Silliman James

From: Suffern Paul
Sent: Wednesday, February 11, 2015 7:47 AM
To: Burtch Timothy; Silliman James
Cc: Tuccio William
Subject: RE: CEN14FA278 (Duluth, 6/7/14, Lancair), Memsic Meeting Support
Attachments: windat0700CDT.jpg; windat1000CDT.jpg; windat1118cdtwitharrows.jpg; windat1900CDT.jpg

Good morning Tim,

Attached you'll find all the wind aloft data I have for this case. All in all the winds are not that strong below 20,000 feet. The first image is of the upper air balloon sounding from 0700 CDT, 2nd image is the 1000 CDT computer model sounding for the accident site, 3rd image is the wind velocity based on radar observations right at 1118 CDT... this matches the wind velocity from the 1000 CDT sounding the best with northeast wind for the first 4,000 to 5,000 feet msl... last image is the upper air sounding from 1900 CDT with an all west wind but still not that strong. All in all hard to get above 30 knots below 15,000 to 20,000 feet in this case... I've looped the wx radar data over and over to see if there was any "random" waves or anything moving through the area and I don't see anything. I've had cases where that shows up, but this case doesn't fit the right setup for that. Please let me know if you need anything else!

Paul2

From: Burtch Timothy
Sent: Tue 2/10/2015 6:52 PM
To: Silliman James
Cc: Tuccio William; Suffern Paul
Subject: RE: CEN14FA278 (Duluth, 6/7/14, Lancair), Memsic Meeting Support

Thank you, Jim.

I didn't winds aloft in Paul's files. Am I missing it Paul?

From: Silliman James
Sent: Tuesday, February 10, 2015 6:45 PM
To: Burtch Timothy
Cc: Tuccio William; Suffern Paul
Subject: RE: CEN14FA278 (Duluth, 6/7/14, Lancair), Memsic Meeting Support

Tim and Bill,

Paul Suffren provided the information about the weather. Please contact Paul if more information about the winds is required.

Jim

From: DuRall, Robert [mailto[redacted]
Sent: Tuesday, February 10, 2015 1:33 PM
To: Burtch Timothy

Silliman James

From: Suffern Paul
Sent: Wednesday, June 24, 2015 7:44 AM
To: Silliman James
Subject: FW: CEN14LA278: Weather assistance
Attachments: 1500utcsoundingimage.jpg; 1615utcIRimageforCEN14FA278caseforemail.jpg

Hi Jim,

Below is an email that describes the cloud cover conditions from the surface through 20,000 feet msl as likely IMC conditions. The 1000 CDT computer model generate upper air sounding showed abundant moisture at the surface well past 10,000 feet msl with cloud cover likely. This matches the weather radar data and images I've sent to you showing the wind speed data. The wind speed data also shows the weather radar echoes up to the 20,000 foot altitude (and higher) meaning that sufficient moisture was present to return power to the radar and cloud droplets were likely up that high. In addition, I've attached the infrared satellite image from 1115 CDT/1615 UTC closest to 1123 CDT before the accident time and the cloud top temperatures above the accident site were around – 45 Celsius which would correspond to around 32,000 feet msl cloud tops. So clouds were likely from the surface through at least 32,000 feet msl. Is this helpful? Please let me know if you need anything else! Always happy to help!

Paul2

From: Suffern Paul
Sent: Wednesday, June 25, 2014 8:22 AM
To: Silliman James
Cc: Koschig Betty
Subject: RE: CEN14LA278: Weather assistance

Good morning Jim,

It definitely shows that IMC would be likely. I've got computer model data for 1500 UTC or 1000 CDT which is the closest time I've got. This picture is of the weather computer model data for the accident site at 1000 CDT. It shows cloud cover was likely from the surface through 20,000 feet or more. In addition, icing conditions would have been likely starting at 10,000 feet and above. Given the weather radar data and satellite data, this upper air sounding is definitely representative of the conditions with the line of rain in the area and just east of Duluth over Lake Superior. Please let me know what else I can get you! Thanks,

Paul2

From: Silliman James
Sent: Wednesday, June 25, 2014 7:44 AM
To: Suffern Paul
Cc: Koschig Betty
Subject: RE: CEN14LA278: Weather assistance

Paul,

What does the data show about the conditions about 6,500 msl? Would the pilot be in IFR conditions?

