

AMOMFW 2013 Madison, Wisconsin

Initial Analysis of Weather Conditions Around Mount Elizabeth on January 23, 2013

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BYRD POLAR RESEARCH CENTER



Byrd Polar Research Center

Polar Meteorology Group

The Ohio State University



Timeline of events

- 23/0900UTC – Emergency locator transmitter activated
- 23/2340UTC – Maritime NZ reports 90kt winds at the site
- 26/0645UTC – Maritime NZ reports wreckage located near summit of Mt Elizabeth at 13,000ft

Motivation

To investigate whether unusual weather conditions were associated with the accident in order to improve aviation safety in the future.



AMPS 10-km WRF -- Ross-Beardmore Window

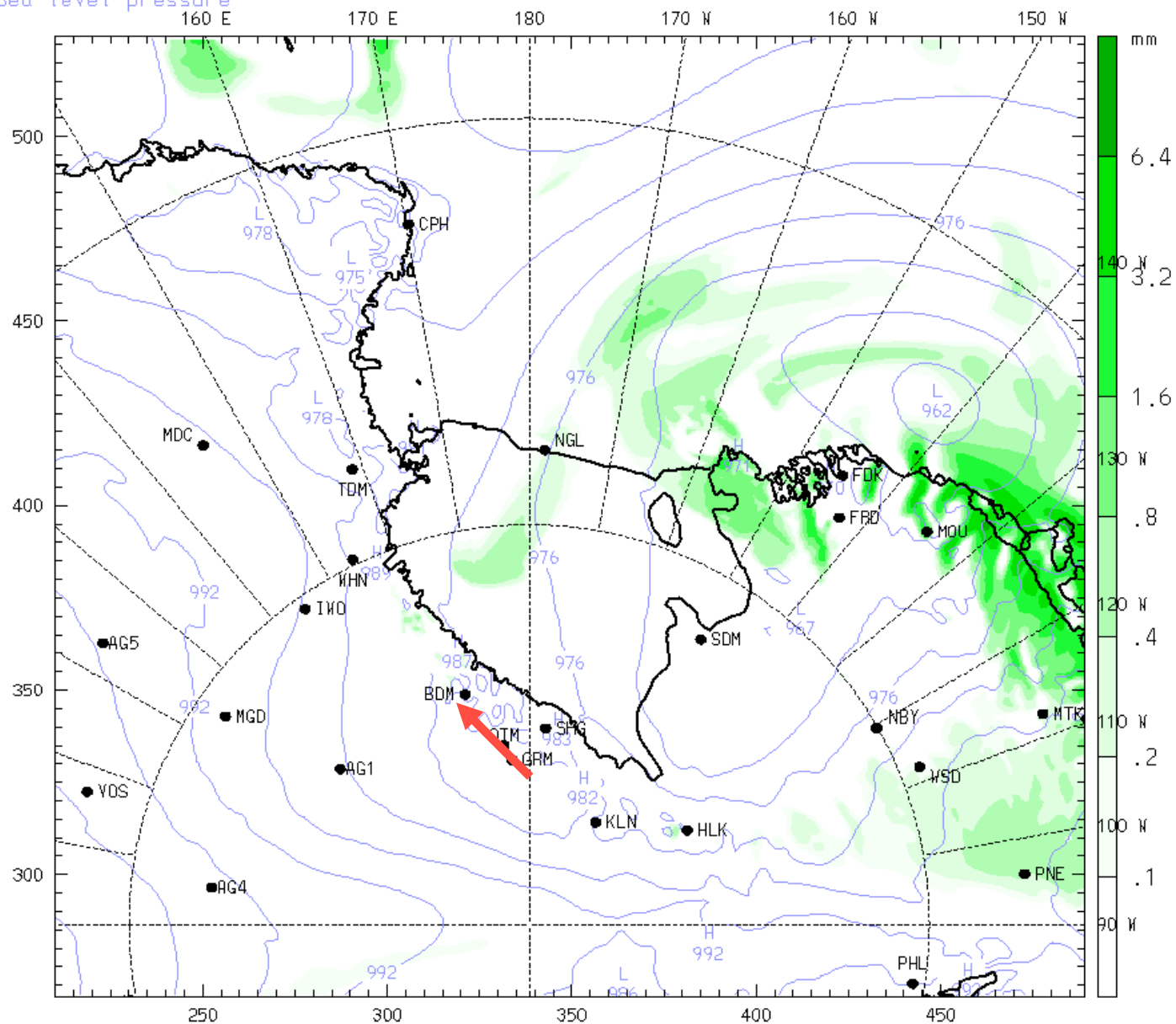
Fcst. 9 h

Total precip. in past 3 h

Sea-level pressure

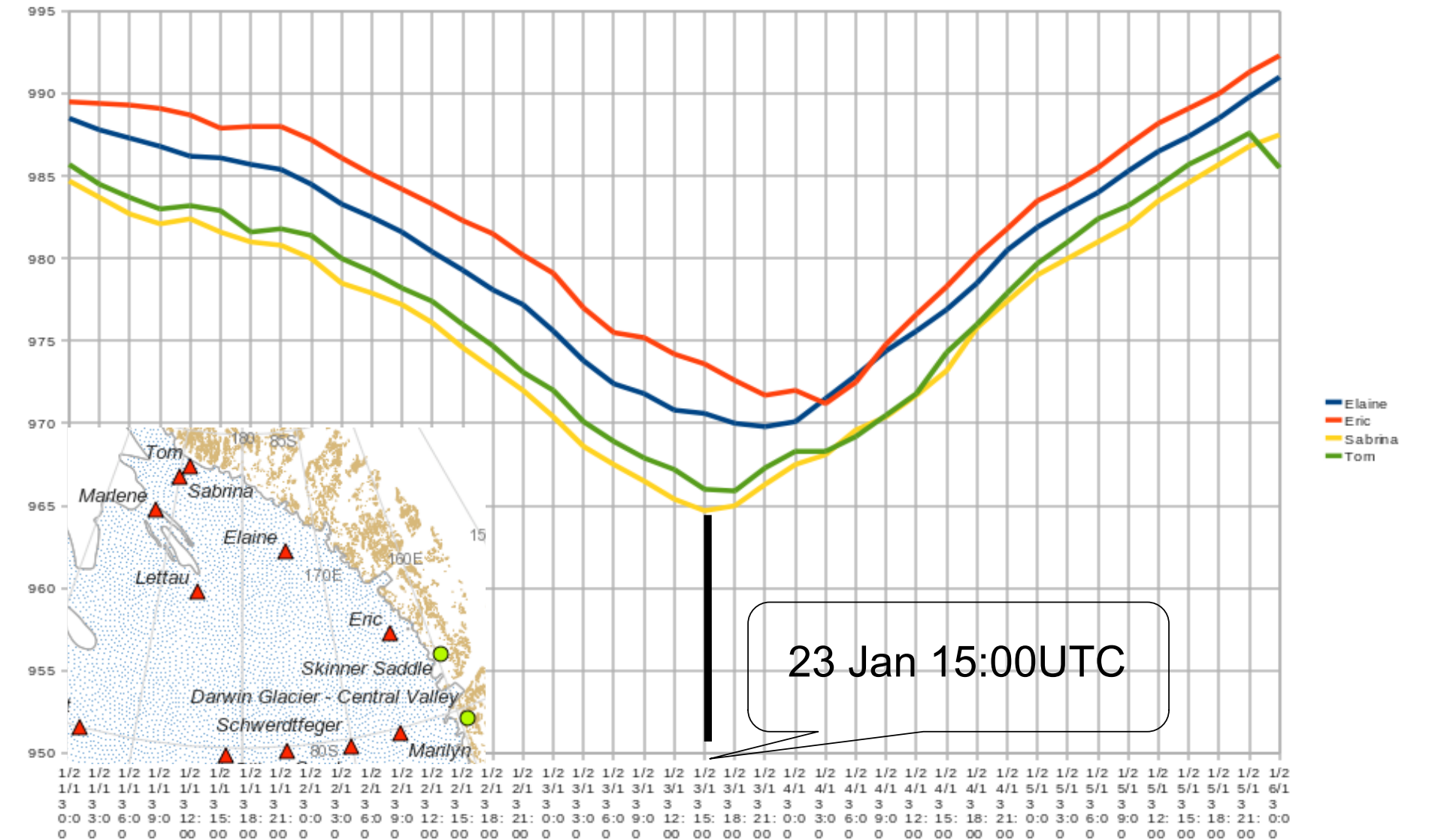
Init. 00 UTC Wed 23 Jan 13

Valid. 09 UTC Wed 23 Jan 13



CONTOURS: UNITS=hPa LOW= 964.00 HIGH= 1004.0 INTERVAL= 4.0000
Model Info: V3.3.1 M KF MYJ PBL WSM 5class Noah LSM 10 km, 60 levels, 75 sec
