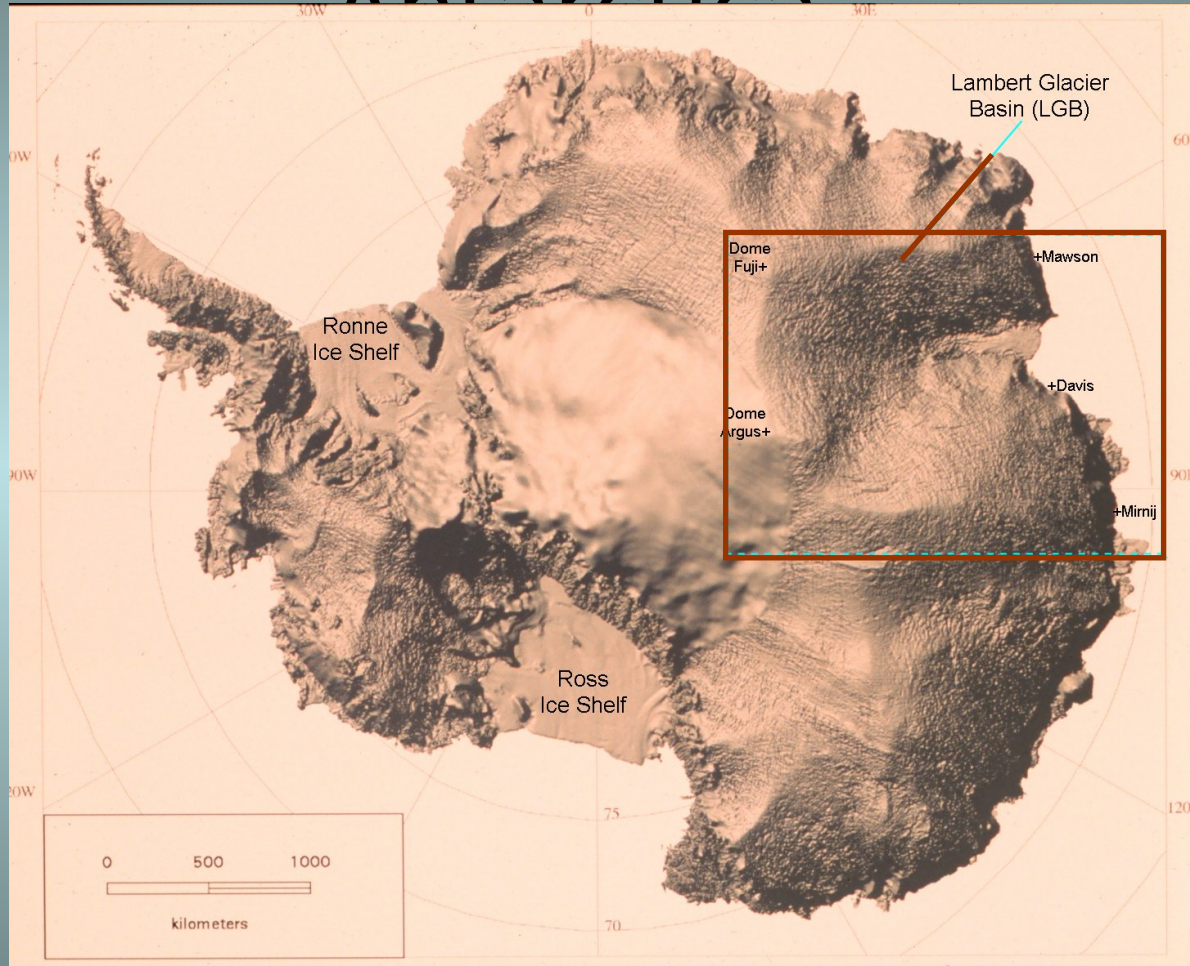


# Lambert Glacier Basin Outflow across the Amery Ice Shelf, East Antarctica



Scott Carpentier

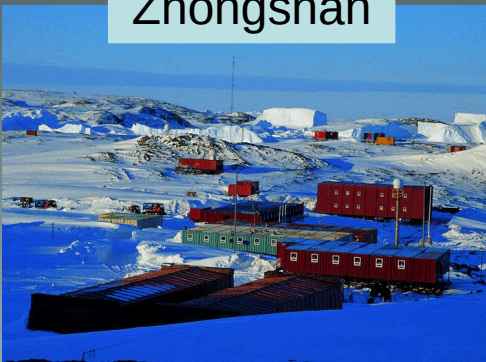
Forecaster, Tasmania/Antarctica  
Region