Jim

Silliman James

From: Suffern Paul
Sent: Tuesday, June 10, 2014 1:36 PM
To: Silliman James
Cc: Misencik Paul
Subject: RE: CEN14LA278: Weather assistance
Attachments: mapofArea.jpg; band1visibleimage1615utc.jpg; band1visibleimage1630utc.jpg; weatherradarat1622utc.jpg

Hi Jim,

Definitely looks to be IMC conditions, especially the further east and across the Lake someone went. KDLH:

SPECI KDLH 071632Z 12006KT 10SM BKN003 OVC010 11/10 A3007 RMK AO2 T01110100=

SPECI KDLH 071622Z 14009KT 10SM SCT003 BKN010 OVC027 11/10 A3006 RMK AO2 CIG 007V011 T01110100=

SPECI KDLH 071602Z 08004KT 10SM SCT007 OVC025 12/09 A3006 RMK AO2 T01220094=

Had the highest ceilings and visibilities of the airports surrounding that part of the lake. I've got the metars from the two harbors area and superior below and they show much lower conditions around the accident time:

Two harbors:

METAR KTWM 071654Z AUTO 17004KT 1/2SM HZ OVC002 11/08 A3005 RMK AO2=

METAR KTWM 071634Z AUTO 14005KT 3SM HZ BKN002 OVC033 11/08 A3005 RMK AO2=

SA 07/06/2014 16:14-> METAR KTWM 071614Z AUTO 09003KT 10SM DZ SCT013 OVC031 12/09 A3005 RMK AO2=

Superior:

METAR KSUW 071655Z AUTO 00000KT 10SM BKN005 BKN009 OVC040 11/11 A3007 RMK AO2 T01120107=

SA 07/06/2014 16:35-> METAR KSUW 071635Z AUTO 06003KT 10SM OVC005 11/11 A3007 RMK AO2 T01100106=

SA 07/06/2014 16:15-> METAR KSUW 071615Z AUTO 09003KT 10SM OVC009 11/11 A3007 RMK AO2 T01100105=

Sky harbor:

METAR KDYT 071613Z AUTO 08004KT 10SM -DZ BKN007 BKN011 OVC032 11/10 A3008 RMK AO2=

I've provided the weather satellite from 1115 and 1130 CDT (KDLH is the red dot) along with the weather radar from 1122 CDT showing the cloud cover slowly moving west to east and the weather radar showing the rain across of the Duluth area but across the lake and slowly moving eastward. Given the weather radar signature, surface map, and satellite pictures this is a scenario for low clouds to come into the area after the rain falls and expected IMC/IFR conditions. Still the weather forecaster writing the TAF for KDLH didn't see so and kept updating the TAF for worse and worse conditions. It would be interesting to know what the pilot got as far as weather beforehand. Have you made a request to LMFS for that or would you like me too? I'm grabbing the rest of the weather forecast and PIREPs to see what

they show across the area too. Those text products probably won't come in till later on this evening and so once they do I'll provide another update for you as far as what was "expected for weather conditions. The TAFs are below...see the pretty constant updating...meaning the weather forecaster was "chasing the weather conditions" (times in UTC):

17:30-> TAF KDLH 071730Z 0718/0818 07007KT 6SM BR BKN002 OVC010
TEMPO 0718/0720 1SM BR SCT002 BKN010 FM072000 07007KT
P6SM SCT050 BKN140 FM072300 01005KT P6SM SCT150 FM080300
31004KT P6SM SKC FM081700 21006KT P6SM SCT050=

16:41-> TAF AMD KDLH 071641Z 0717/0812 10007KT 6SM BR SCT005 OVC015
TEMPO 0717/0719 1SM -RA BR BKN003 OVC010 FM071900 06009KT
P6SM SCT035 BKN070 FM072200 03008KT P6SM OVC100 FM072300
31004KT P6SM SCT100=

Accident time 1622 UTC

15:09-> TAF AMD KDLH 071509Z 0715/0812 04008KT 6SM BR SCT005 OVC035
TEMPO 0715/0718 1SM -RA BR SCT005 OVC025 FM071800 06009KT
P6SM SCT035 BKN070 FM072200 03008KT P6SM OVC100 FM072300
31004KT P6SM SCT100=

12:30-> TAF AMD KDLH 071230Z 0713/0812 36009KT 5SM RA BR SCT011 BKN060
OVC080
TEMPO 0713/0715 3SM -RA BR OVC025 FM071500 04011KT 5SM
-RA BR SCT015 OVC035 FM072200 03008KT P6SM OVC100 FM072300
31004KT P6SM SCT100=

Please let me know if you have any questions and about the LMFS requesting preflight weather and then I'll continue to grab other forecast data too. Thanks!

