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Bureau of Meteorology

The Casey Thunderstorm



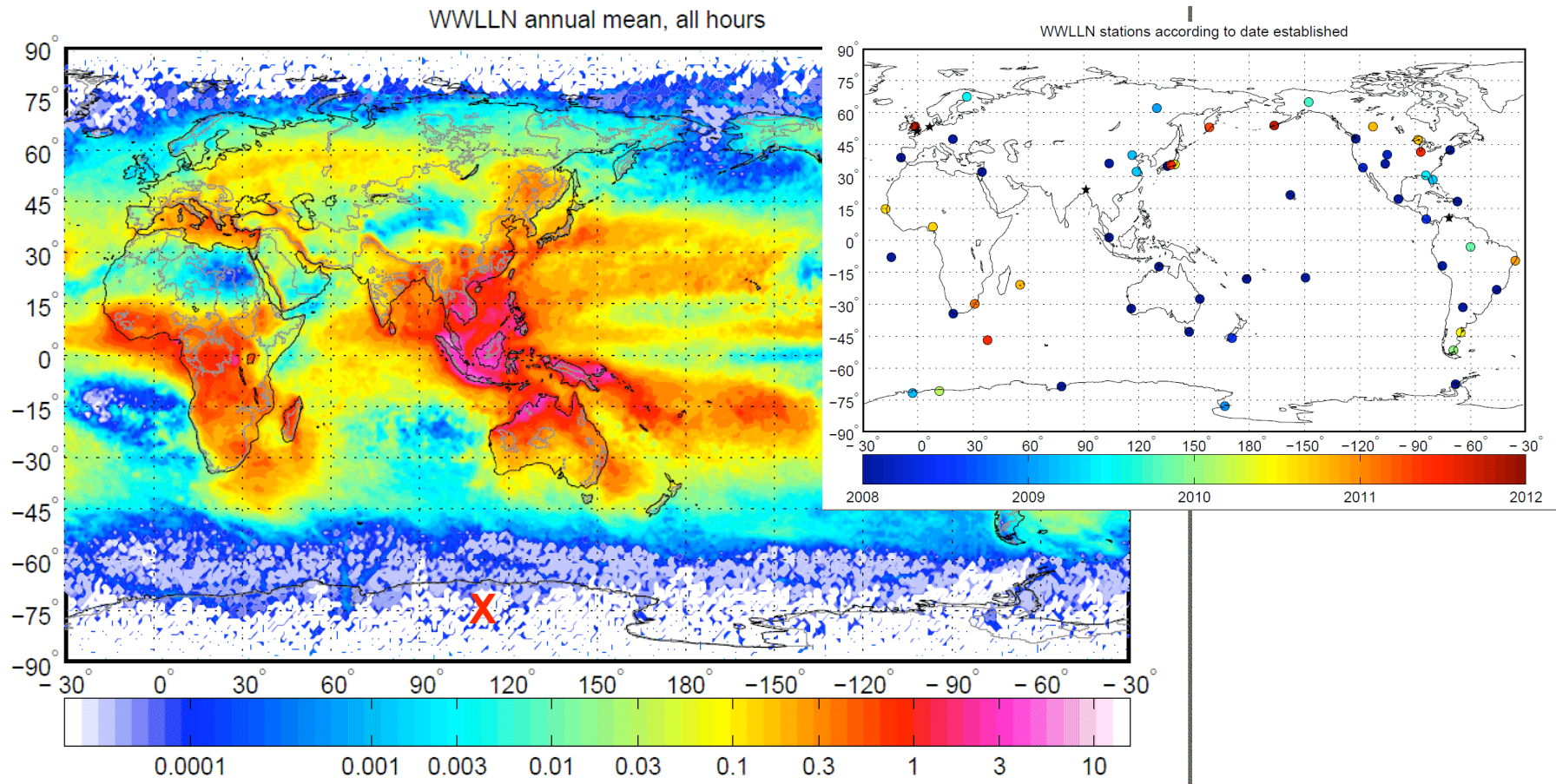
21UTC 17th December 2011- photo: Craig George



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World-Wide Lightning Location Network (WWLLN)

Continuously monitors global lightning since 2008. Detection efficiency 10%. Strokes $\text{km}^{-2} \text{yr}^{-1}$

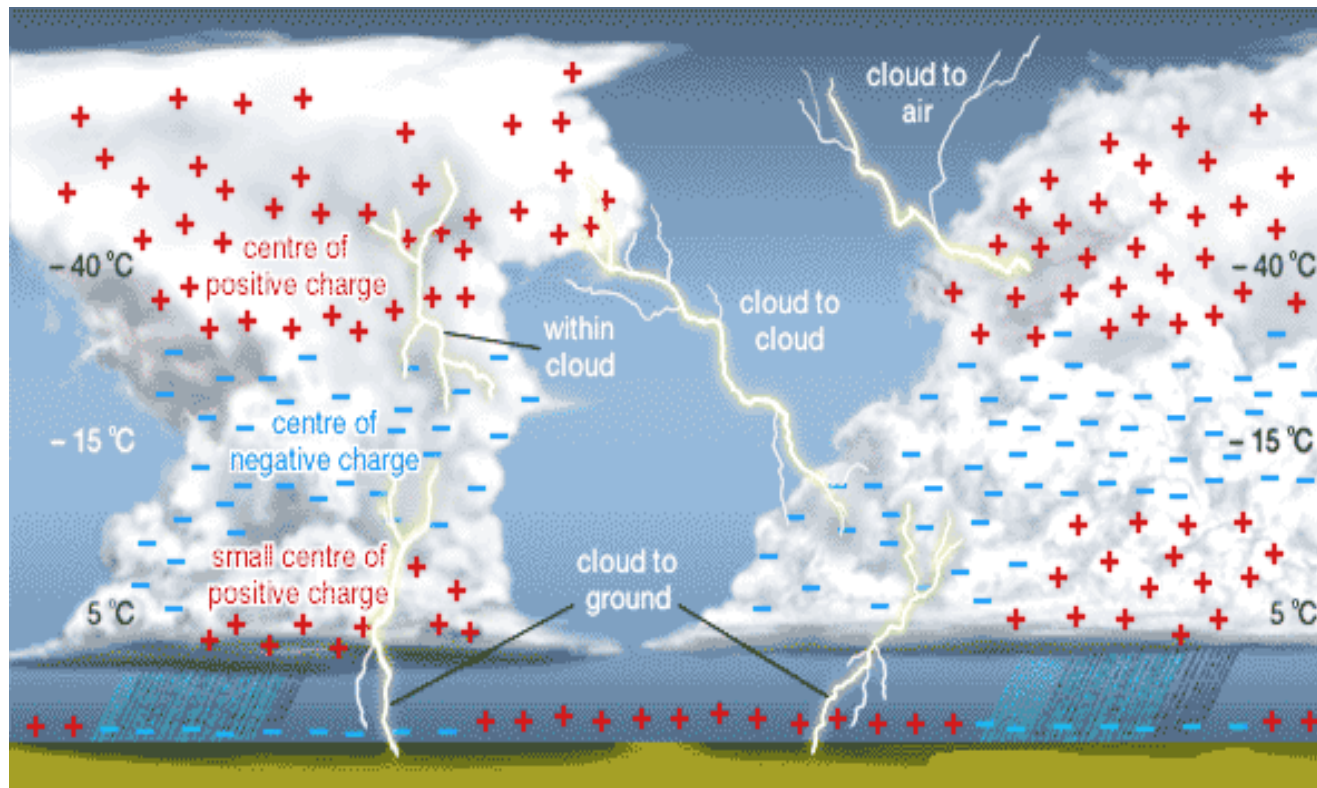


The WWLLN recorded 3 strikes directly over the station between 2100-2107 UTC, from 7 sensors (high confidence). No other strokes were recorded nearby within 24hrs.