June 2011

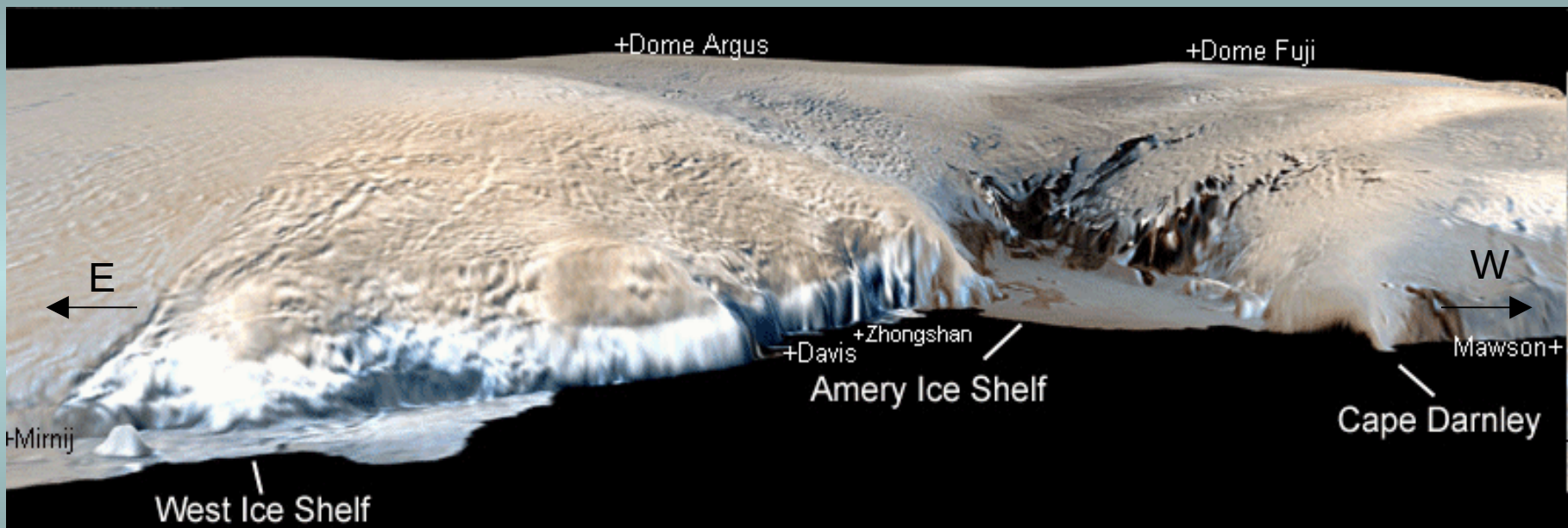


**Australian Government**  
**Bureau of Meteorology**

Zhongshan



Progress



Davis

Photo: D. McVeigh



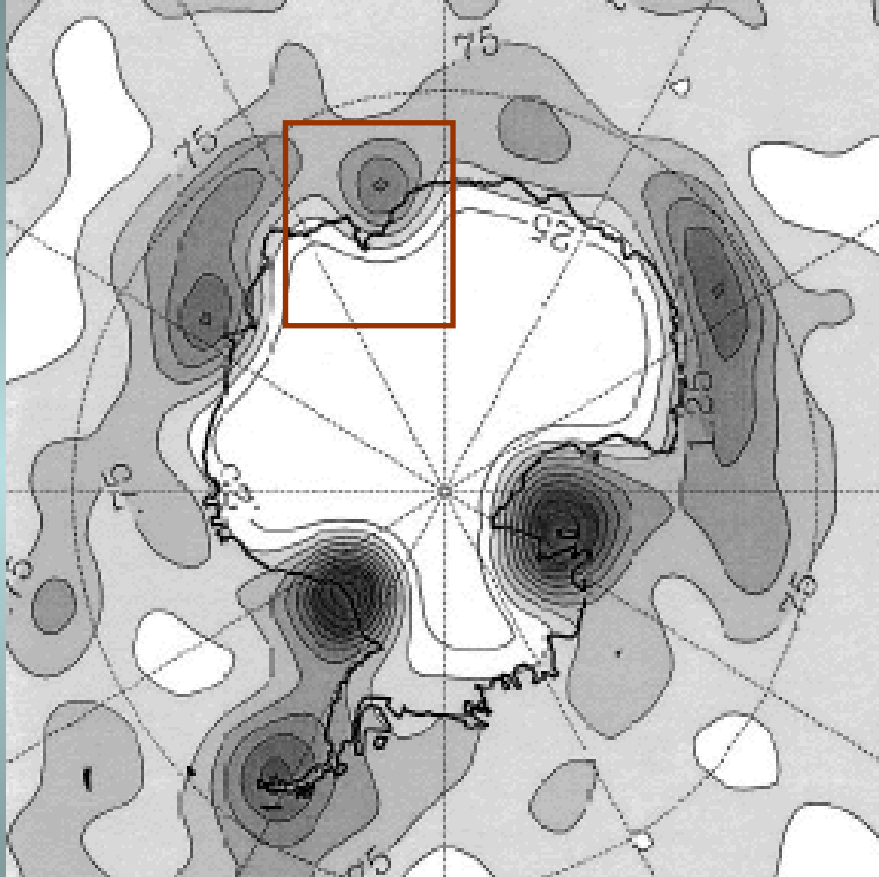
Mawson



Photo: D. Dowe

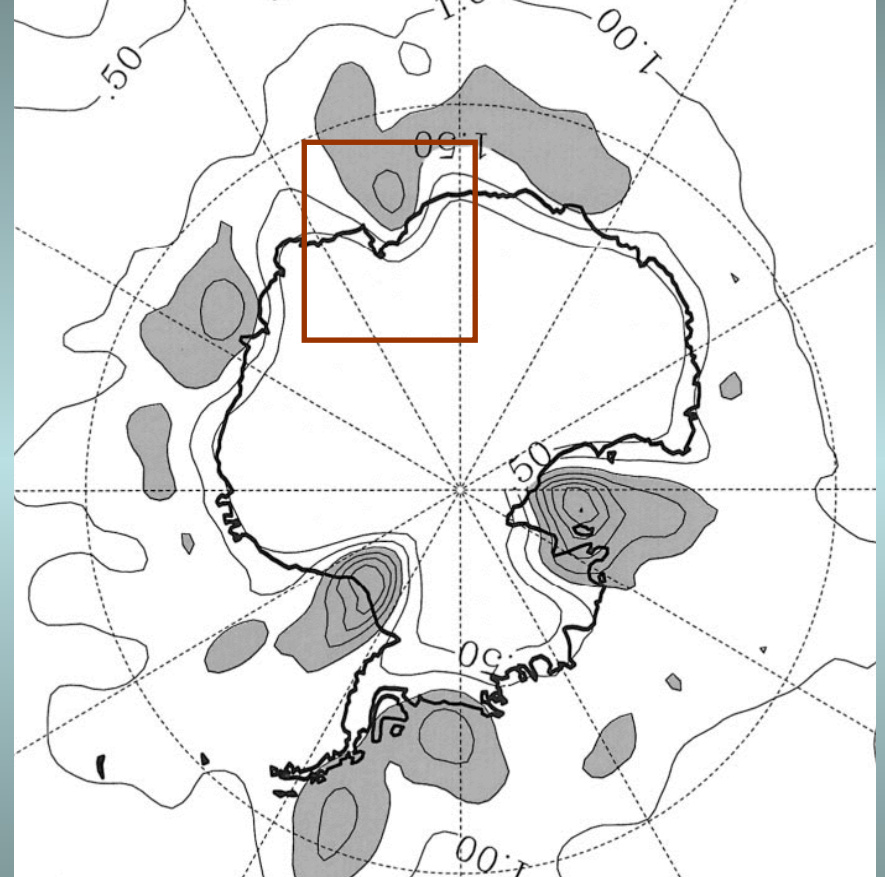


## Cyclogenesis density



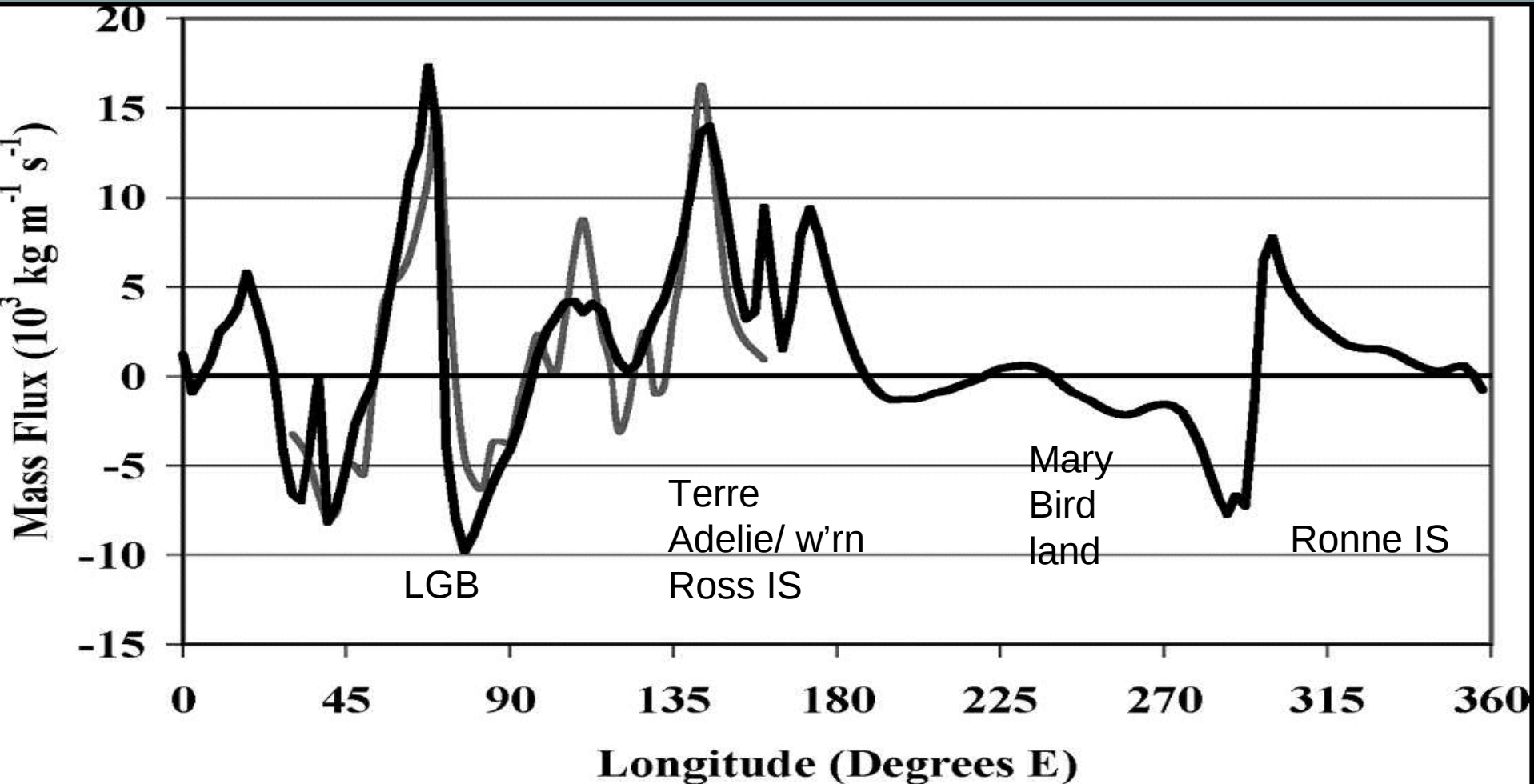
Winter: JJA

## Interannual variability (st dev)



Winter: JJA

Mean meridional mass flux (northward is positive) in lowest 1500 m AGL at 67.5°S (thin line) and 70°S (thick line) from the June 2003–May 2004 AMPS archive.