Paul2

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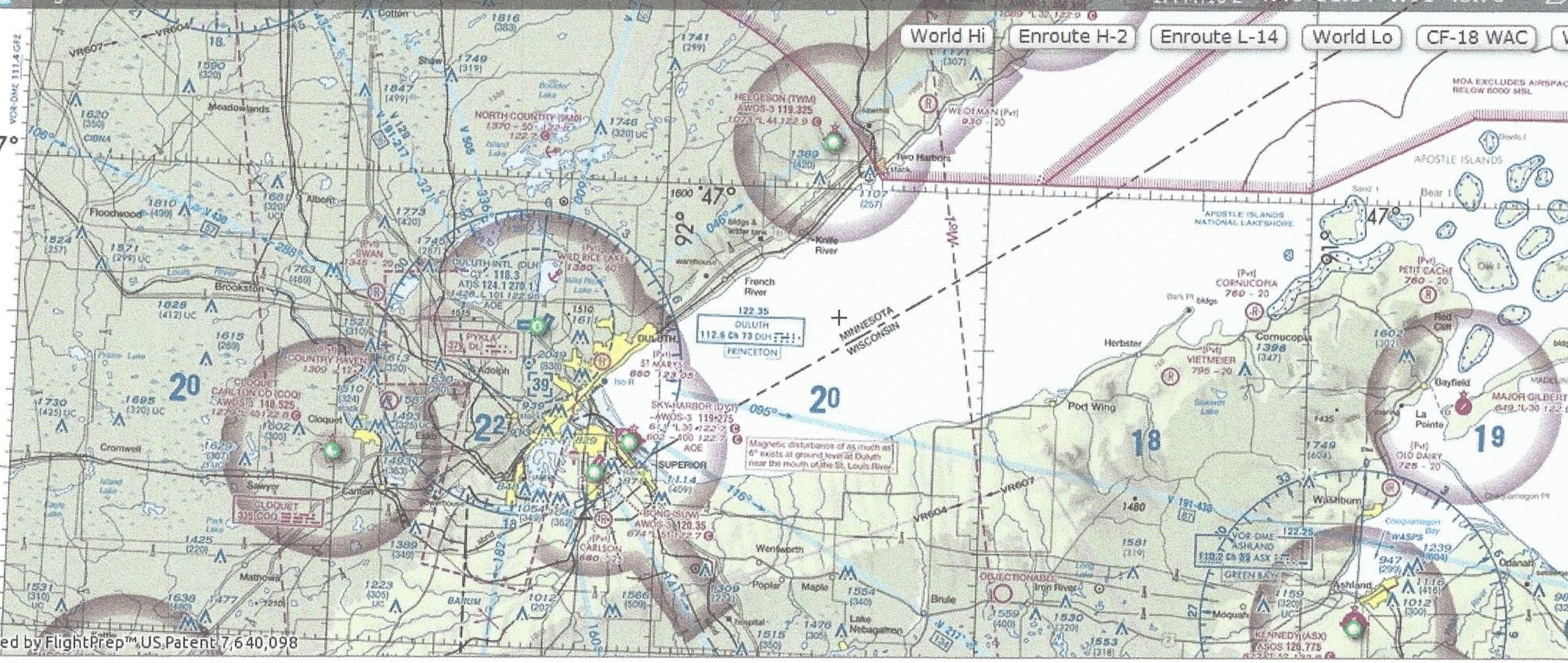
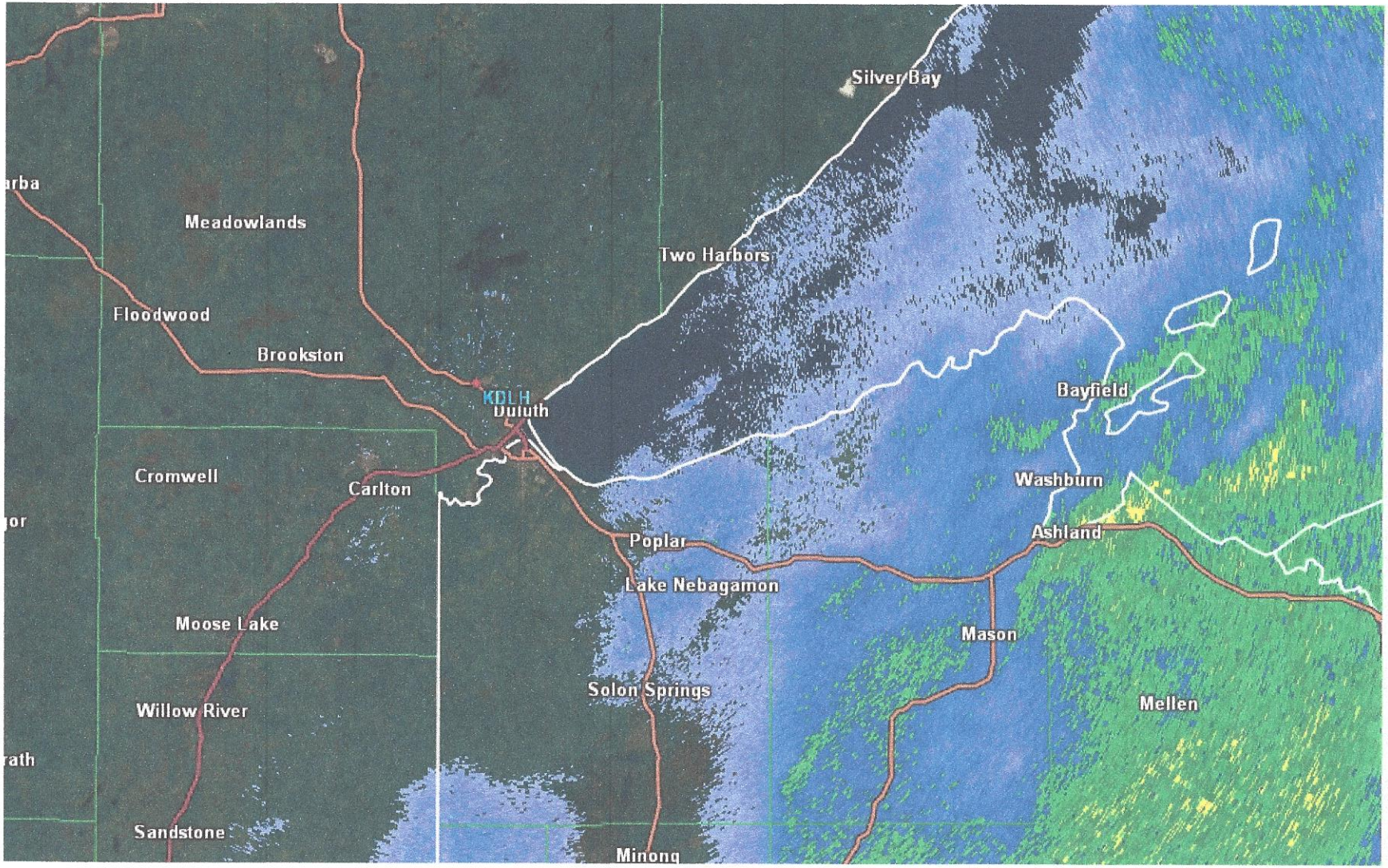
Aeronautical Charts