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Vigorous Upward Lift in Sufficient Depth of Mixed Phase Cloud





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Antarctic Cumulonimbus



Davis

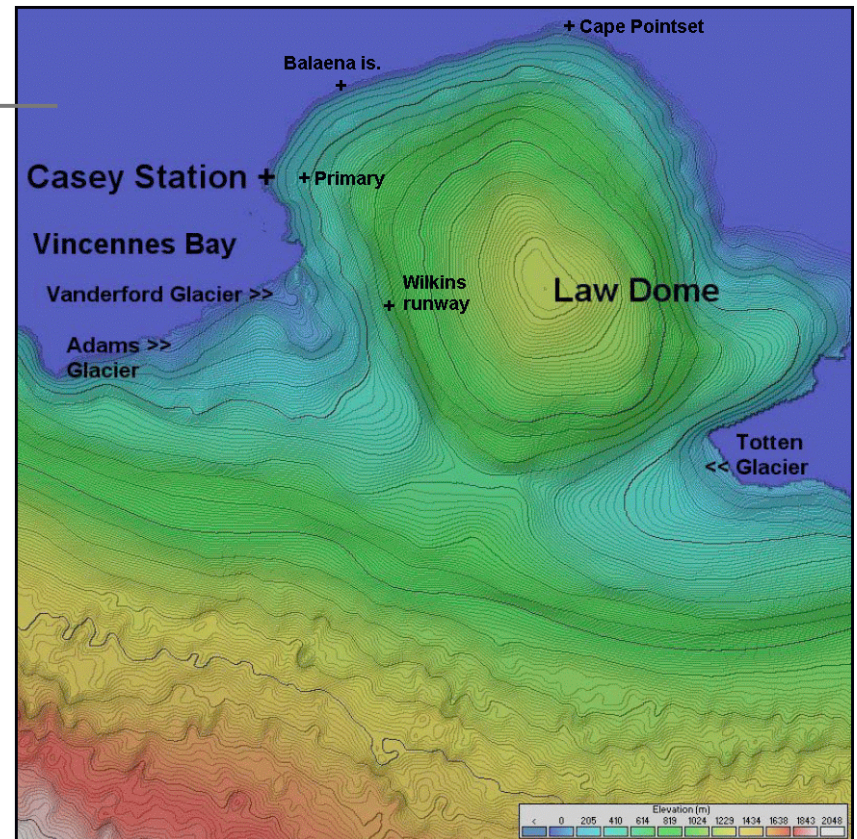
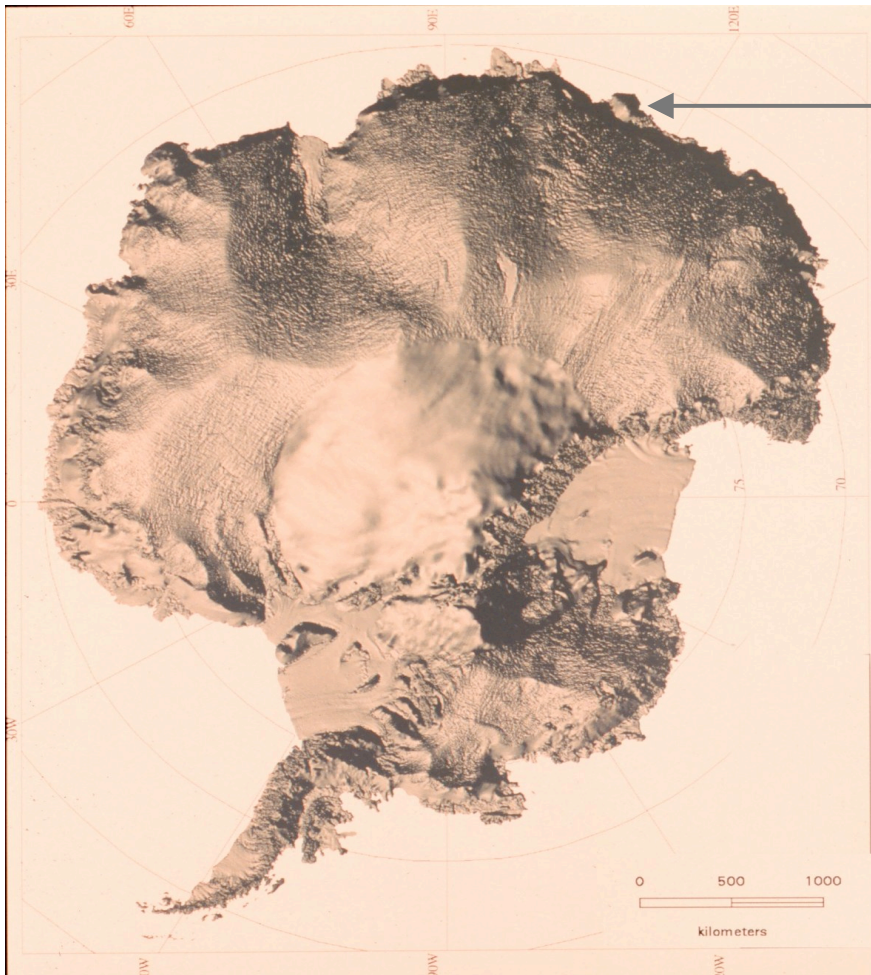


Casey



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Regional setting

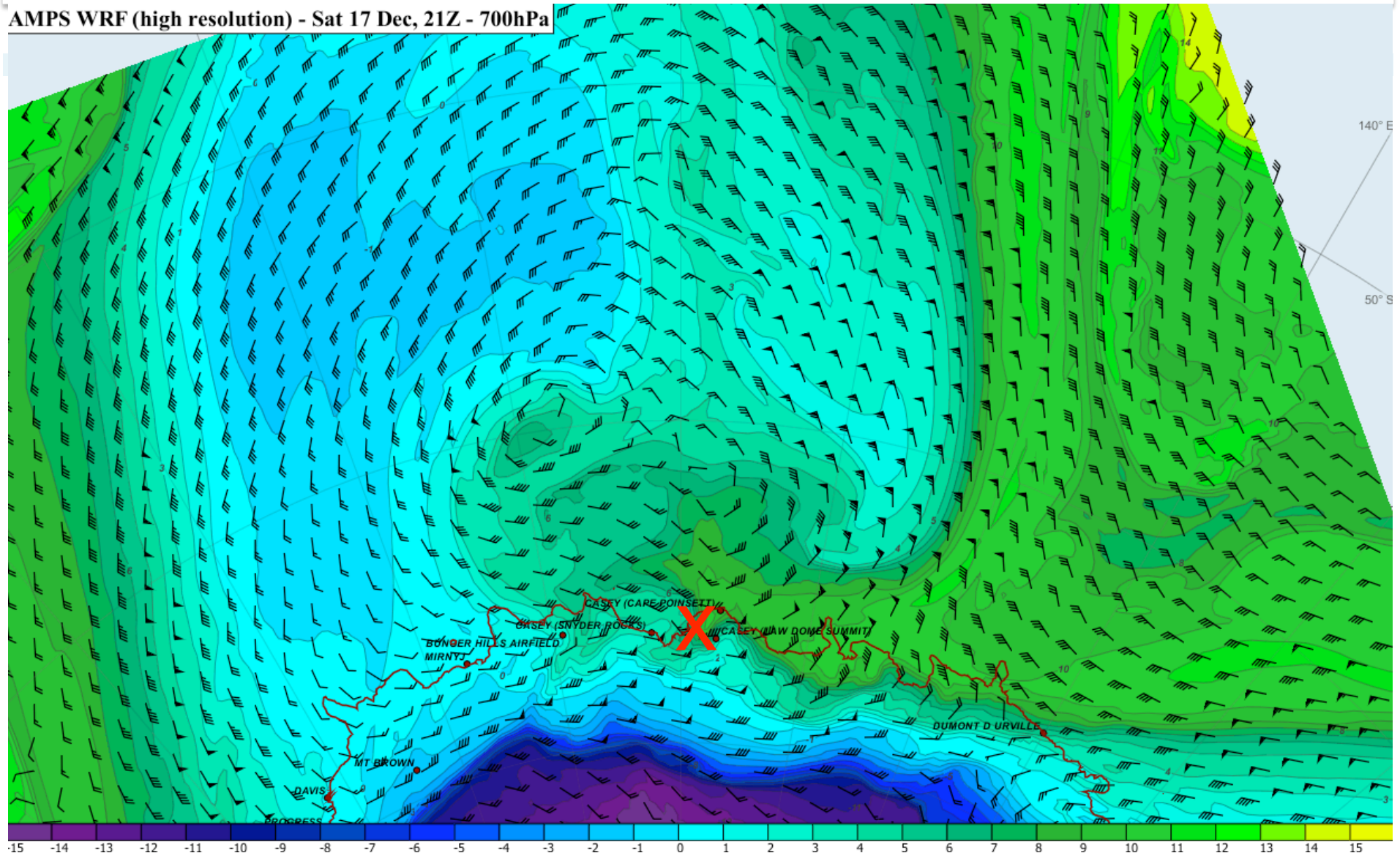




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Wet bulb potential temperature (21Z)