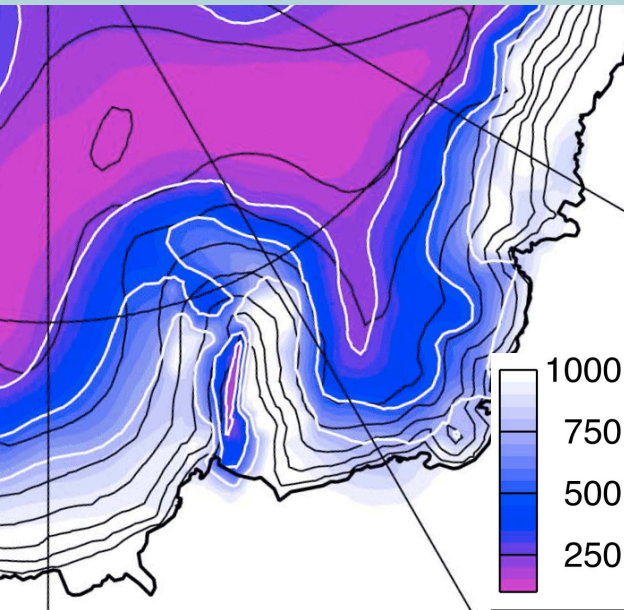
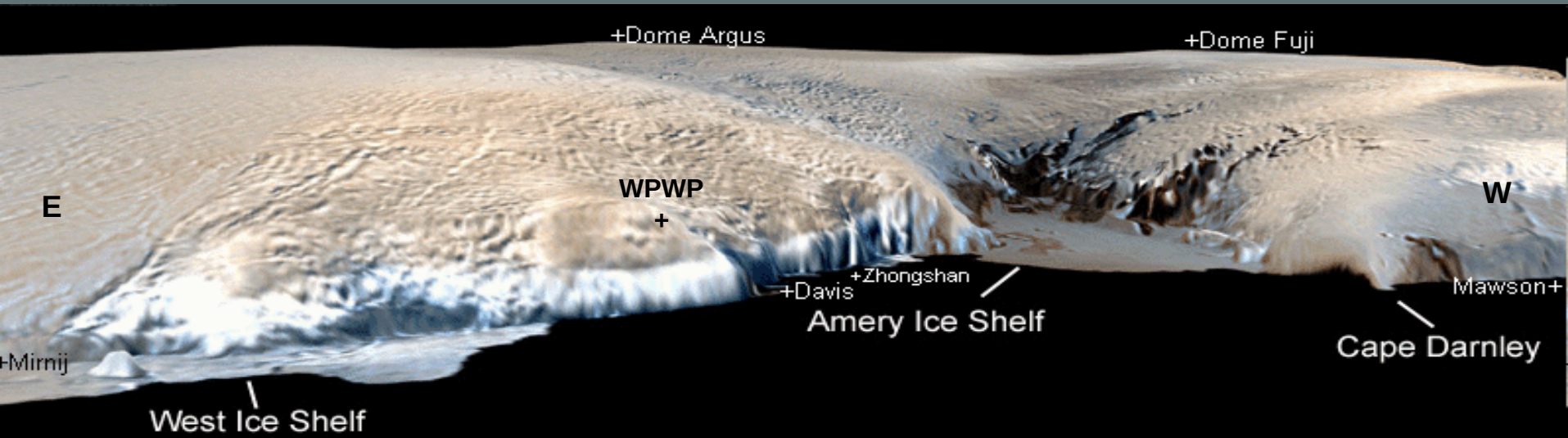
# Sea Ice Factory at Cape Darnley and Mackenzie Bay

**Table 1.** Mean Values of Annual Cumulative Sea-Ice Production for the Major 13 Antarctic Coastal Polynyas with their Standard Deviations and Trends<sup>a</sup>

Polynya	Ice Production, km <sup>3</sup>	Trend, km <sup>3</sup> /10yr
Ross	390 ± 59	-85
Darnley	181 ± 19	-13
Mertz	120 ± 11	+27
Shackleton	110 ± 14	+11
Amundsen	92.0 ± 16	-16
Weddell	84.6 ± 25	-30
Barrier	80.0 ± 19	+44
Dibble	75.5 ± 11	+19
Vincennes	73.3 ± 9.9	+7.7
Mackenzie	68.2 ± 5.8	-7.8
Terra Nova	59.2 ± 10	-3.7
Dalton	42.6 ± 6.7	+1.7
Bellingshausen	33.7 ± 6.1	-7.7
Total	1410 ± 75	-53

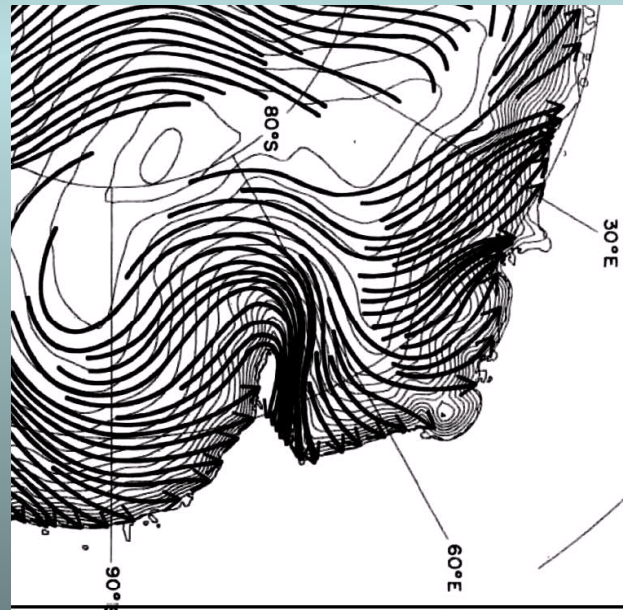
<sup>a</sup>The calculation was performed for 1992–2001 using the ERA-40 data. The locations of the polynyas are indicated in Figure 1.