Airports | Charts | Forum | Fuel Prices

Go | Flight Plan | 17:44:10 Z N46°51.84' W91°43.76'

World Hi | Enroute H-2 | Enroute L-14 | World Lo | CF-18 WAC





Site: KDLH
VST: 06/07/2014 16:22:35 Z
Prod: 06/07/2014 16:22:32 Z
VCP: 212 SMV: ----
Tilt: 0.534°

Select Product:

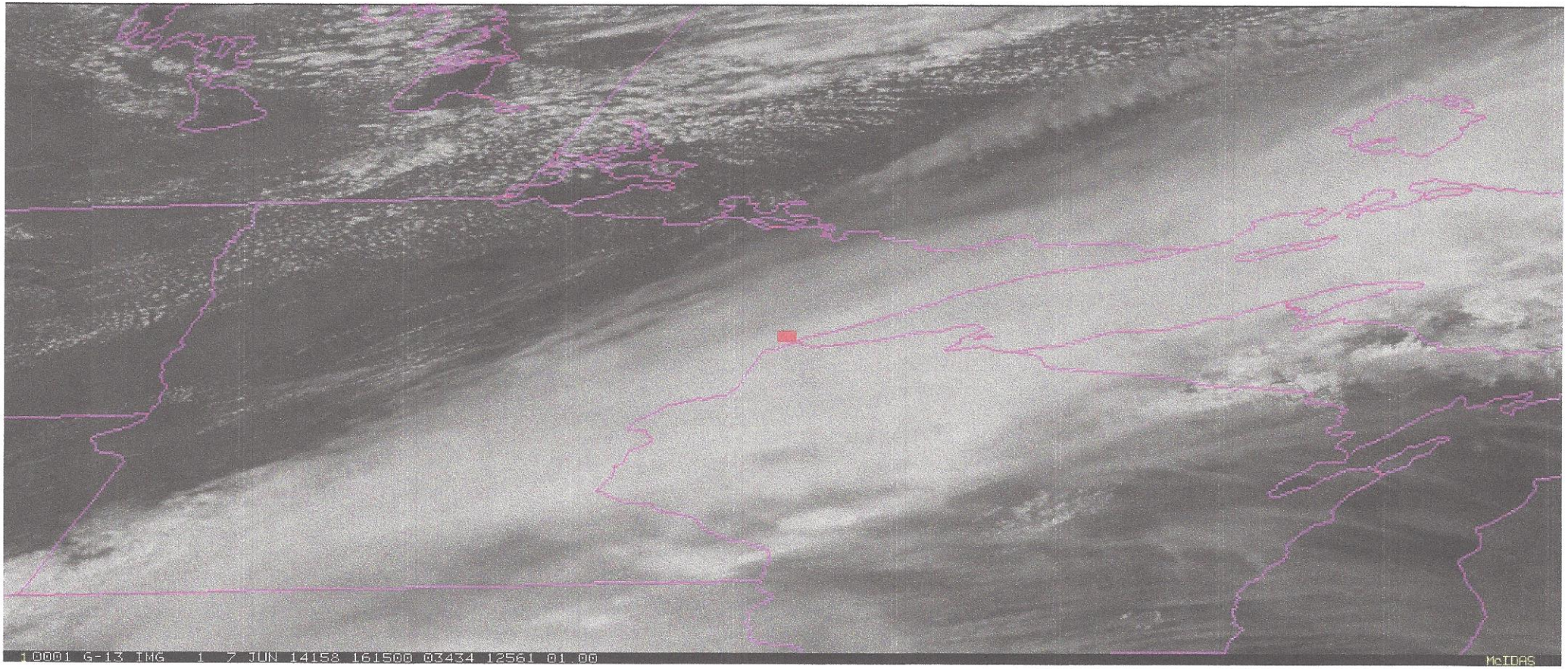
(•) BR	( ) VIL	( ) ZDR