AMPS WRF (high resolution) - Sat 17 Dec, 21Z - 700hPa

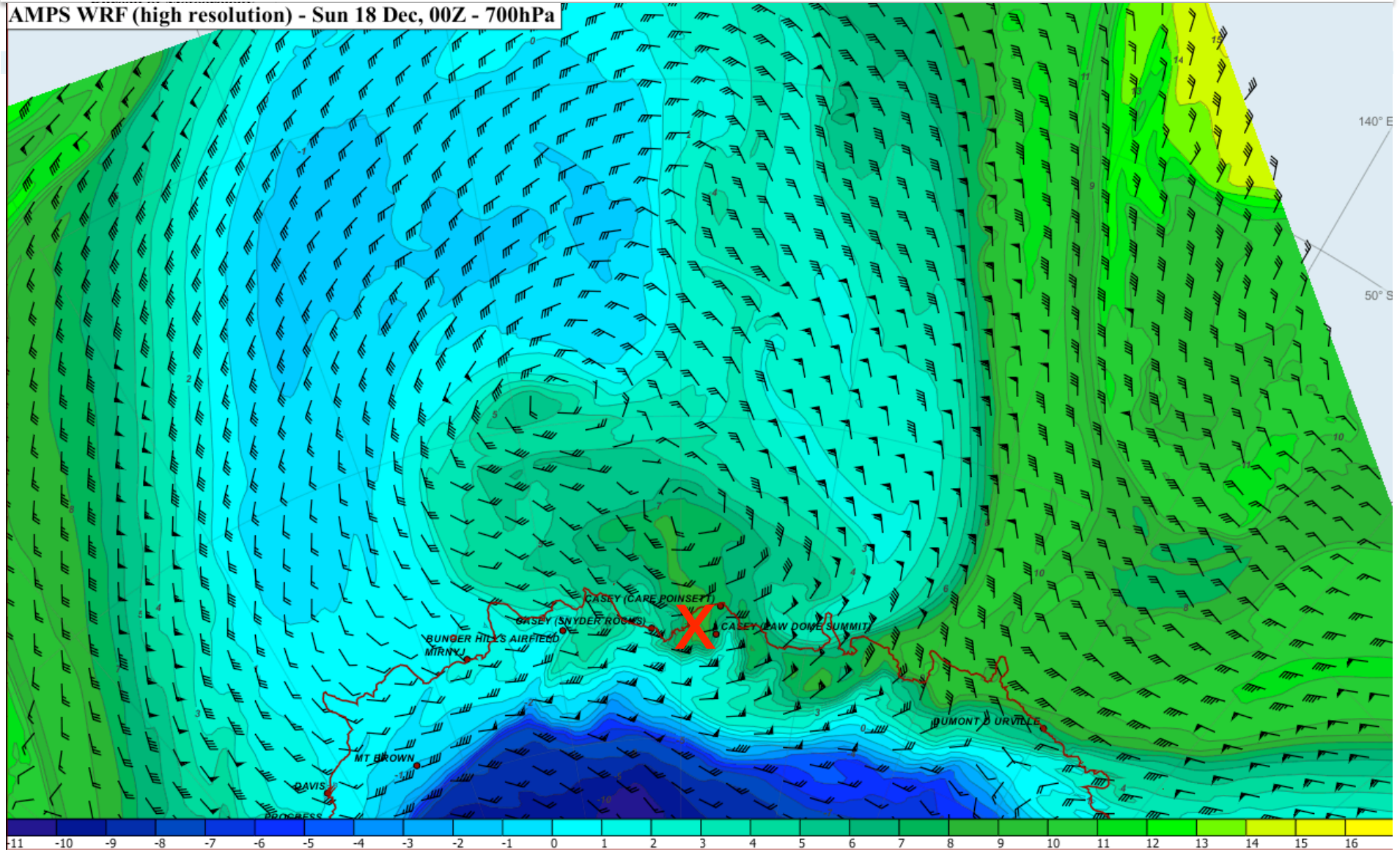




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Wet bulb potential temperature (00Z)

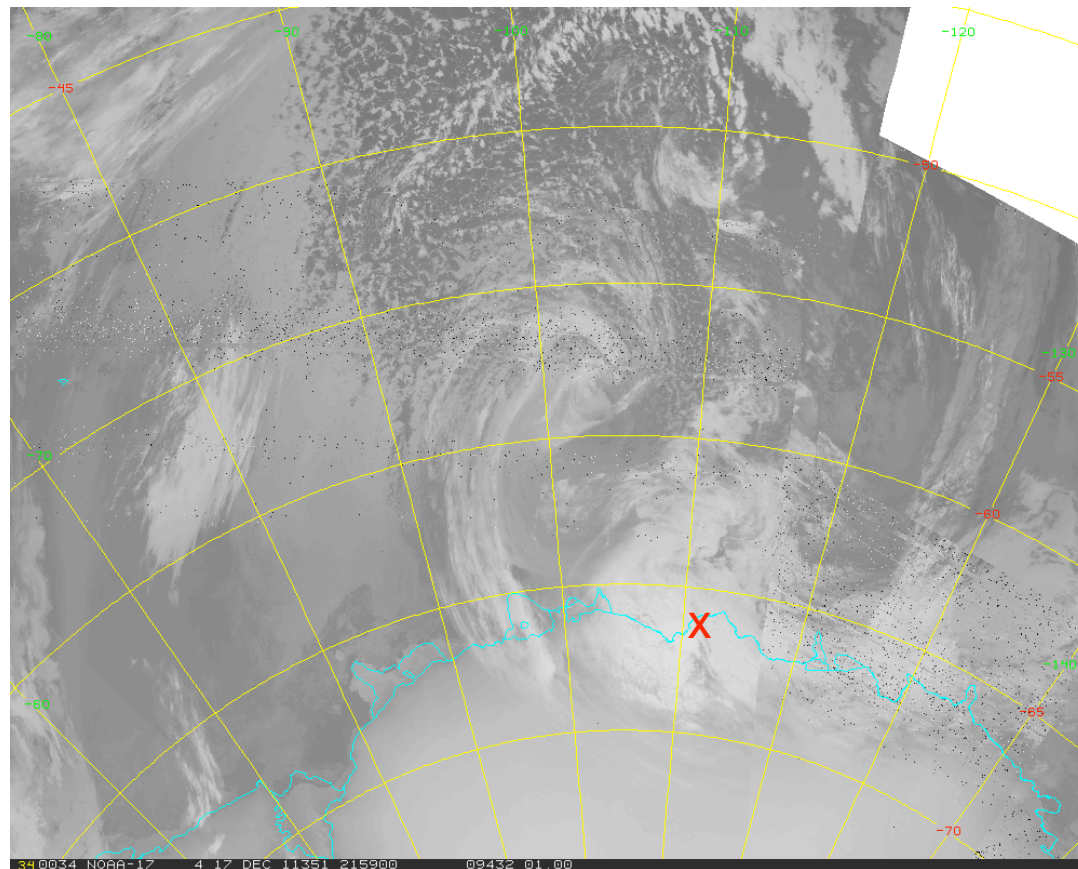
AMPS WRF (high resolution) - Sun 18 Dec, 00Z - 700hPa





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NOAA IR Composites 17th – 22UTC

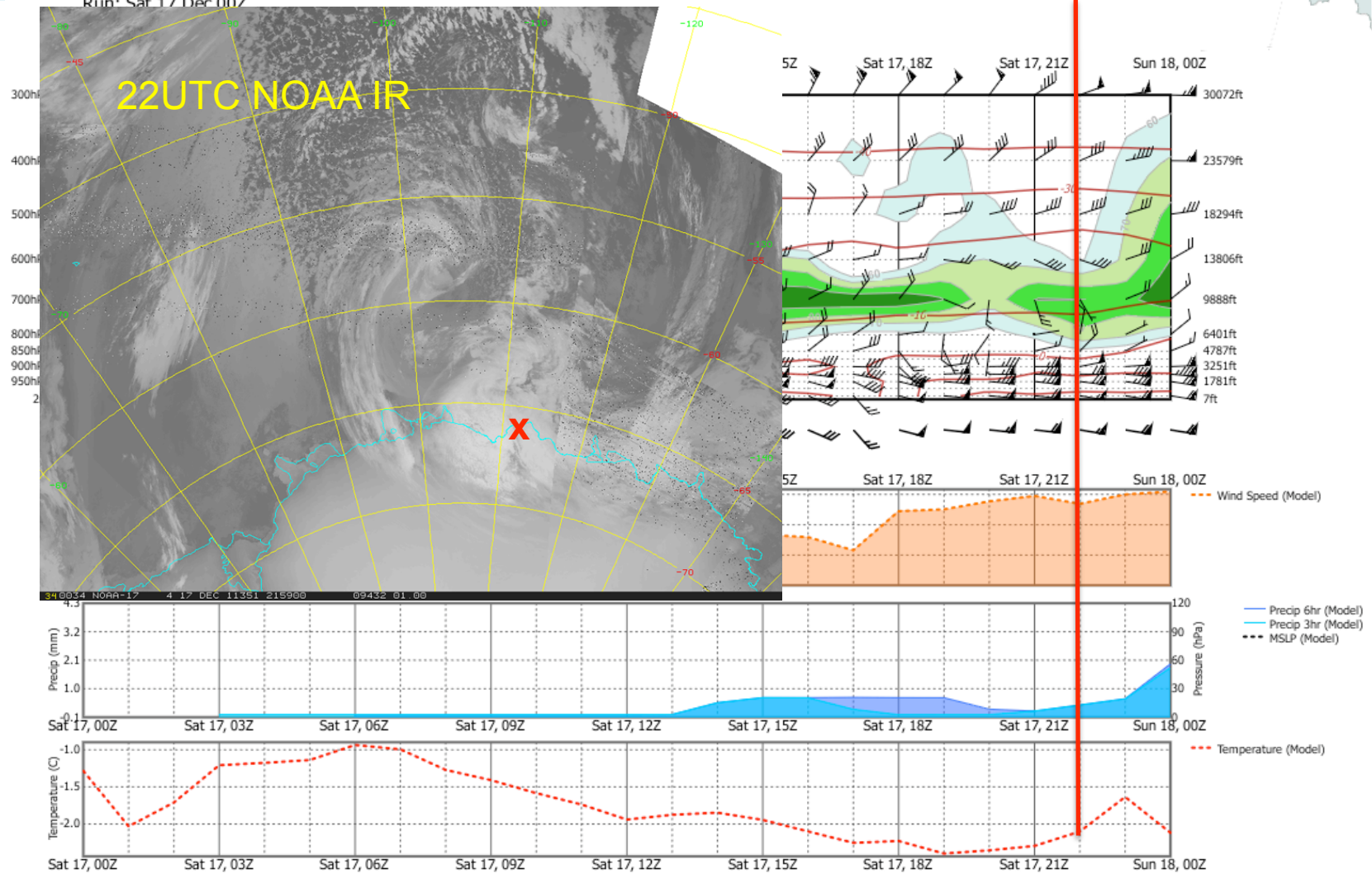




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Casey Station Time Series Forecast (24hr)