SW: Goddard DIFF: simple KM: 2D Smagor

Station pressure – Ross Ice Shelf



BDM Beardmore GI: lat/lon = (-84.0000, 164.5000)

Grid Point (321, 348) lat/lon = (-84.0499, 164.6958)

AMPS WRF Forecast Cycle:

2013-01-22/00 Z

Model Grid ΔX:
10.000 km

Temperature (°C)

RH (% WRT liq. wat.)

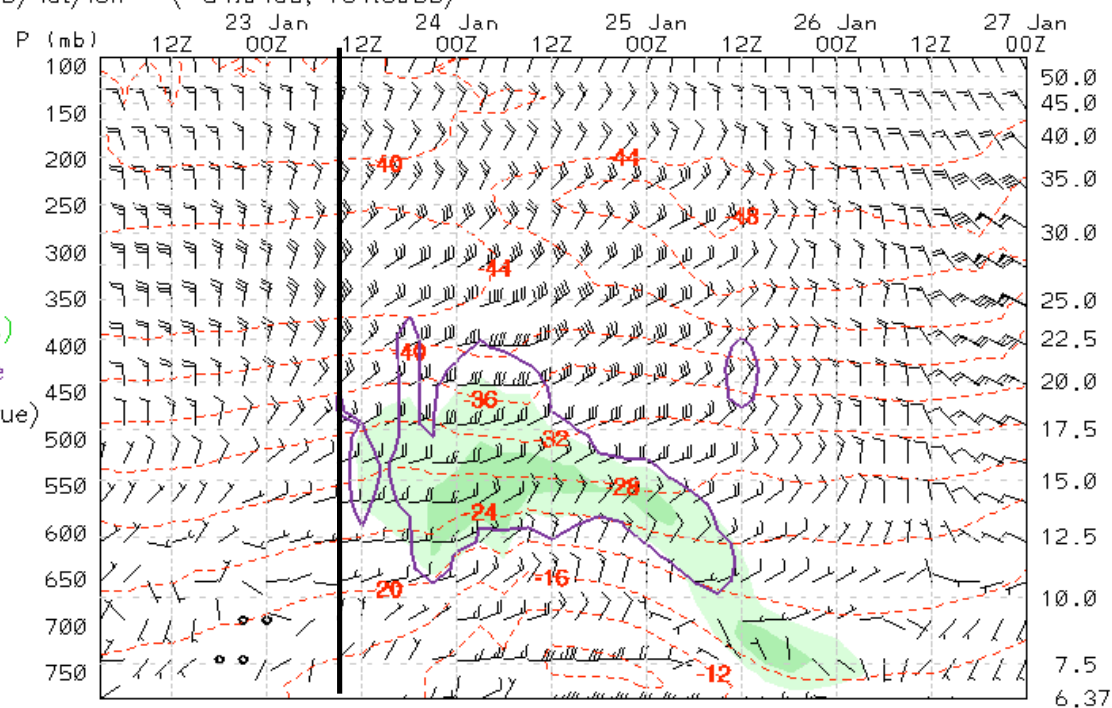
Cloud/Precip Outline

Wind Barbs (kts) (true)

RH > 70%

RH > 80%

RH > 90%



Wind at 10 m

Wind Spd (kts)

Wind Barbs (true)

Wind Barbs (grid)

Precip (mm)

liq. equiv.