# Lambert Glacier Basin



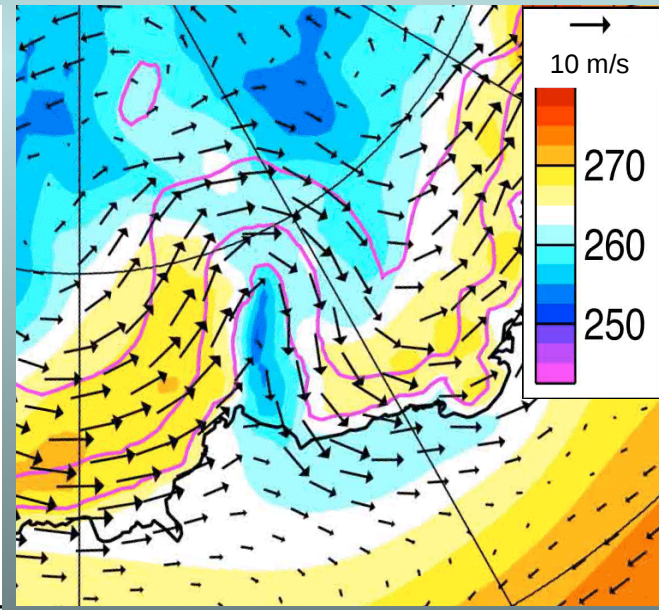
**Average wintertime ABL  
depth in m**

Van de Berg et al 2008



**Mean streamlines at 100 m AGL**

Parish and Bromwich, 2007

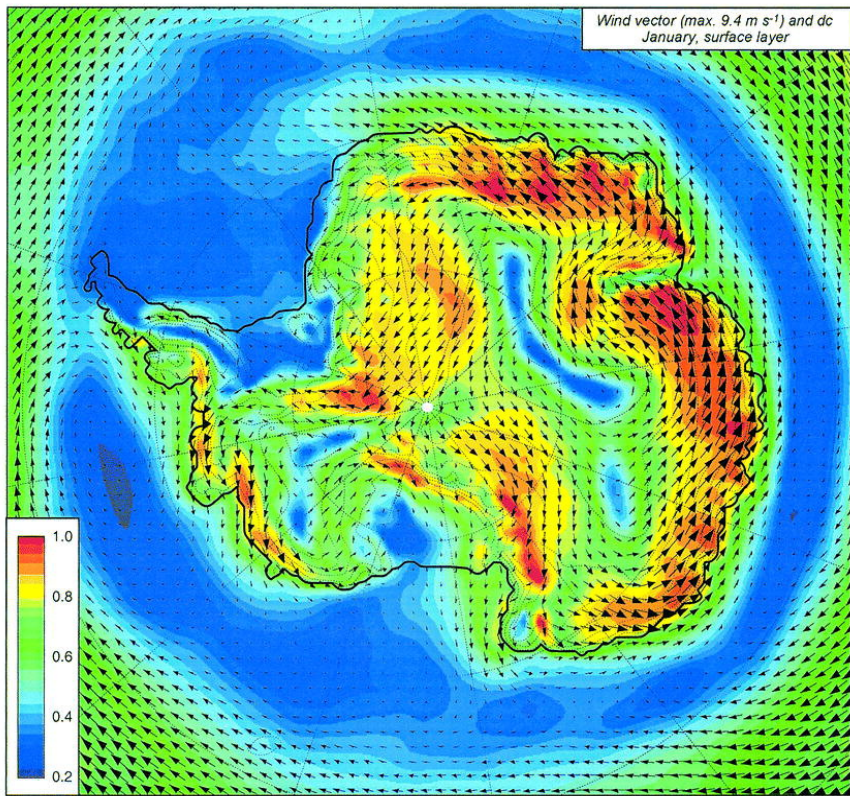


**ABL mean potential  
temperature (K) and wind**

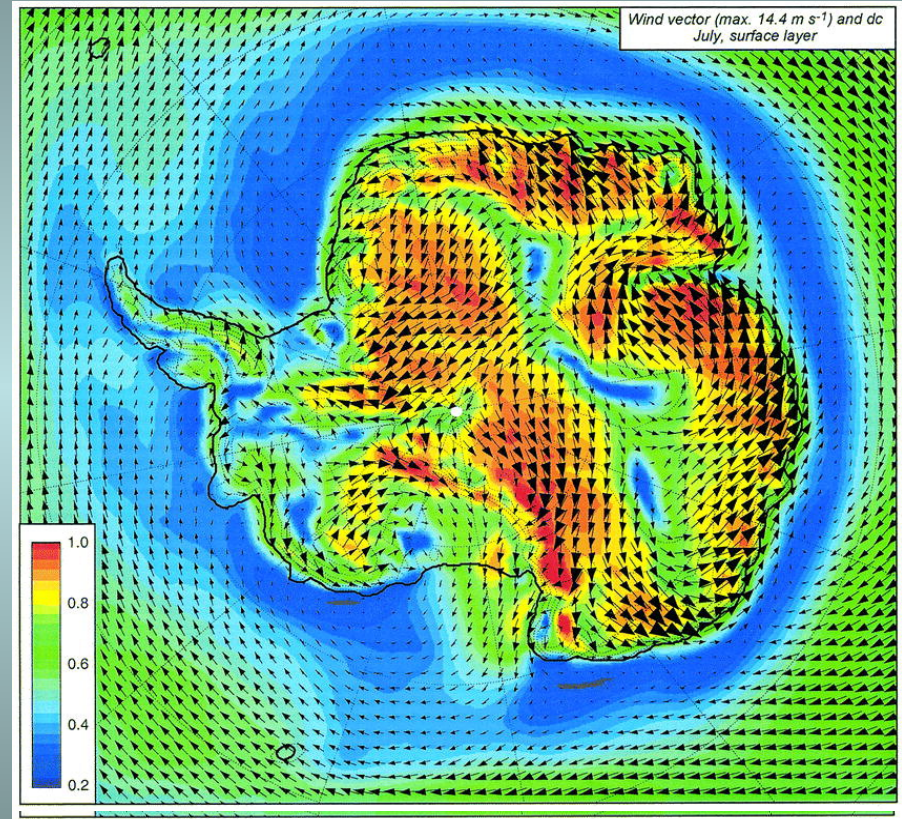
Van de Berg et al 2008