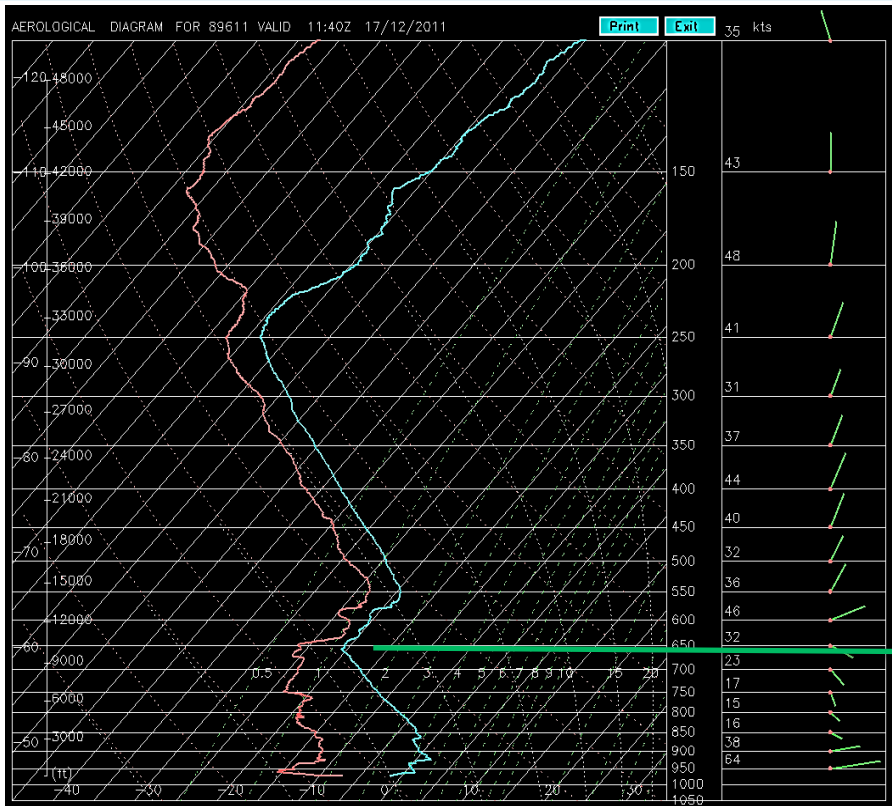
CASEY Time Series
Model: AMPS WRF (high resolution)
Run: Sat 17 Dec 00Z



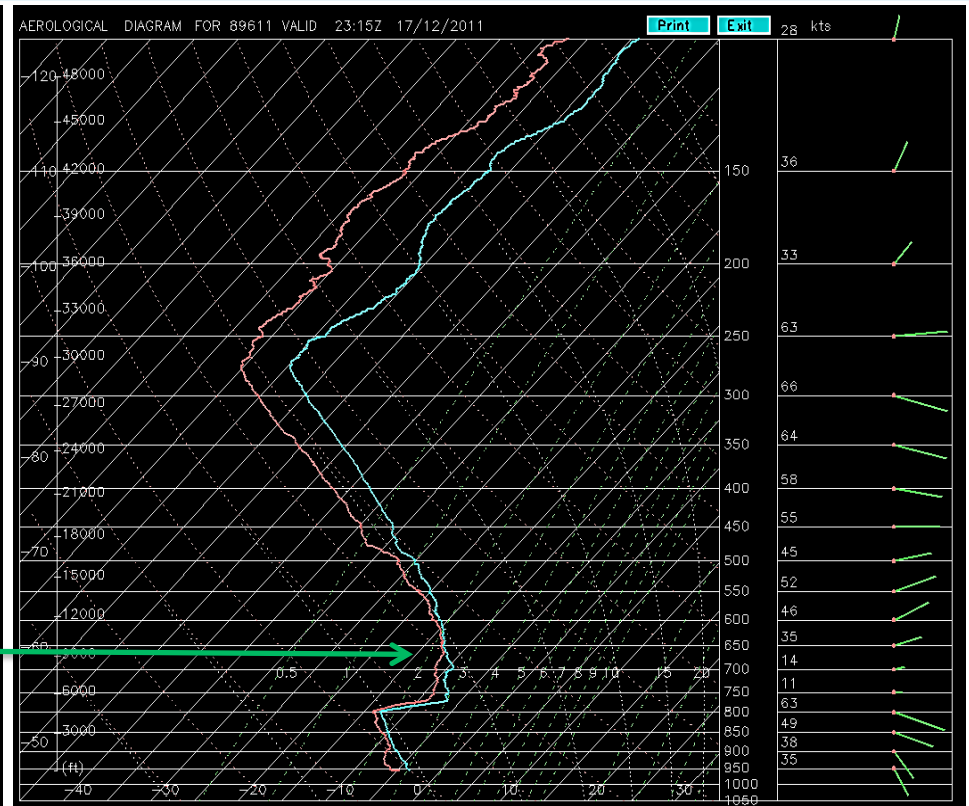


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Pre-storm and post-storm



17th Dec 11z



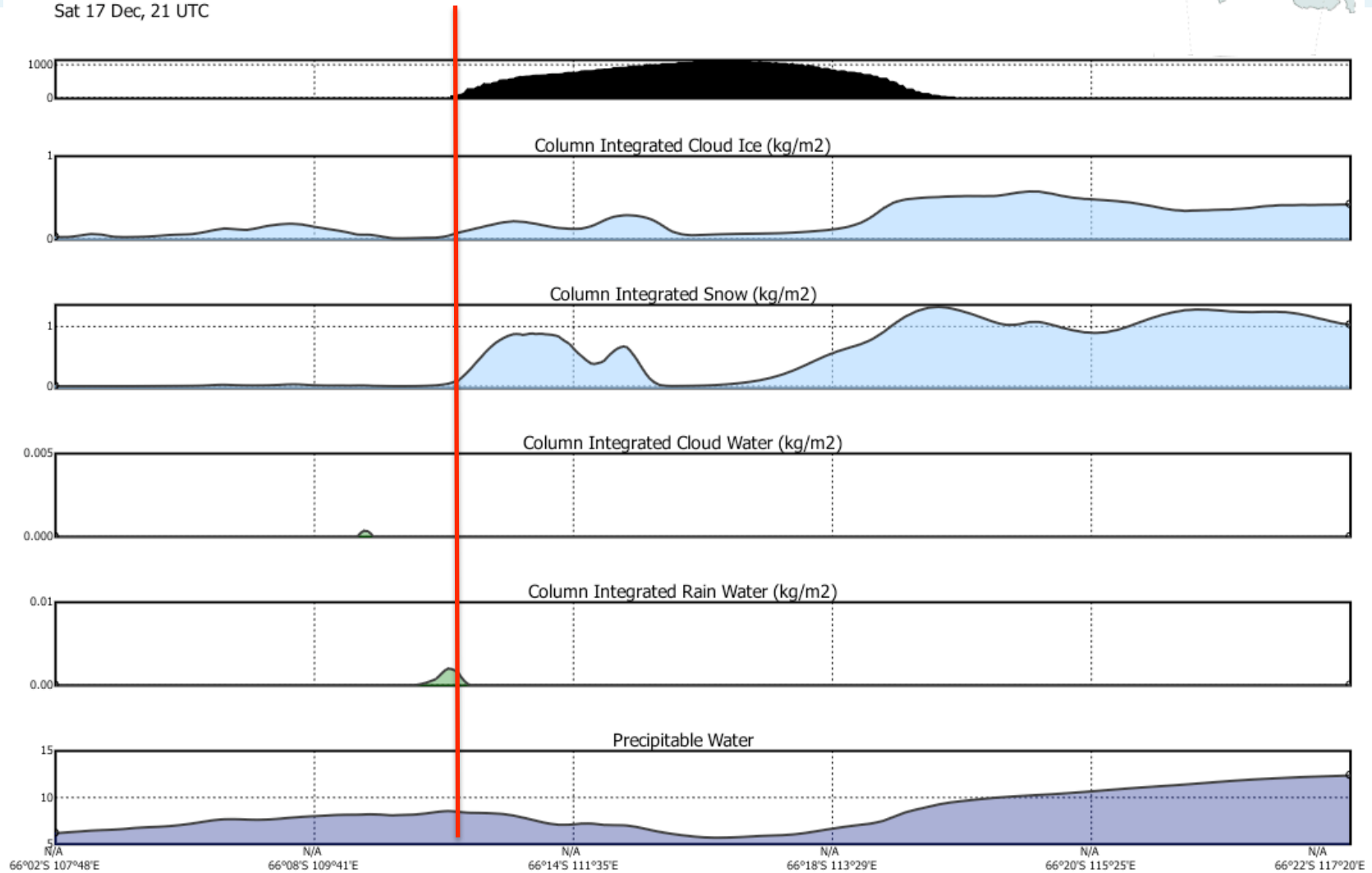
17th Dec 23z



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Column integrated phase composition