( ) BV	( ) VILD	( ) CC
( ) SRV	( ) POSH	( ) PHI
( ) SW	( ) MEHS	( ) KDP
( ) ET	( ) NROT	( ) HCA

Select Tilt:

0.5°	0.9°	1.3°	1.9°
2.4°	3.2°	4.0°	5.2°
6.4°	8.0°	10.0°	12.5°
15.6°	19.5°		

Product Details:

Max: 51.0 dbz
Az: 159.2°
Ran: 170.6 nm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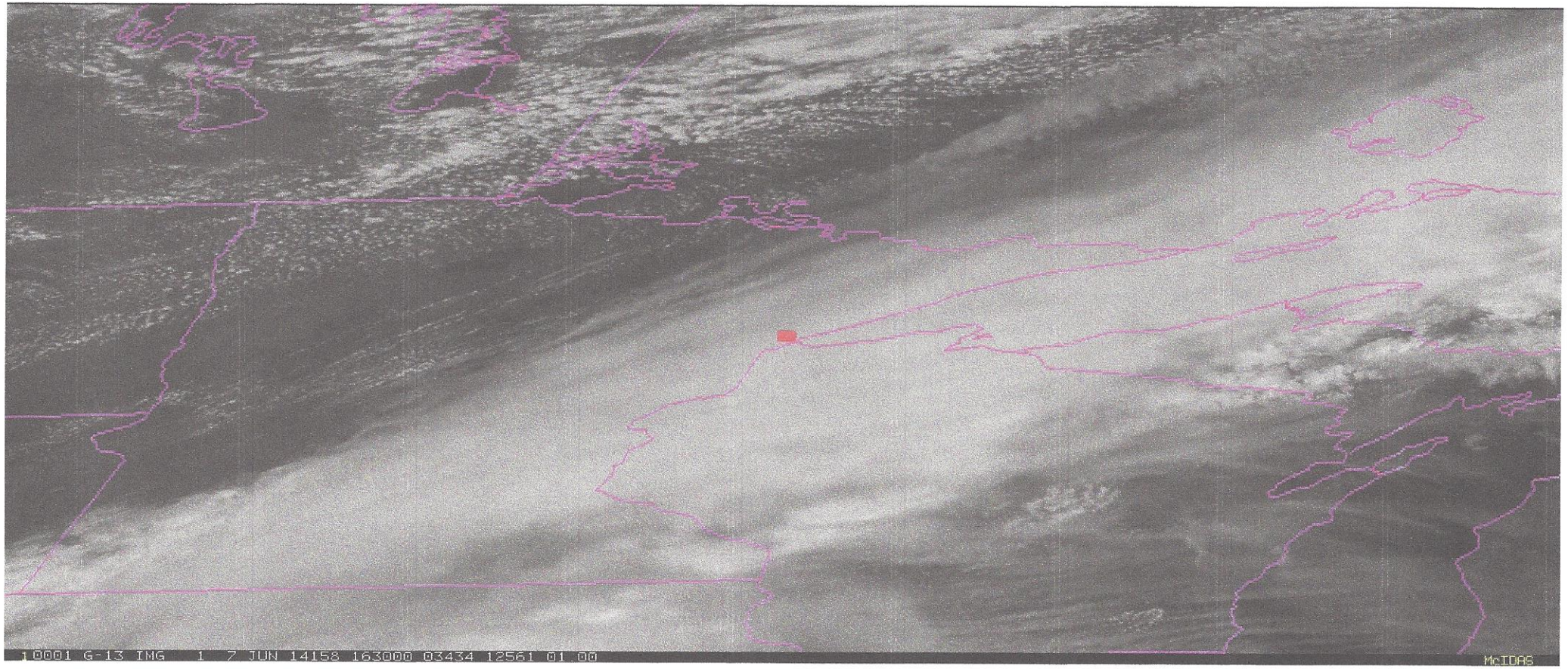
McIDAS