# Wind strength and directional constancy



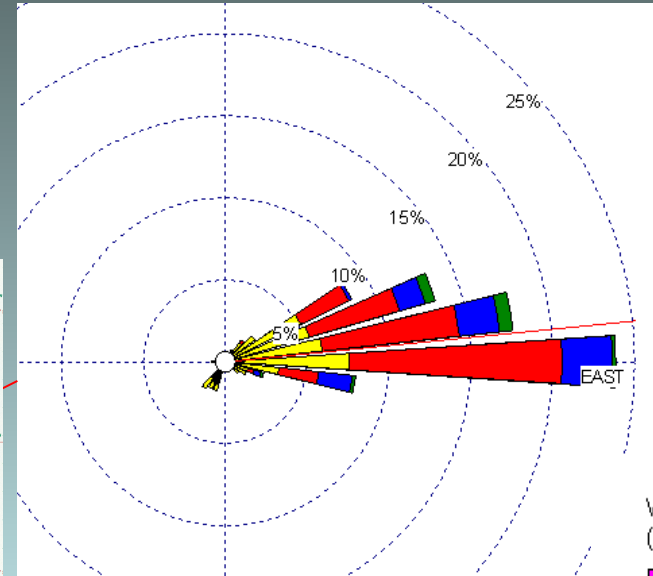
January



July



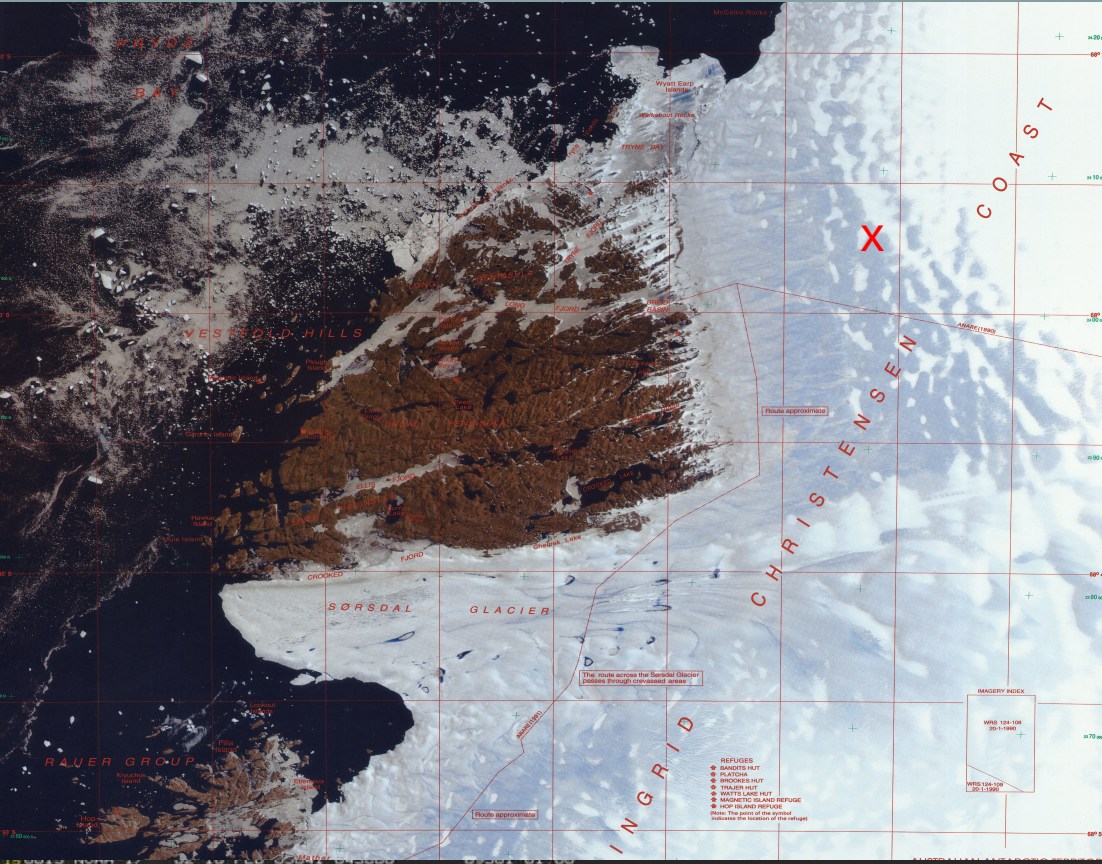
# Whoop Whoop January



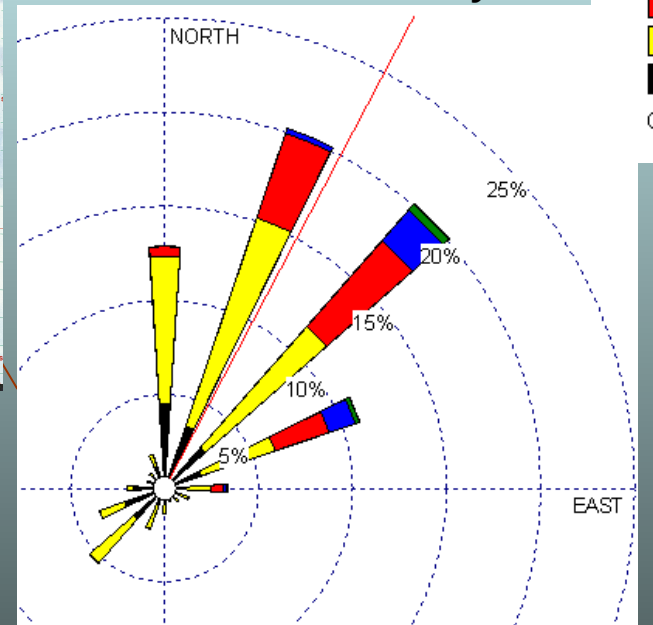
WIND SPEED  
(Knots)

- >= 60
- 45 - 60
- 35 - 45
- 25 - 35
- 15 - 25
- 7 - 15
- 3 - 7

Calms: 6.35%



# Davis January

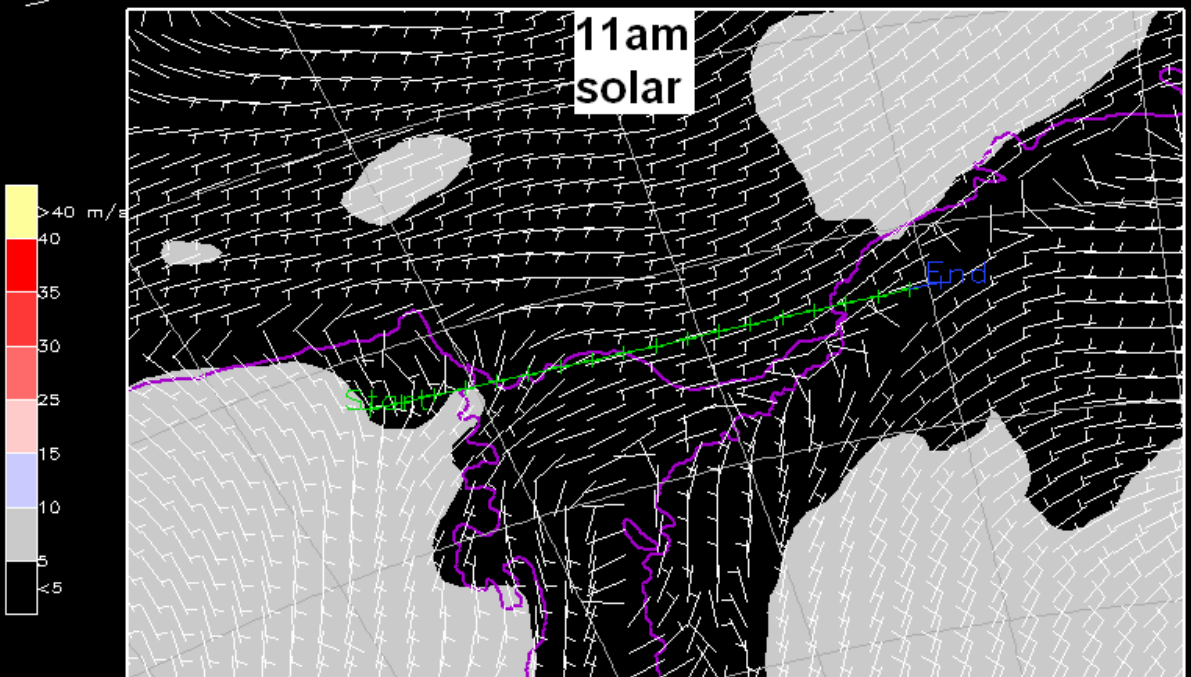
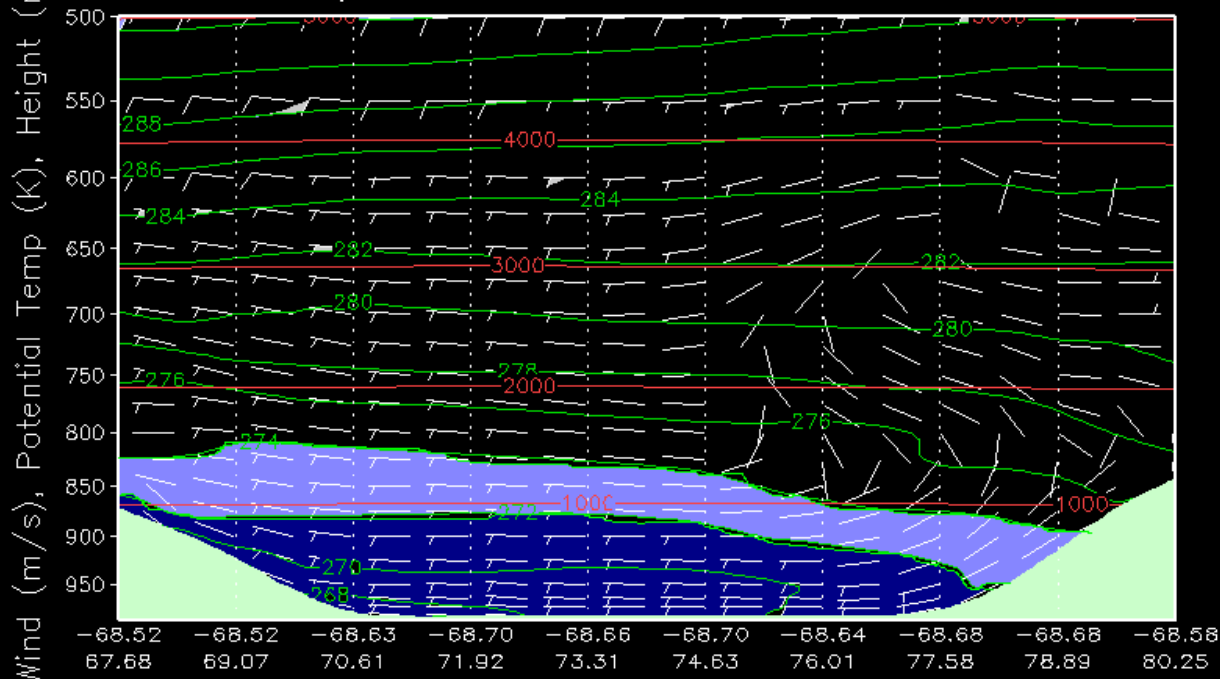