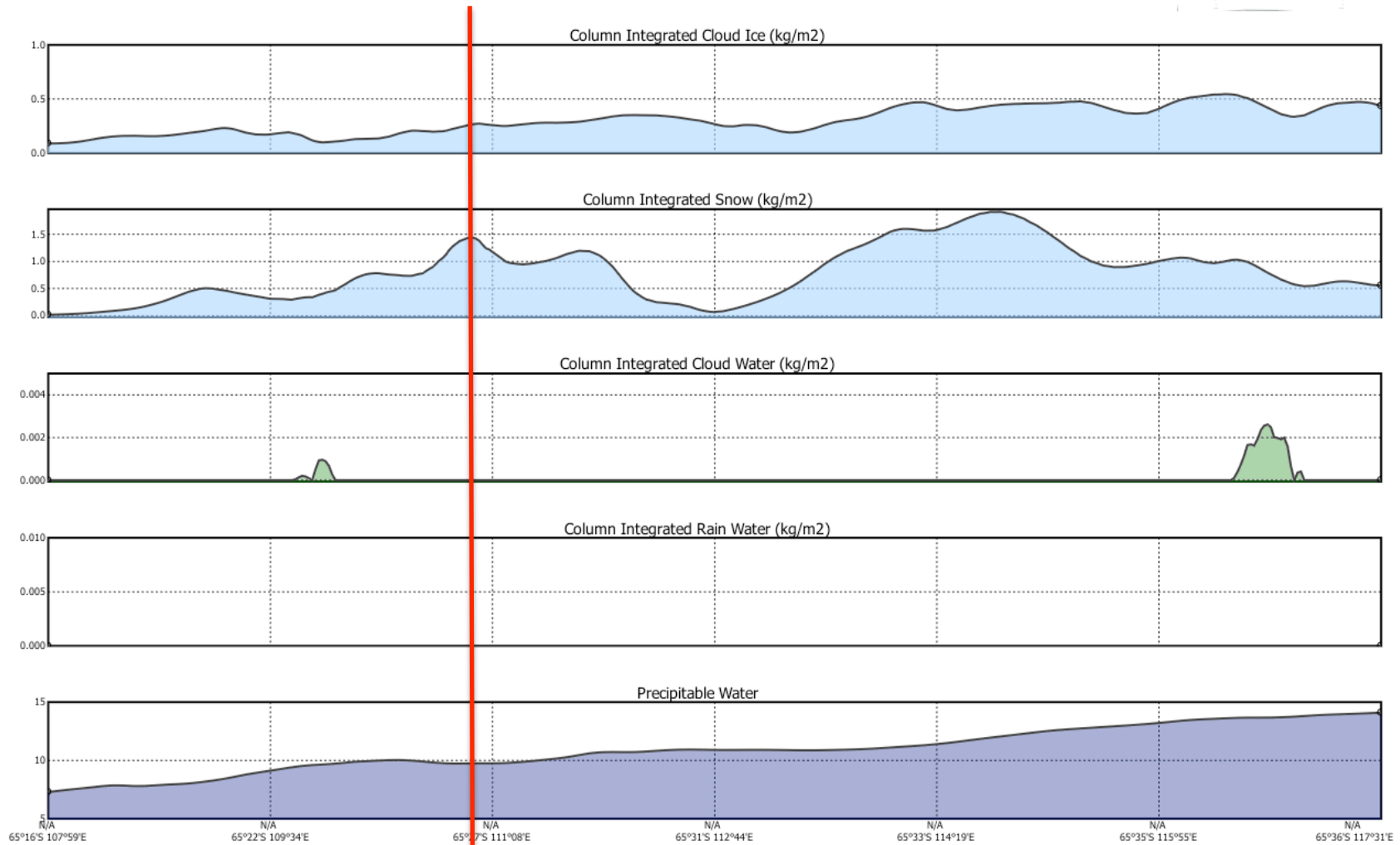
Phase Composition
AMPS WRF (high resolution)
Sat 17 Dec, 21 UTC