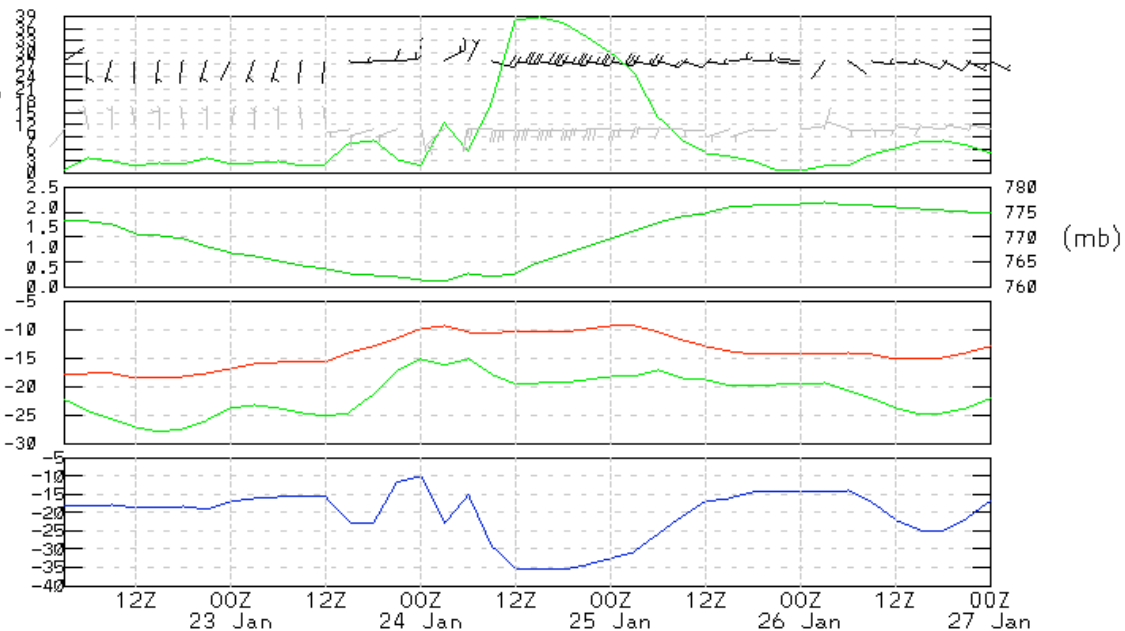
3-hr accum

Pressure (mb)

Temperature (°C)

Dewpoint (°C)

Wind Chill T (°C)



AMPS 10-km WRF -- Ross-Beardmore Window

Fcst. 9 h

Relative humidity (w.r.t. ice)