Steaming fog approaching Davis in SW'ly





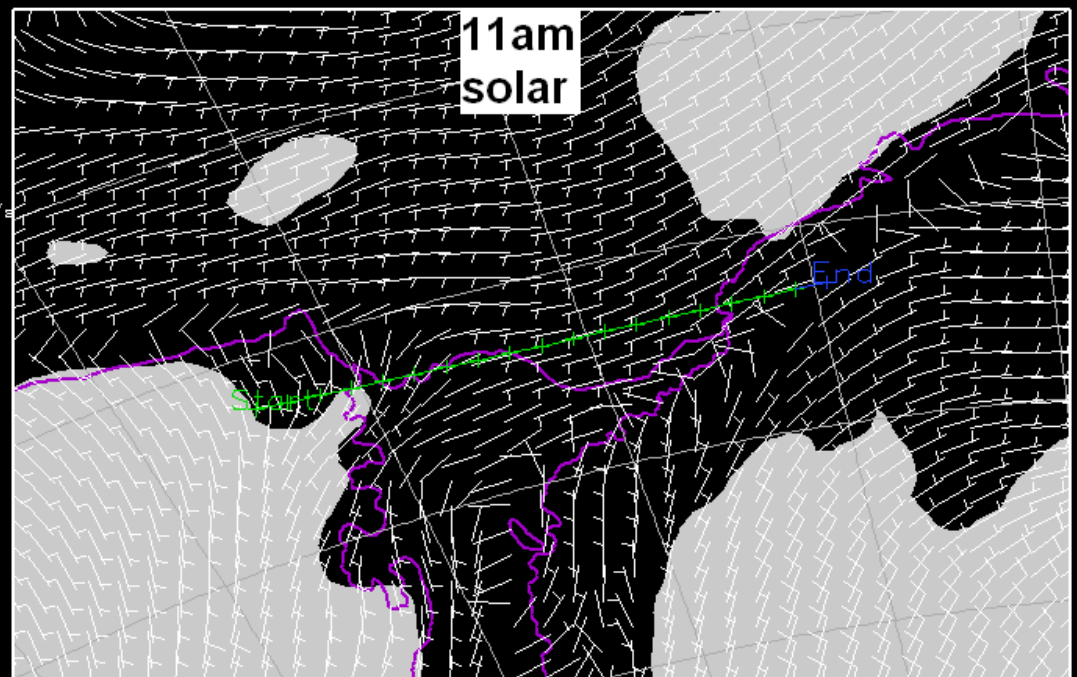
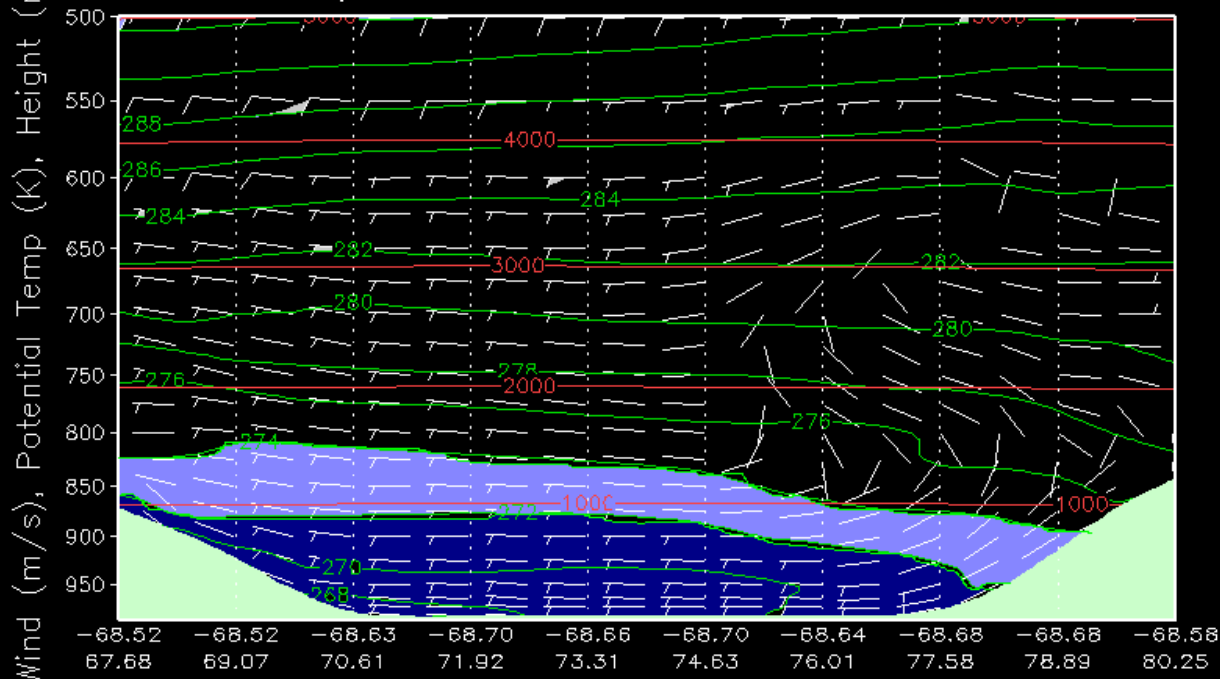
# +042HR polarLAPS Section 06Z 20JAN2008



Near surface wind flow and section track.