Column integrated phase composition

Phase Composition
AMPS WRF (high resolution)
Sat 17 Dec, 21 UTC

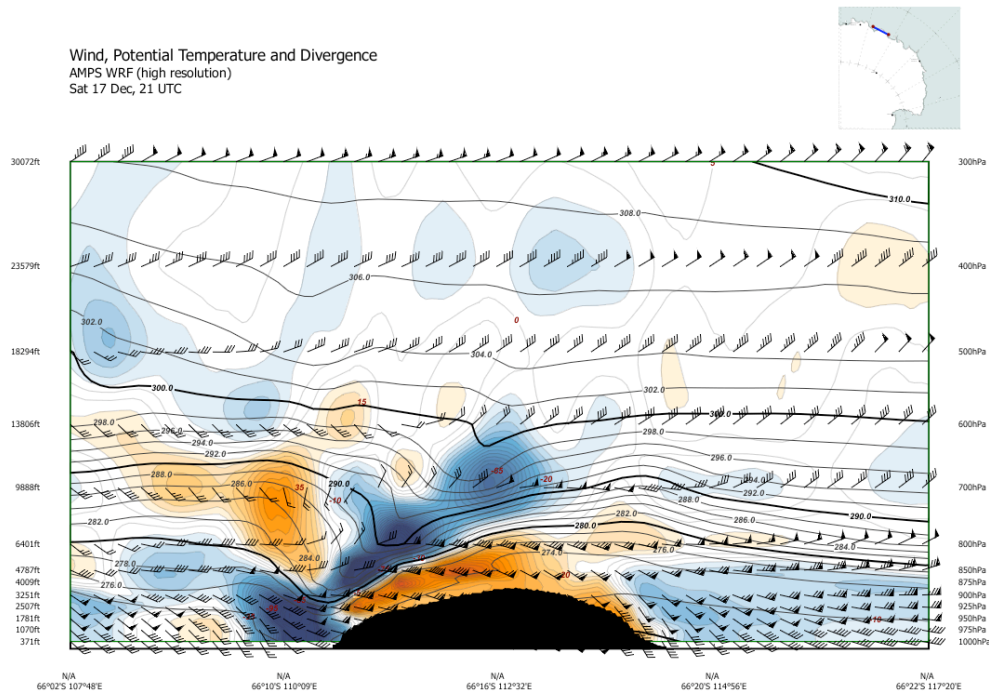




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Casey downslope windstorms

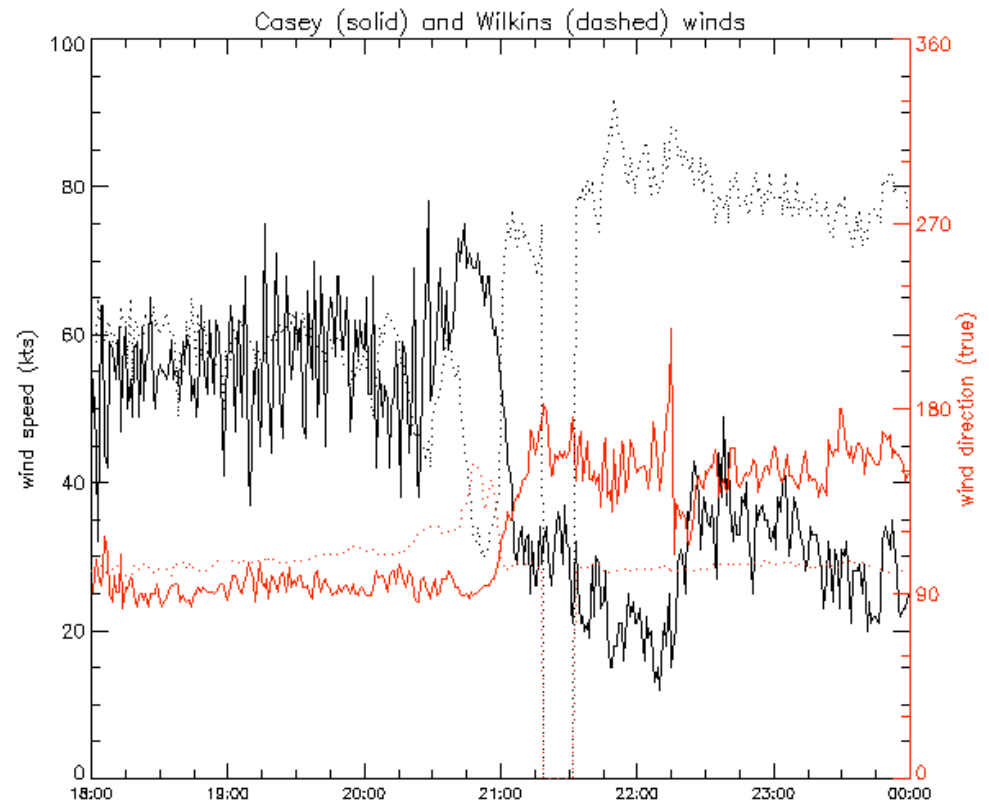
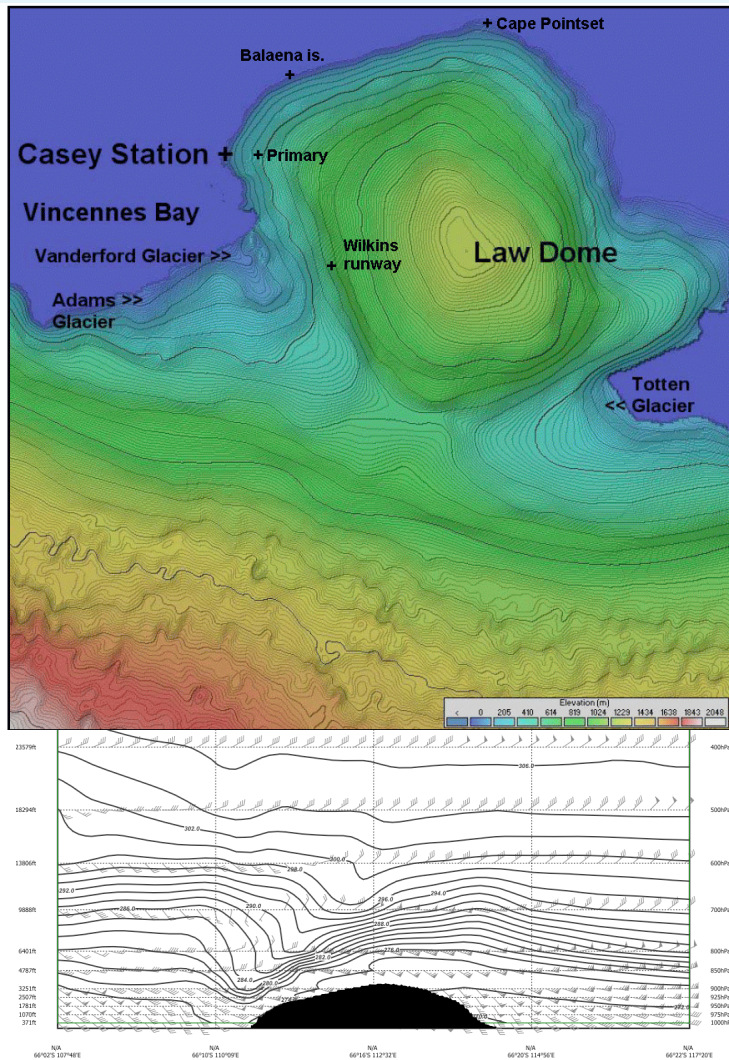
Wind, Potential Temperature and Divergence
AMPS WRF (high resolution)
Sat 17 Dec, 21 UTC





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Casey and Wilkins 1 minute data

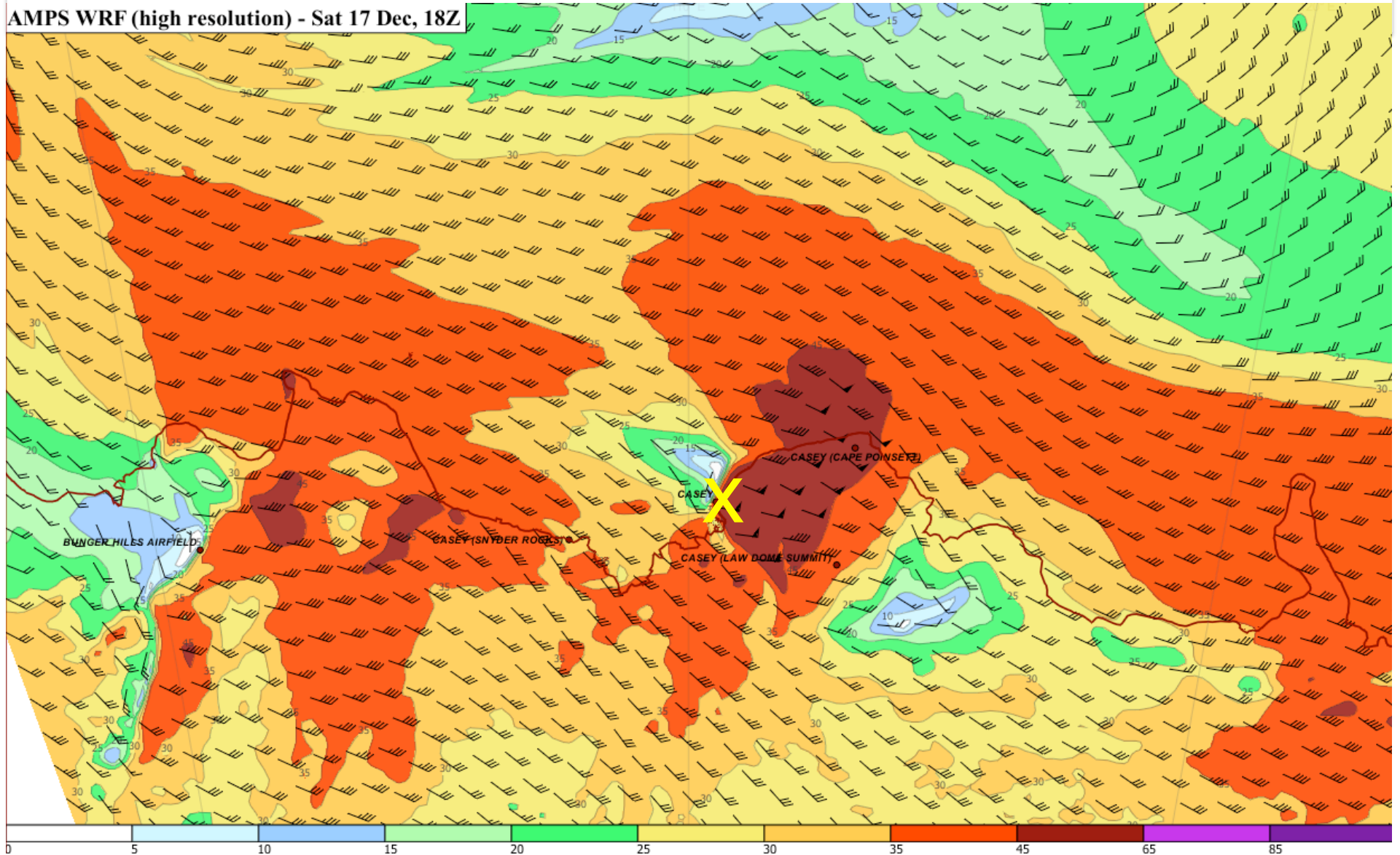




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10m Winds (18Z)

