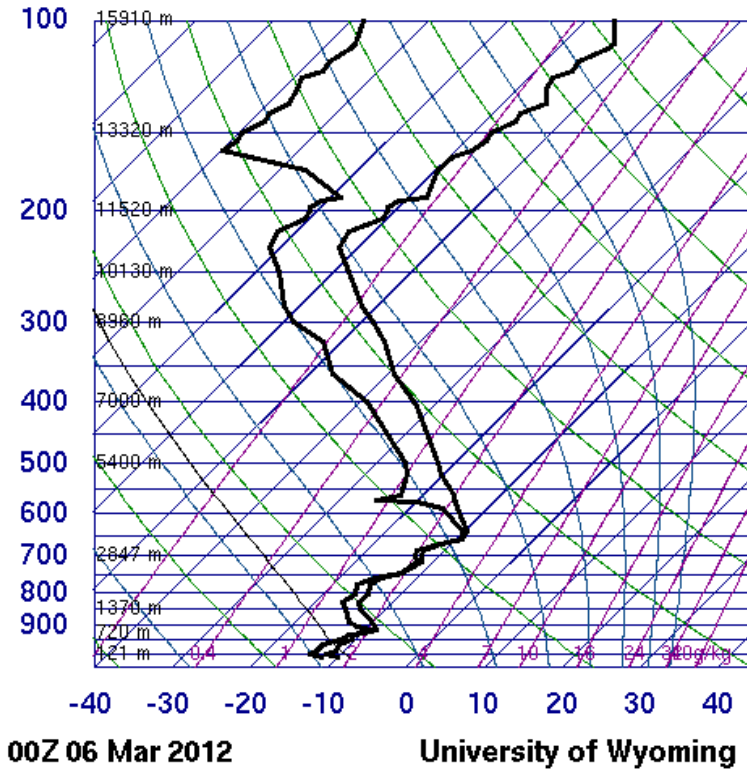
70326 PAKN King Salmon



SLAT	58.68
SLON	-156.65
SELV	15.00
SHOW	23.15
LIFT	38.18
LFTV	38.36
SWET	80.98
KINX	-13.8
CTOT	-7.40
VTOT	13.60
TOTL	6.20
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	248.0
LCLP	841.4
MLTH	260.6
MLMR	0.63
THCK	534.2
PWAT	9.67

Figure 3, King Salmon, AK skew-T plot, 1200 GMT 06 MAR 2012

70273 PANC Anchorage



SLAT	61.16
SLON	-150.01
SELV	40.00
SHOW	24.80
LIFT	31.69
LFTV	31.82
SWET	242.5
KINX	-7.30
CTOT	6.80
VTOT	8.80
TOTL	15.60
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	259.5
LCLP	946.2
MLTH	263.6
MLMR	1.42
THCK	527.9
PWAT	9.46

Figure 4, Anchorage, AK skew-T plot, 0000 GMT 06 MAR 2012