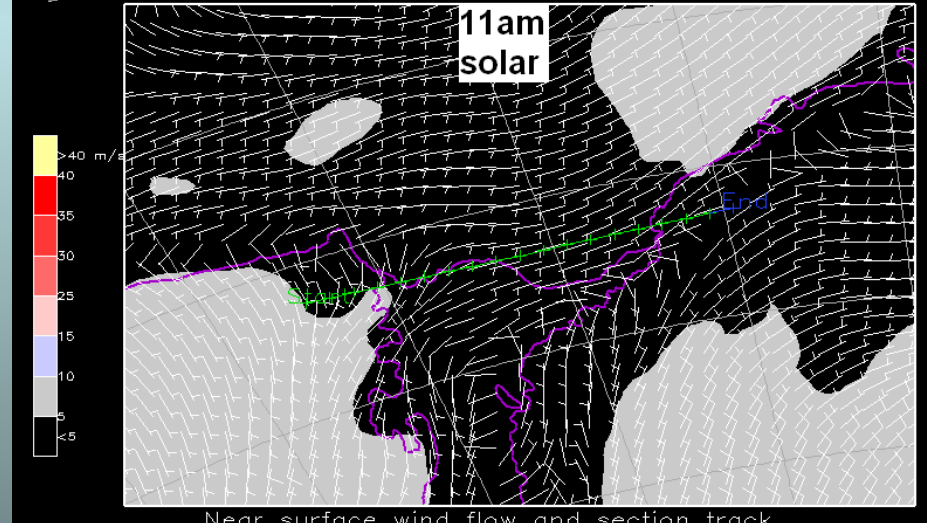
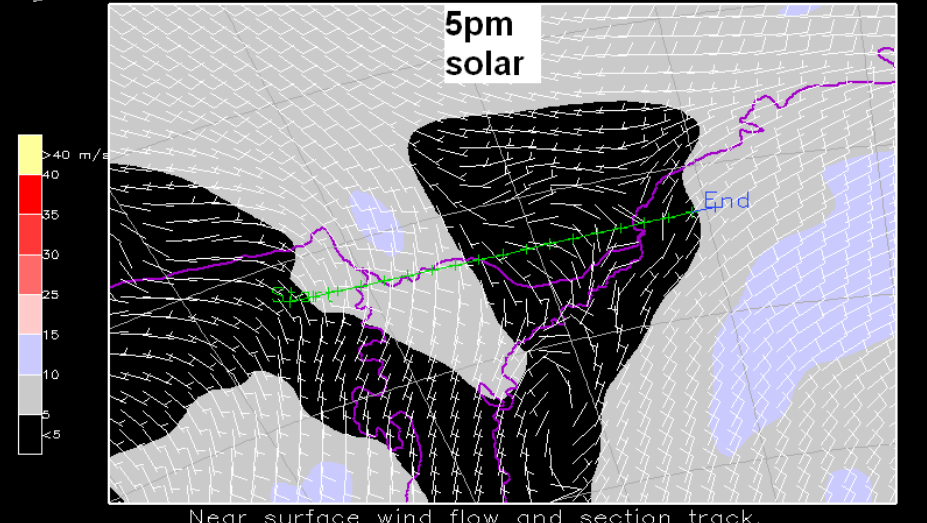
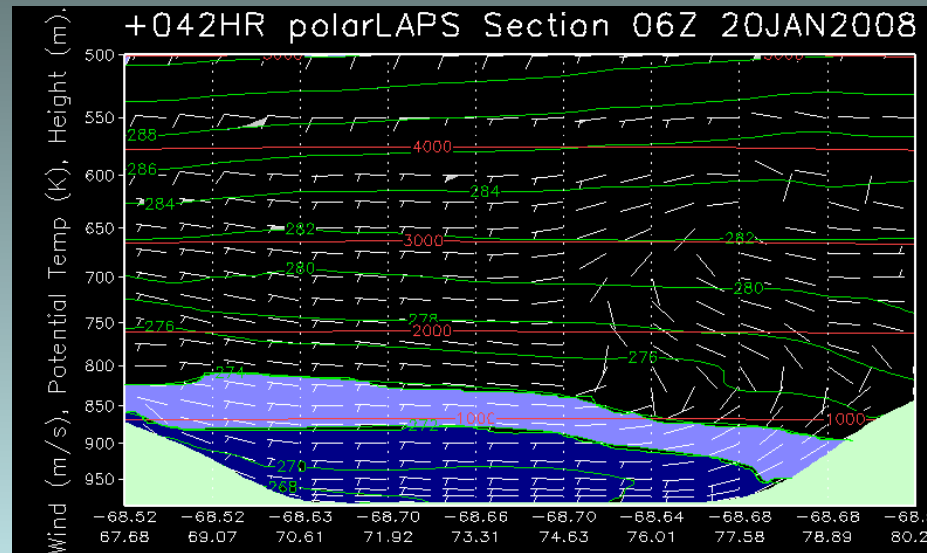
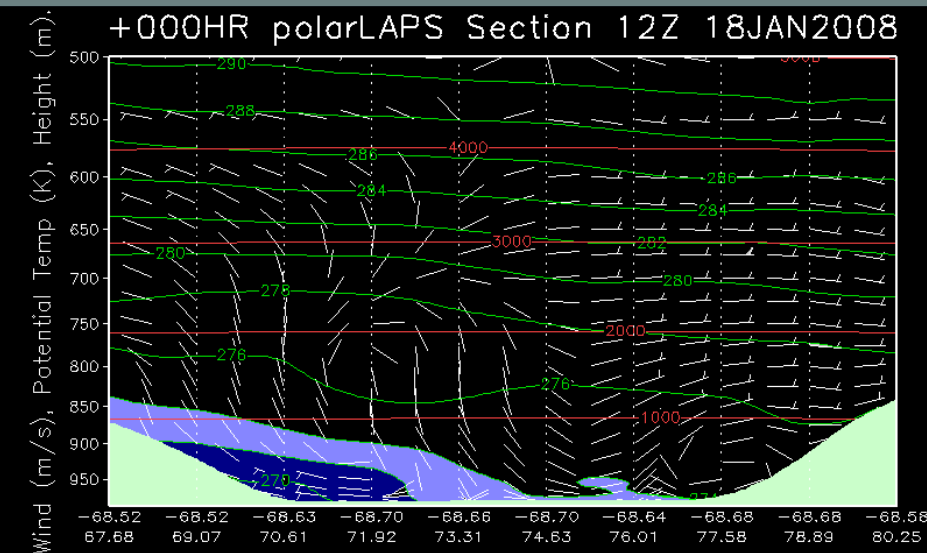
# +042HR polarLAPS Section 06Z 20JAN2008



Near surface wind flow and section track.

# Normal outflow

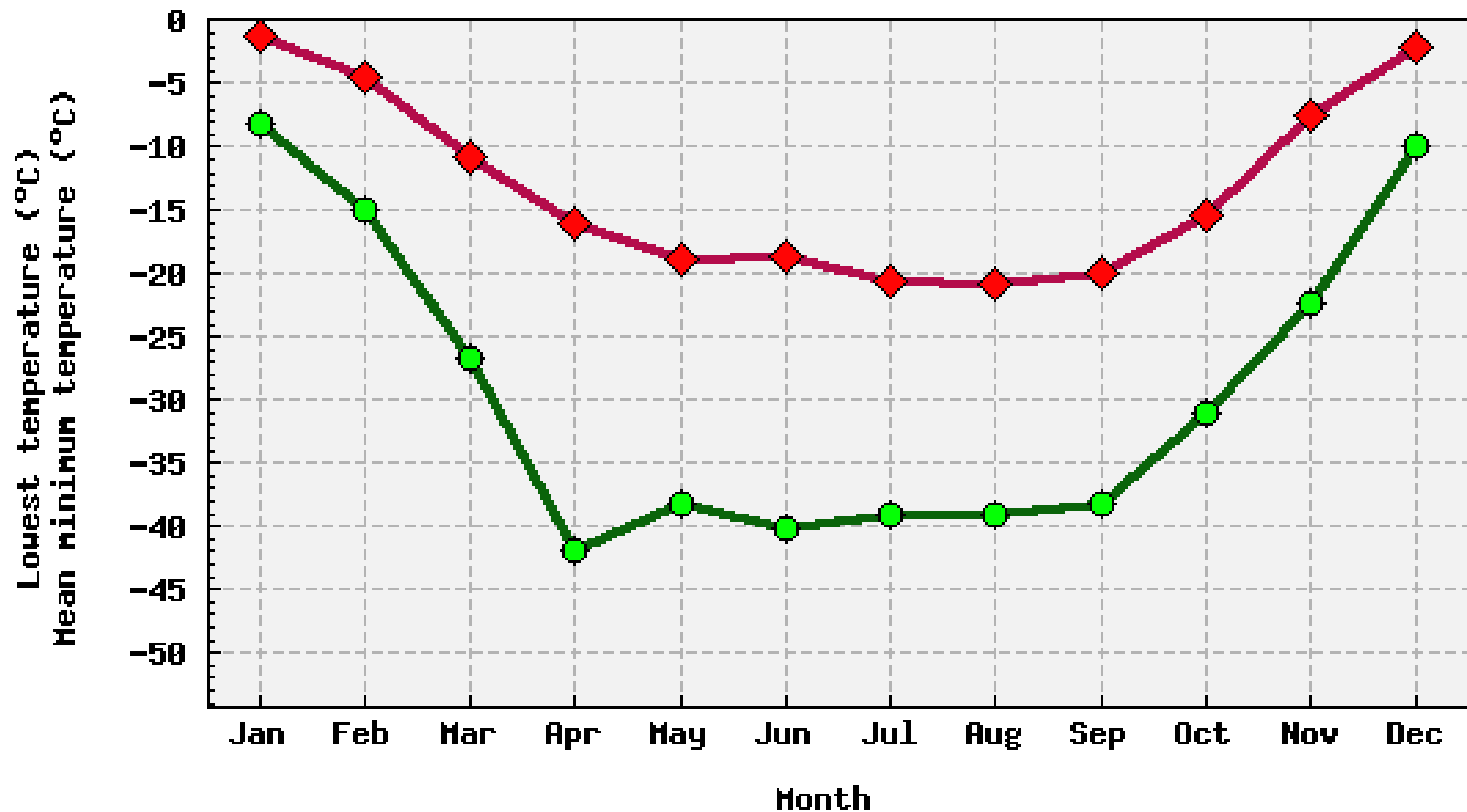
# Blocked outflow



Near surface wind flow and section track.