AMPS WRF (high resolution) - Sat 17 Dec, 18Z



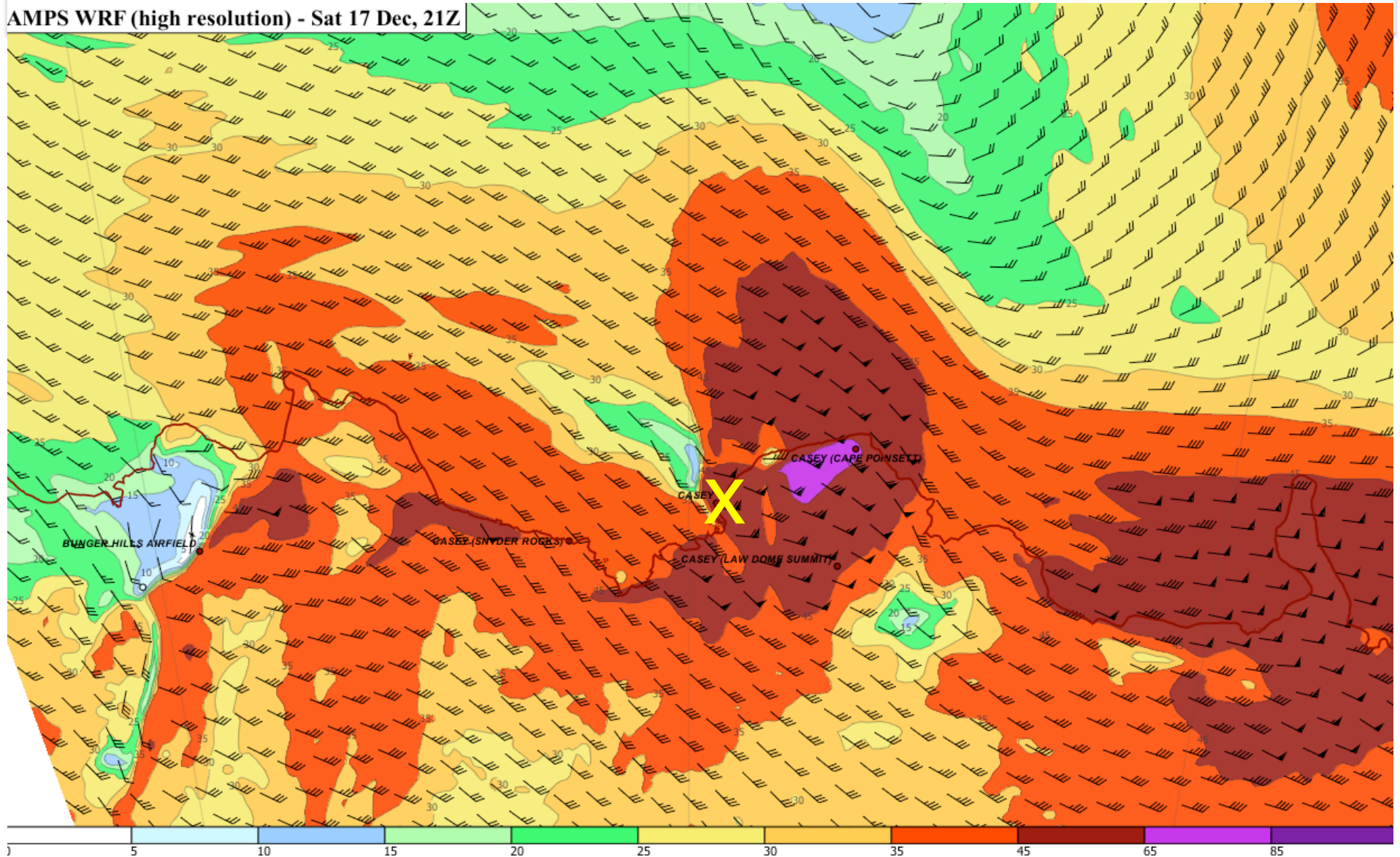
0 5 10 15 20 25 30 35 45 65 85



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10m Winds (21Z)

AMPS WRF (high resolution) - Sat 17 Dec, 21Z



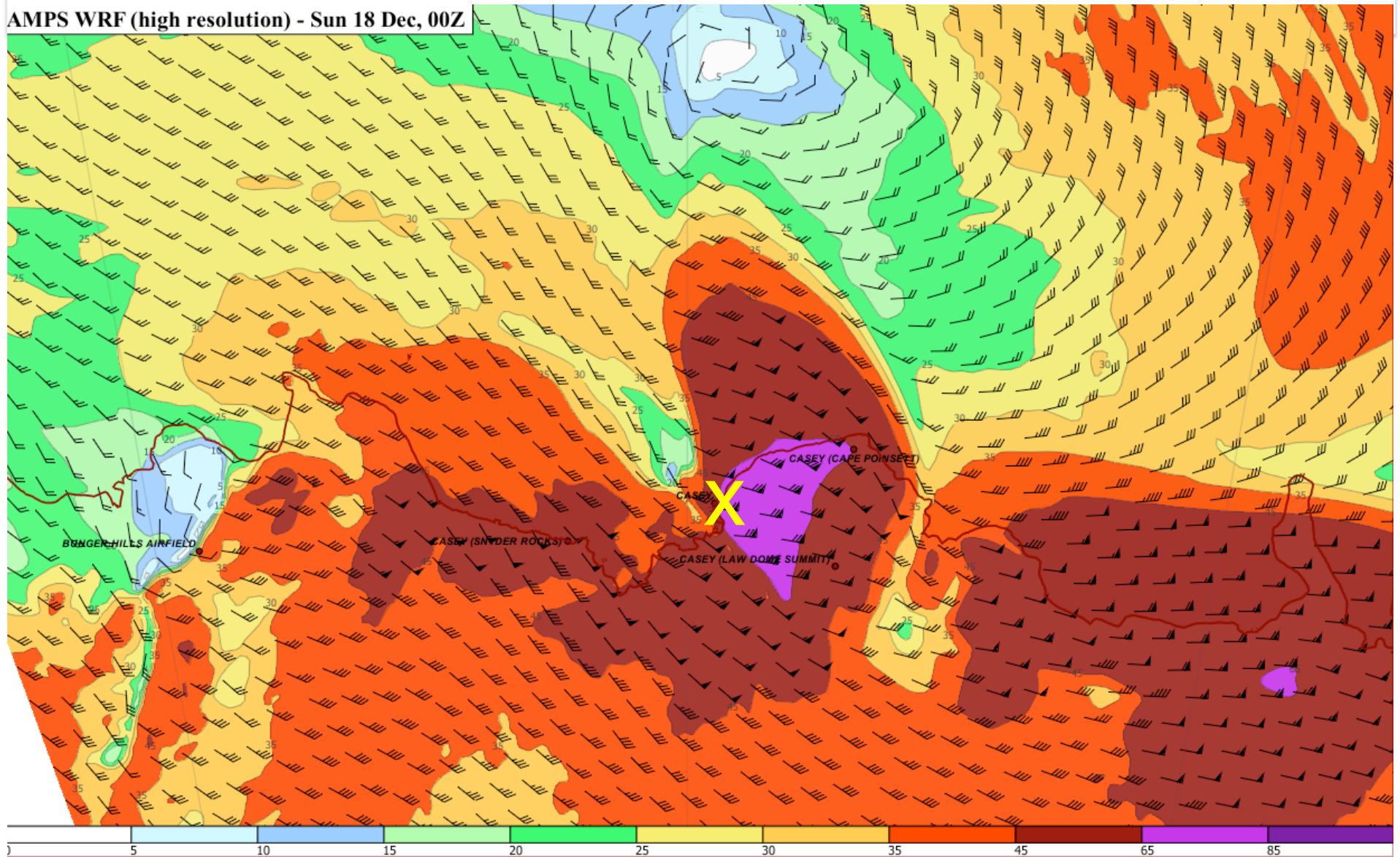
0 5 10 15 20 25 30 35 45 65 85



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10m Winds (00Z)

AMPS WRF (high resolution) - Sun 18 Dec, 00Z



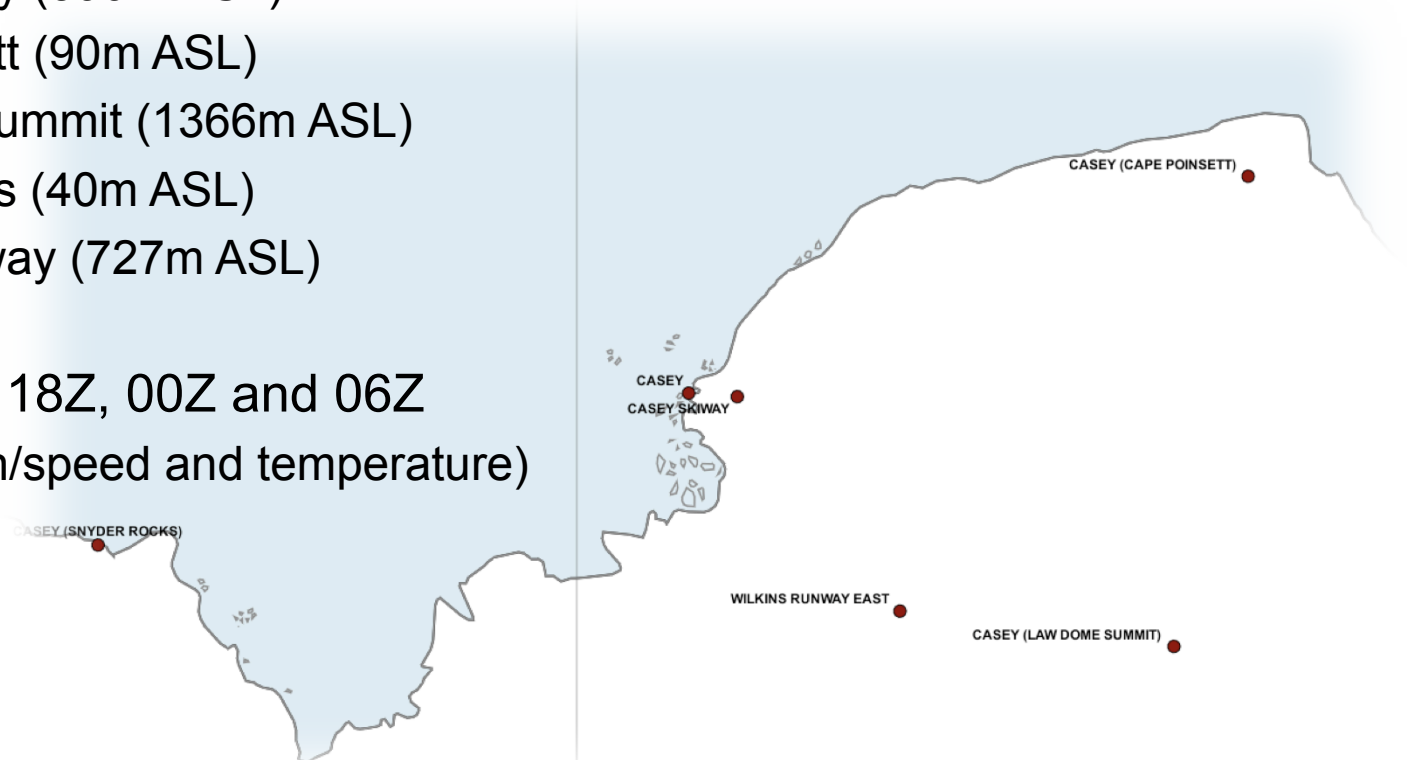


Comparison of NWP with Observations

AWS at and nearby Casey Station

- Casey Station (40m ASL)
- Casey Skiway (390m ASL)
- Cape Poinsett (90m ASL)
- Law Dome Summit (1366m ASL)
- Snyder Rocks (40m ASL)
- Wilkins Runway (727m ASL)