Geopotential height

Temperature

at pressure = 600 hPa

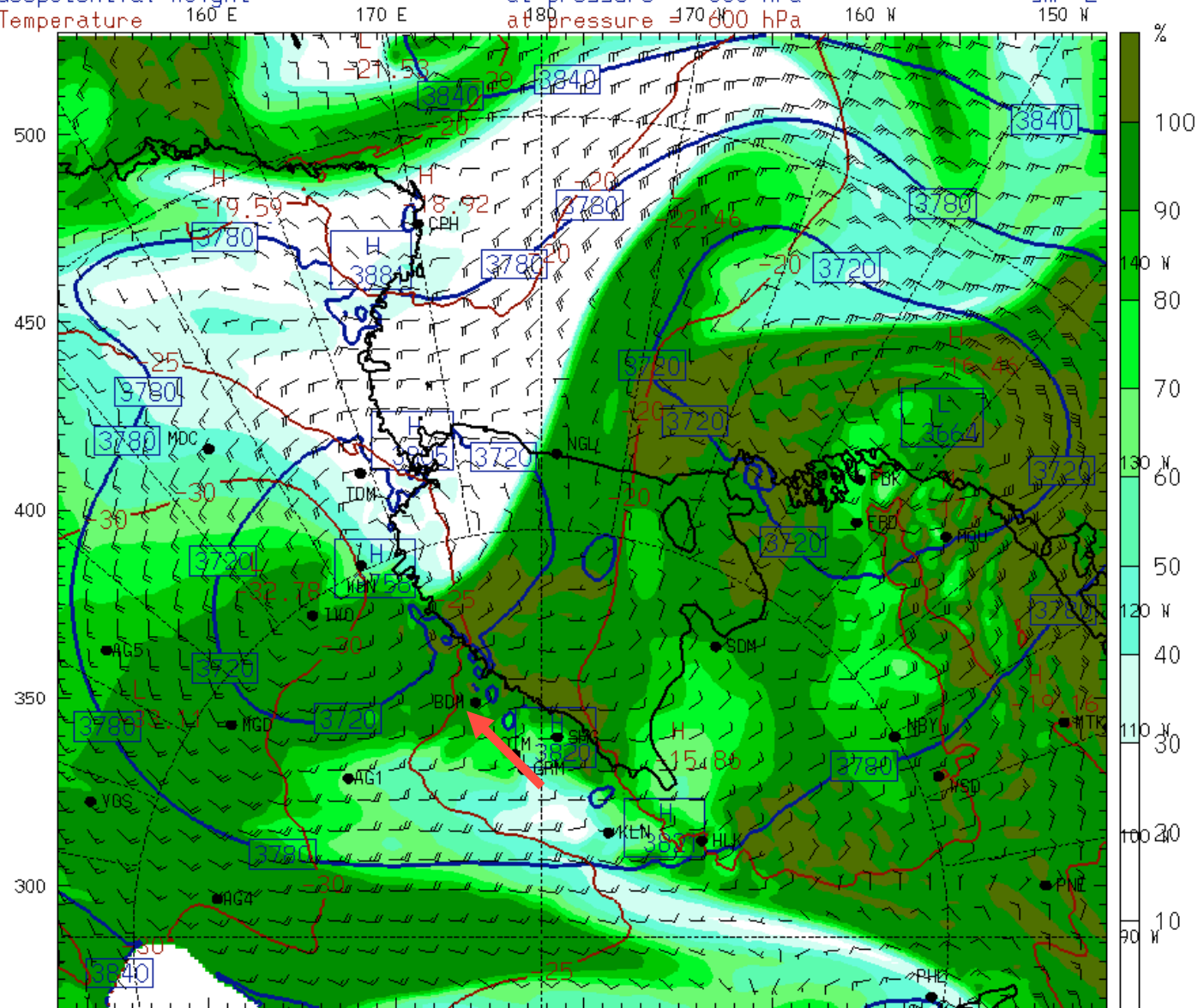
at pressure = 600 hPa

at pressure = 600 hPa

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sm= 2



AMPS 10-km WRF -- Ross-Beardmore Window

Fcst. 9 h

Total cloud mixing ratio

Geopotential height

Temperature