10001 G-13 IMG 1 7 JUN 14158 163000 03434 12561 01.00
McIDAS

Summary Listing | Complete Listing | Interval Listing | Data Analyses | Severe Weather | Compare Indices | CAPE Listing | (storm table)

Level	Height (ft-MSL)	Pres (mb)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS	Icing - Type (AFGWC method)	Wave/x---W---Turb nm	fpm	max
1	846	988	9.3	9.0	98	71 / 5	LGT	LIGHT				
2	1207	975	9.5	9.3	99	64 / 10	MDT					
3	1914	950	8.1	8.1	100	57 / 17						
4	2636	925	6.7	6.4	98	49 / 18	LGT					
5	3375	900	6.4	5.8	96	41 / 14						
6	4134	875	6.2	5.5	95	35 / 12	LGT					
7	4914	850	5.2	4.6	96	17 / 11	LGT					
8	5715	825	4.6	4.1	97	351 / 9						
9	6538	800	3.8	3.5	98	335 / 9	LGT					
10	7386	775	3.4	3.3	99	311 / 5	LGT					
11	8259	750	2.6	2.1	96	264 / 8						
12	9157	725	0.5	0.5	100	262 / 10	LGT					
13	10081	700	-0.3	-0.3	100	262 / 14	LGT		LGT Rime			
14	12022	650	-2.5	-2.7	99	263 / 22			LGT Rime	2.39	335	LIGHT
15	14097	600	-5.8	-6.3	96	268 / 27			LGT Rime	3.80	368	LIGHT
16	16309	550				259 / 29				4.54	292	LIGHT
17	16321	550	-9.7	-10.6	93		LGT		MDT Rime			
18	18701	500				251 / 35				5.24	207	LIGHT
19	18718	500	-14.0	-15.4	89				LGT Mixed	6.09	212	LIGHT
20	21299	450				241 / 38						
21	21317	450	-19.5	-21.4	85		LGT		LGT Rime			
22	24134	400				230 / 43						
23	24154	400	-25.8	-28.3	79		LGT			9.68	138	LIGHT
24	27254	350				220 / 48						
25	27280	350	-33.5	-36.5	74							
26	30745	300				212 / 51				10.87	154	LIGHT
27	30770	300	-41.7	-45.2	69		LGT					
28	34715	250				220 / 65				16.19	409	LIGHT
29	34739	250	-51.6	-55.3	64		MDT					
30	39347	200				243 / 97						
31	39398	200	-60.2	-63.4	66		MDT					
32	45282	151				254 / 44						
33	45365	150	-54.4	-74.4	7					2.83	725	LT-MD
34	53825	100				230 / 25						
35	53865	100	-55.6	-87.3	1							