Observations at 18Z, 00Z and 06Z
(Wind direction/speed and temperature)





Comparison of NWP with Observations

		18Z		00Z		06Z	
		NWP	OBS	NWP	OBS	NWP	OBS
Casey	wind_dir (°)	104	92	98	152	53	41
	wind_spd (kts)	51	45	61	23	49	47
	T (°C)	-2.3	-1.4	-2.2	-3.3	-0.9	-0.6
Law Dome Summit	wind_dir (°)	103	70	102		62	30
	wind_spd (kts)	37	33	56		43	44.9
	T (°C)	-14.2	-14.5	-11.6	-14.5	-6	-10.2
Cape Poinsette	wind_dir (°)	127	40	139	40	69	40
	wind_spd (kts)	53	57.9	65	43	29	18.1
	T (°C)	-5.8	-4.9	-4.8	-2.6	0	-1.7
Wilkins Runway East	wind_dir (°)	95	102	95	102	65	56
	wind_spd (kts)	47	58.9	73	77.9	51	44.9
	T (°C)	-11	-9.1	-8.9	-8.1	-3.8	-3.7
Casey Skiway South	wind_dir (°)	105	109	98	99	60	52
	wind_spd (kts)	53	49	69	83	53	48
	T (°C)	-6.5	-5.7	-6.2	-5.2	-1.6	-1.5
Snyder Rocks	wind_dir (°)	141	150	145	180	126	140
	wind_spd (kts)	34	36.9	52	44.9	45	34
	T (°C)	-5.3	-2.3	-3.4	-4.1	-1	-1.1



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Comparison of NWP with Observations

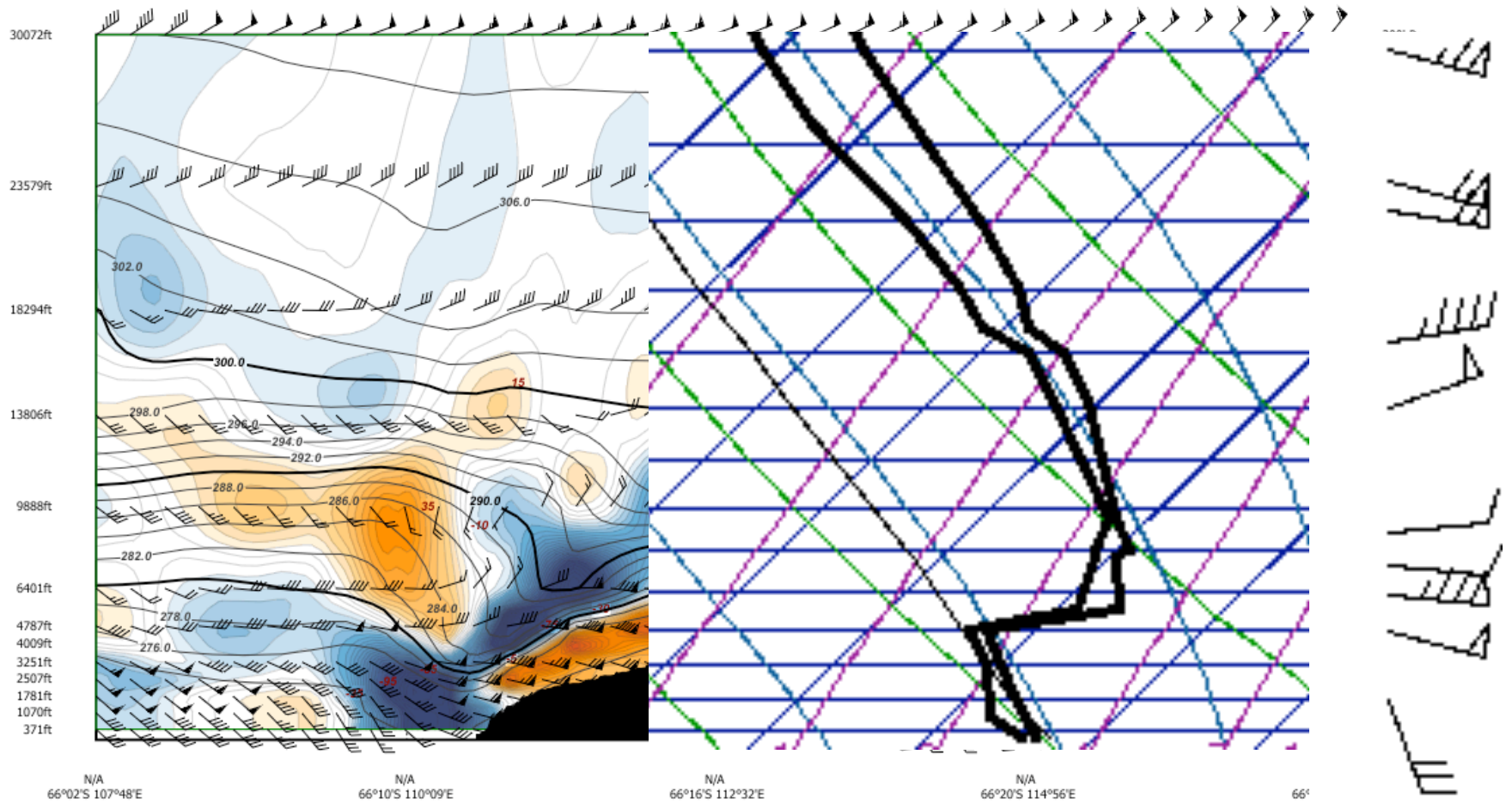
		18Z		00Z		06Z	
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Horizontal Cross-Section (21Z)

Wind, Potential Temperature and Divergence
AMPS WRF (high resolution)
Sat 17 Dec, 21 UTC





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Thank-You



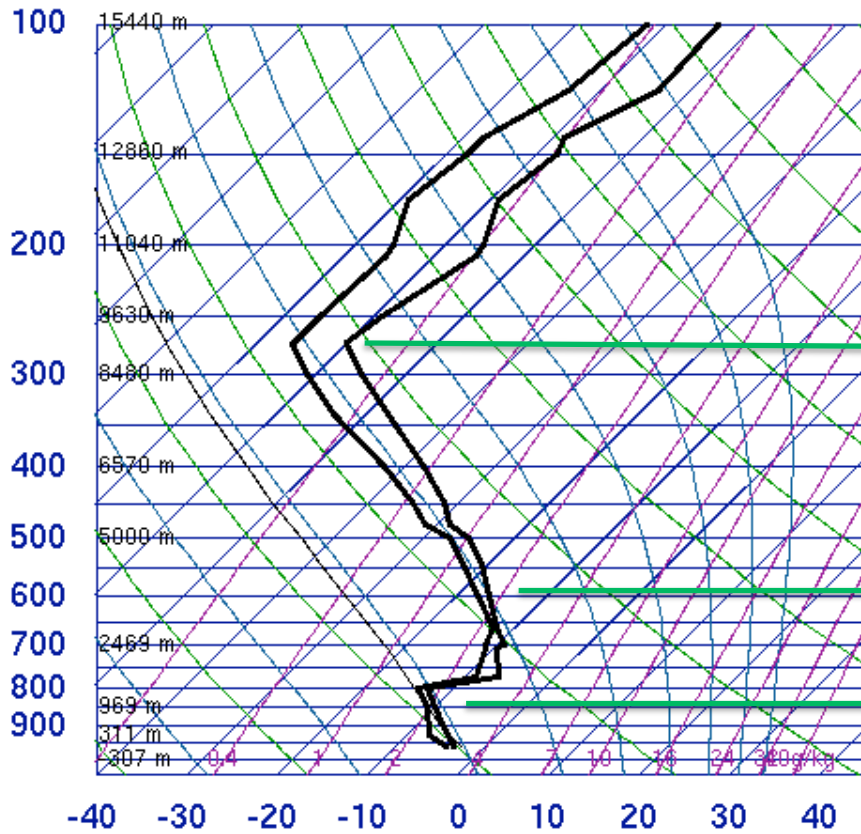
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s.carpentier@bom.gov.au



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23Z sonde and vertical velocities

89611 Casey



00Z 18 Dec 2011

University of Wyoming