Horizontal wind vectors

Avg. k-index = 60 to 1

at pressure = 500 hPa

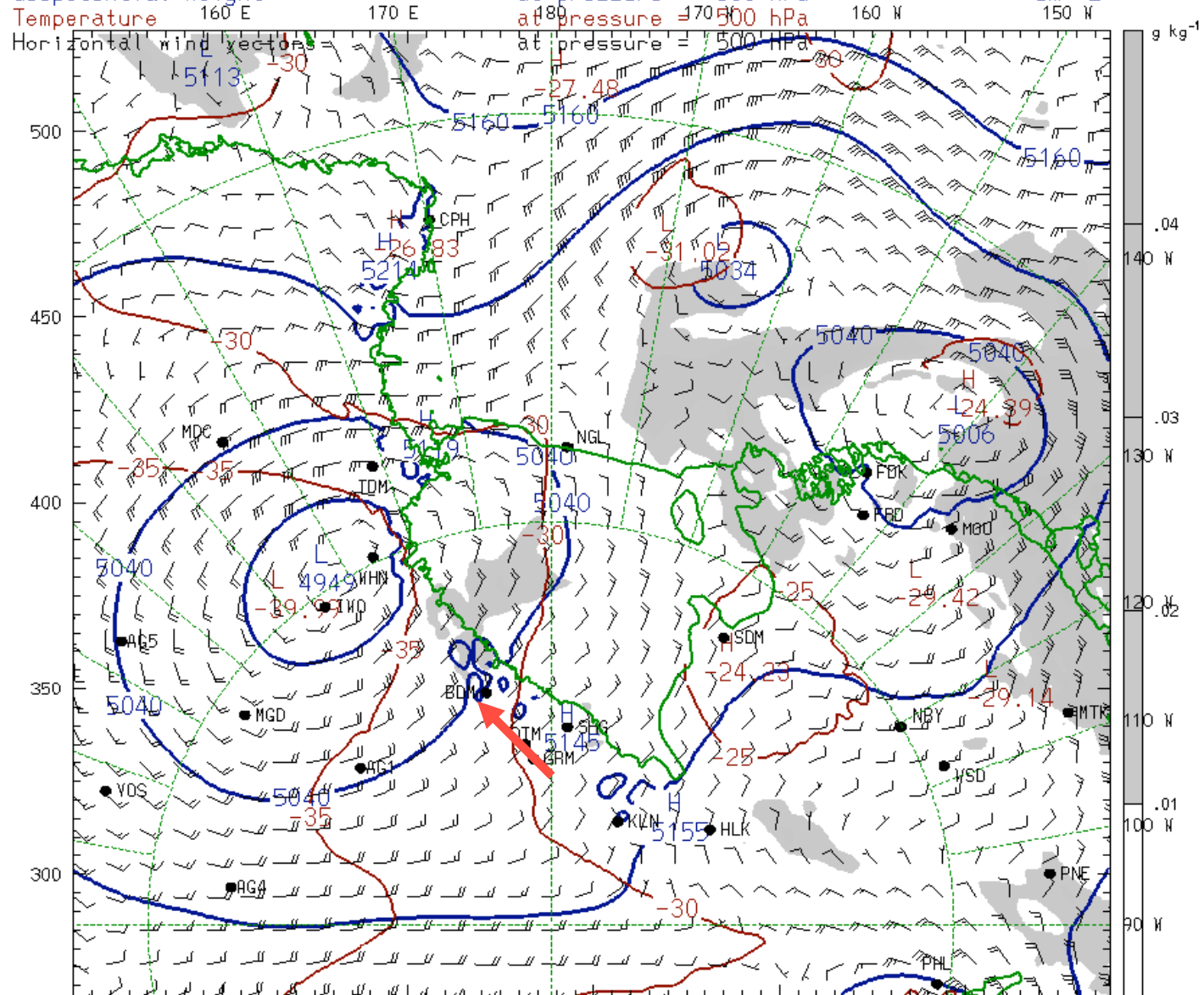
at pressure = 500 hPa

at pressure = 500 hPa

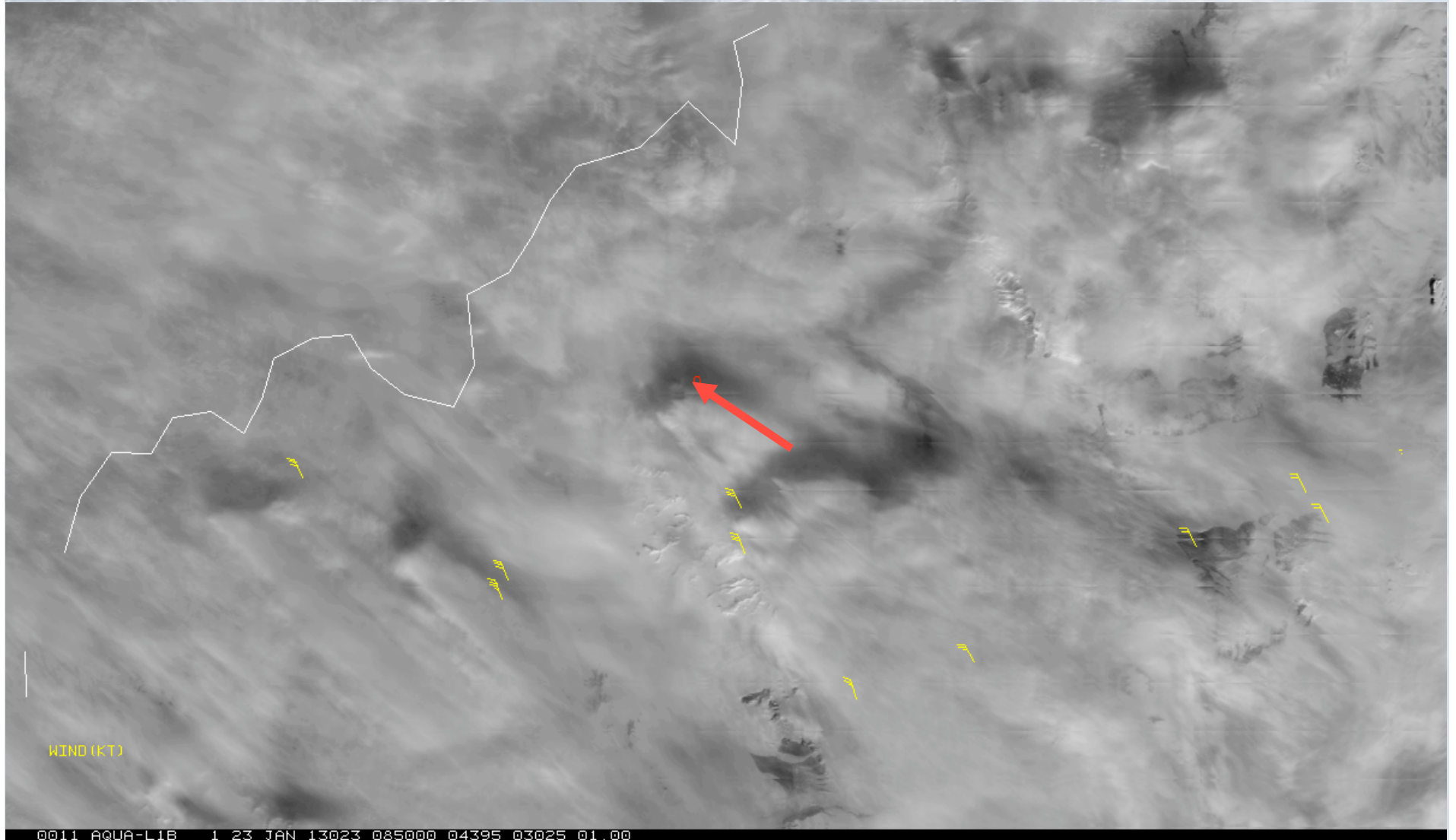
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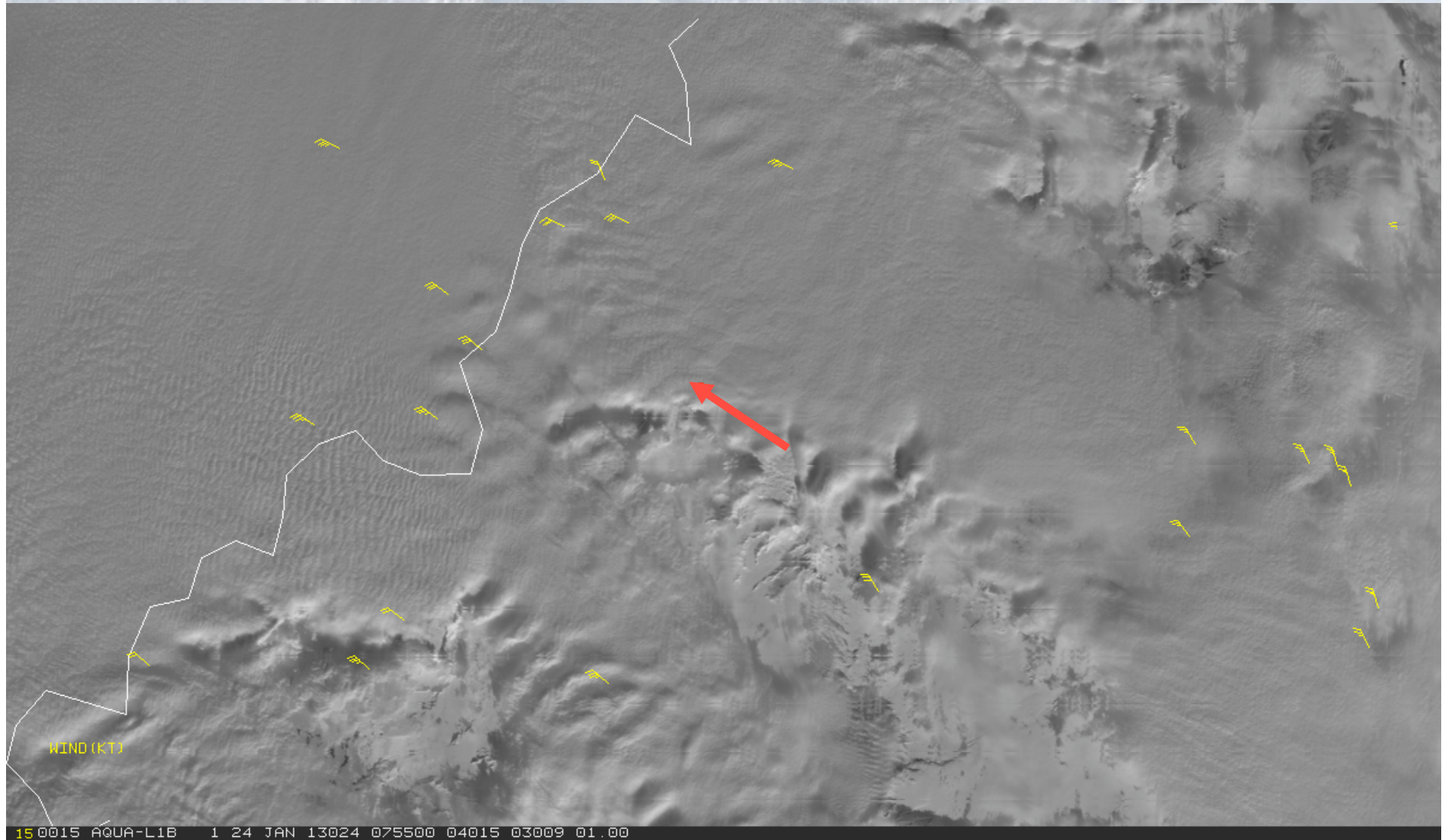
sm= 2



MODIS-AQUA Ch1 23/0850UTC



MODIS-AQUA Ch1 24/0755UTC



Conclusions

- Model and observational data do not suggest winds stronger than 35 knots around the time of the accident.
- Satellite imagery shows increased low and middle level cloud and possible mountain wave activity at later times, which may account for the conditions reported by the Search and Rescue teams.

Where to from here?

- Run a higher-resolution simulation over the area to investigate the potential for topographically-induced high winds or other mesoscale factors.

Data sources

- AMPS archive – NCAR
- AWS observations – AMRC
- Satellite imagery – NASA
- Cloud drift winds – University of Wisconsin