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Level	Height (ft-MSL)	Pres (mb)	T (C)	Td (C)	RH (%)	DD / FF (deg / kts)	CAT (FAA)	LLWS	Icing - Type (AFGWC method)	Wave/x---W---Turb nm fpm max
1	1184	976	11.4	8.1	80	0 / 0	LGT			
2	2000	947				25 / 5				
3	2187	941	11.8	0.8	47		LGT			
4	2657	925	10.6	-1.4	43	360 / 10				
5	3000	913				355 / 11	MDT			
6	4000	880				340 / 17				
7	4723	857	5.2	-4.8	48		LGT			
8	4943	850	4.8	-4.2	52	330 / 16				3.95 2096 SEVERE
9	6000	817				330 / 13				
10	6127	813	1.4	-4.6	64		MDT			
11	6952	788	1.4	-11.6	37	295 / 17	LGT			
12	8044	756	0.2	-18.8	22	280 / 20				2.27 816 MD-SV
13	8323	748	-0.5	-11.5	43					
14	8854	733	-1.1	-18.1	26		LGT			2.74 780 MD-SV
15	9000	729				265 / 18				
16	9685	710	-3.3	-14.3	42					
17	9868	705	-3.3	-15.3	39					2.91 1886 SEVERE
18	10053	700	-3.9	-13.9	46	275 / 18				
19	10239	695	-4.3	-10.3	63					
20	10538	687	-5.1	-9.6	71					
21	10689	683	-4.9	-6.4	89				TRC Rime	
22	10994	675	-4.5	-5.1	96		MDT		MDT Clear	6.42 2573 SEVERE
23	12006	649	-6.7	-6.9	98	250 / 29			LGT Rime	
24	12768	630	-7.3	-7.6	98		MDT		LGT Rime	
25	13000	624				240 / 33				
26	13177	620	-7.5	-9.2	88				TRC Rime	3.60 635 LT-MD
27	13844	604	-8.7	-12.1	76		LGT			4.88 463 LIGHT
28	14000	600				245 / 36				7.13 884 LT-MD
29	14828	581	-11.1	-14.3	77		LGT			
30	16000	554				245 / 44				
31	16704	539	-15.5	-16.1	95				MDT Rime	
32	17123	530	-13.7	-23.7	43					6.07 1482 MD-SV
33	17359	525	-13.9	-23.9	43					11.66 1378 MD-SV
34	17886	514	-15.1	-32.1	22					
35	18470	502	-16.7	-30.7	29		LGT			
36	18568	500	-16.9	-31.9	26	240 / 58				
37	18766	496	-17.3	-34.3	21					10.45 209 LIGHT
38	19518	481	-19.3	-31.3	34		LGT			
39	19927	473	-19.7	-33.7	28	235 / 62				7.22 745 LT-MD

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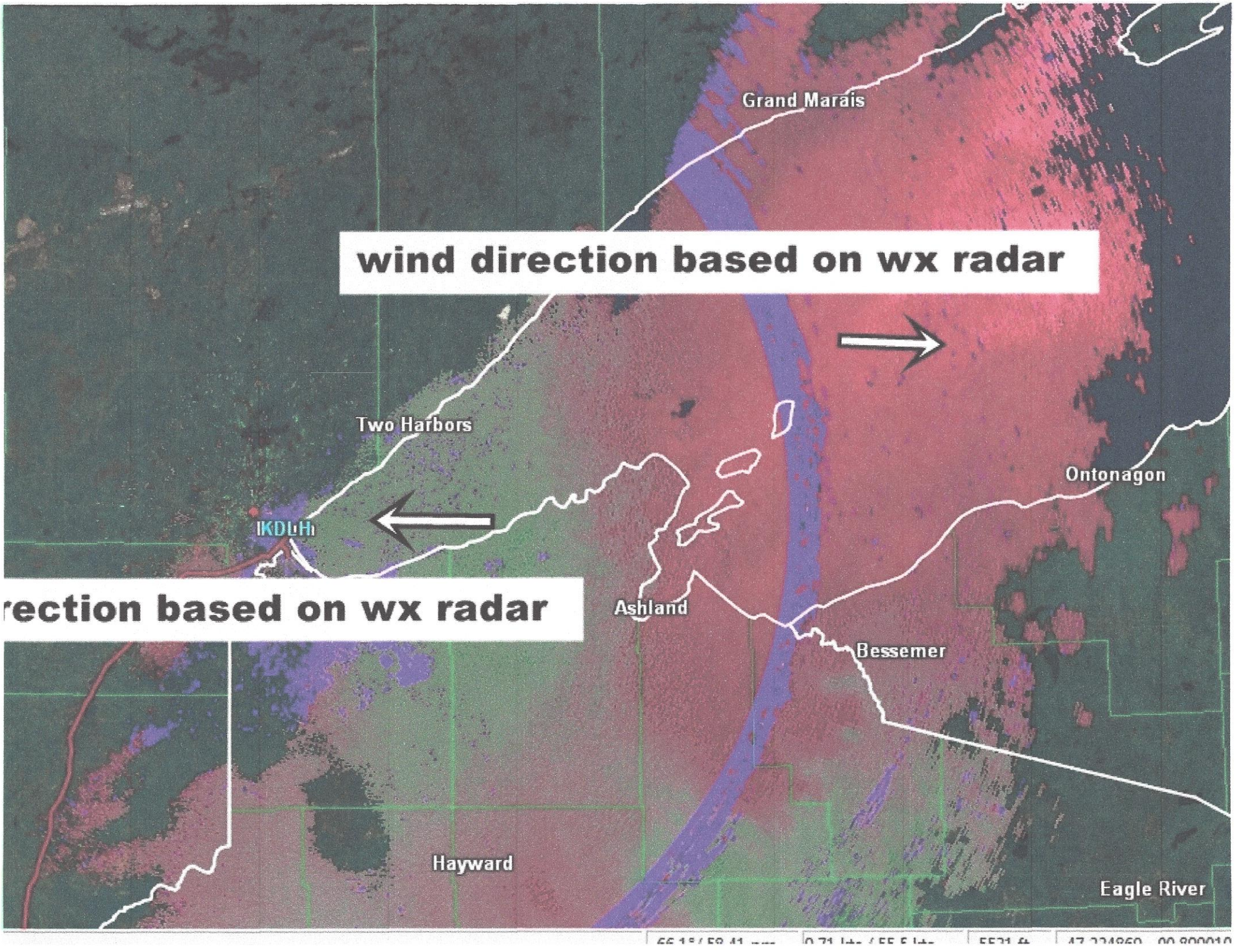
1	1184	974	19.2	1.2	30	280 / 11						
2	1445	965	18.2	0.2	30		SVR	LIGHT				
3	2060	944	15.8	-1.2	31	310 / 18	LGT					
4	2624	925	14.0	-2.0	33	300 / 16						
5	3000	912				295 / 17						
6	4000	880				285 / 17						
7	4935	850	7.2	-2.8	49	280 / 19						
8	5544	831	5.6	-4.4	49							
9	6000	817				275 / 18						
10	6625	798	2.4	-4.6	60							
11	7000	787				270 / 17						
12	7228	780	0.8	-7.2	55		MDT					
13	8000	757				285 / 21						
14	9000	729				280 / 23	LGT					
15	10042	700	-6.7	-12.7	62	290 / 24						
16	11617	658	-10.5	-14.6	72							
17	11848	652	-10.9	-16.9	61							
18	12000	648				285 / 21						
19	12120	645	-10.7	-21.7	40					2.14	361	LIGHT
20	12874	626	-10.7	-35.7	11		MDT			2.47	516	LT-MD
21	13000	623				300 / 28	LGT			3.84	385	LIGHT
22	14000	598				295 / 32				4.68	263	LIGHT
23	15221	570	-14.5	-50.5	3		LGT			5.52	188	LIGHT
24	16000	552				280 / 38						
25	17017	530	-18.1	-41.1	11							
26	17766	514	-19.5	-35.5	23		LGT			7.85	485	LIGHT
27	18437	500	-21.1	-36.1	25	265 / 44				15.32	1061	LT-MD
28	19073	487	-22.9	-37.9	24							
29	19672	475	-23.7	-34.7	36		MDT			7.74	1049	LT-MD
30	20027	468	-24.9	-33.9	43	255 / 50						
31	20283	463	-25.5	-36.5	35							
32	20645	456	-26.3	-34.3	47		MDT			13.01	138	LIGHT
33	21000	449				250 / 56						
34	22577	420	-31.3	-36.3	61							
35	22856	415	-30.9	-51.9	11					5.04	708	LT-MD
36	23195	409	-31.5	-55.5	8		LGT			11.22	490	LIGHT
37	23710	400	-32.7	-55.7	8	245 / 67	LGT					
38	25000	378				240 / 68						
39	25191	375	-35.9	-58.9	8							


Grand Marais
wind direction based on wx radar
Two Harbors
Ontonagon
KDLH
rection based on wx radar
Ashland
Bessemer
Hayward
Eagle River