Near surface wind flow and section track.

# Record cold events at Davis



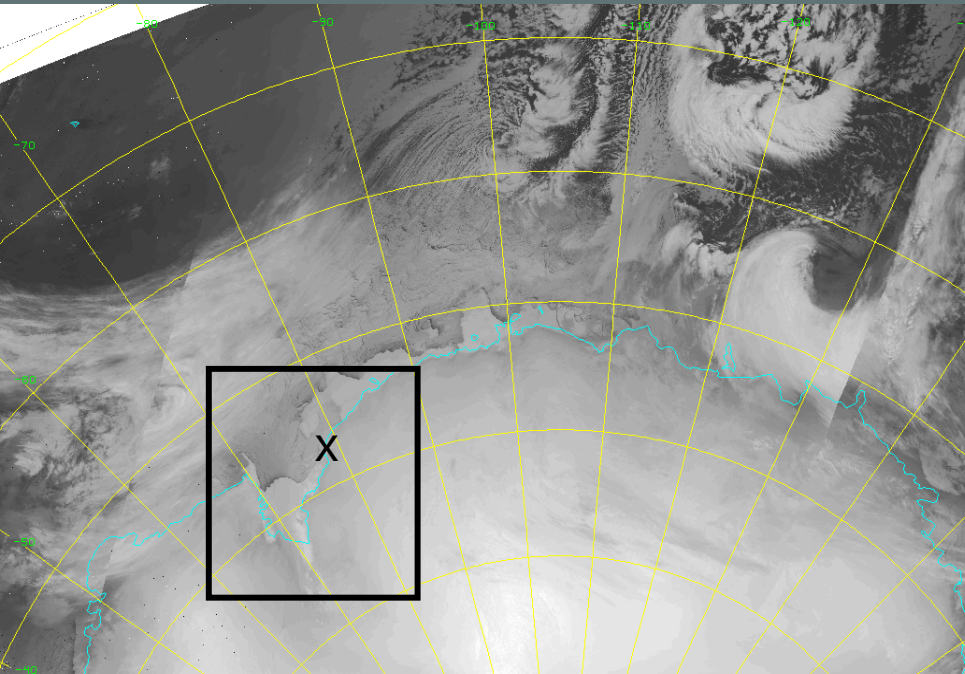
● 300000 Lowest temperature (°C)  
◆ 300000 Mean minimum temperature (°C)



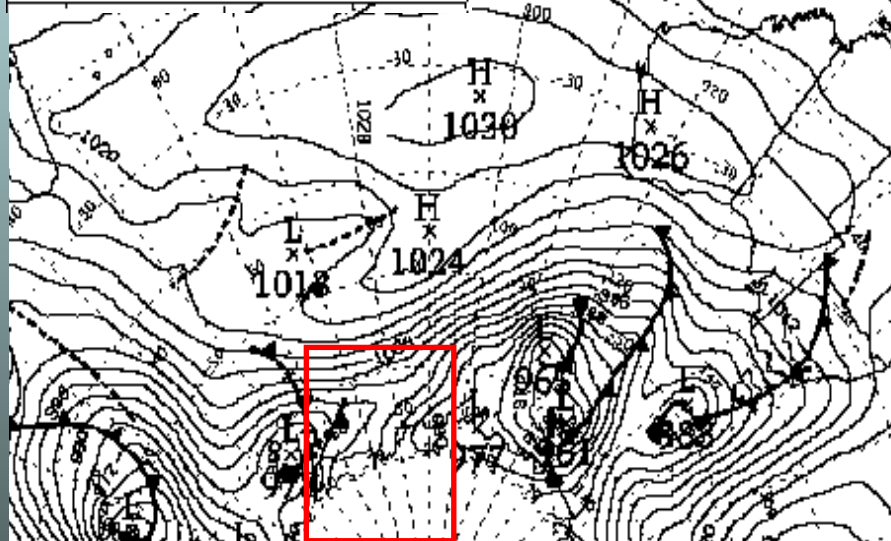
**Australian Government**  
**Bureau of Meteorology**



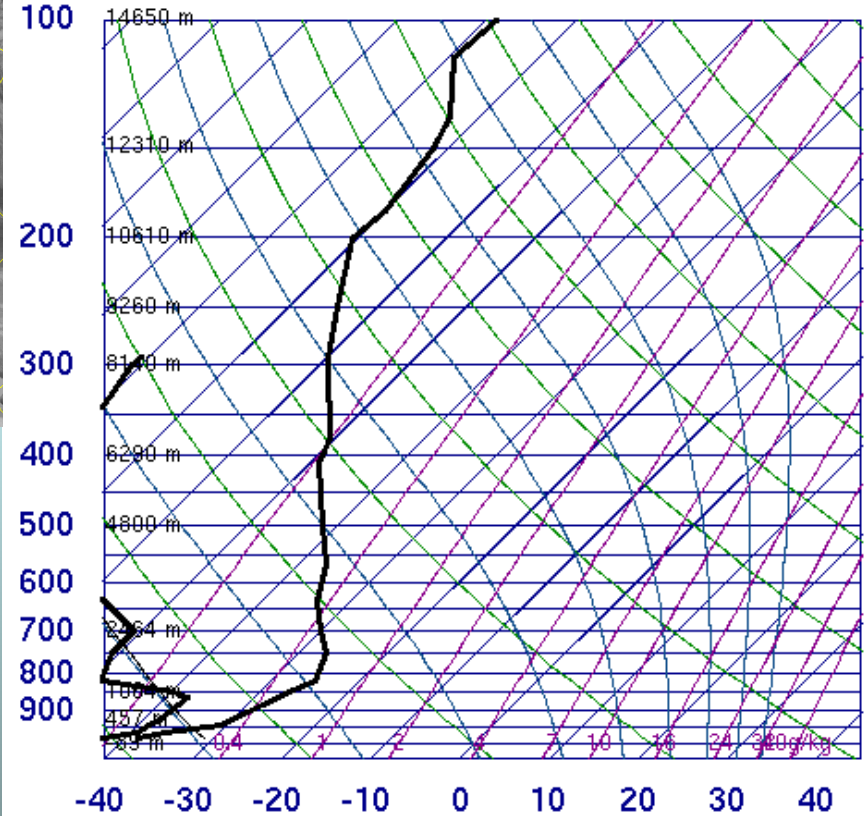
# -39.1c at Davis - 31 August, 2008



National Meteorological and Oceanographic Centre  
 Bureau of Meteorology  
 MSL Analysis (hPa)  
 Valid: 0000 UTC 31/Aug/2008  
 10am EST 31/Aug/2008



## 89571 Davis

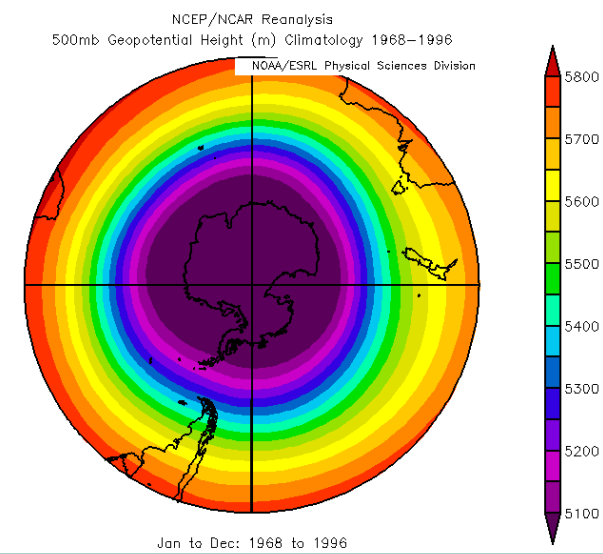


00Z 31 Aug 2008

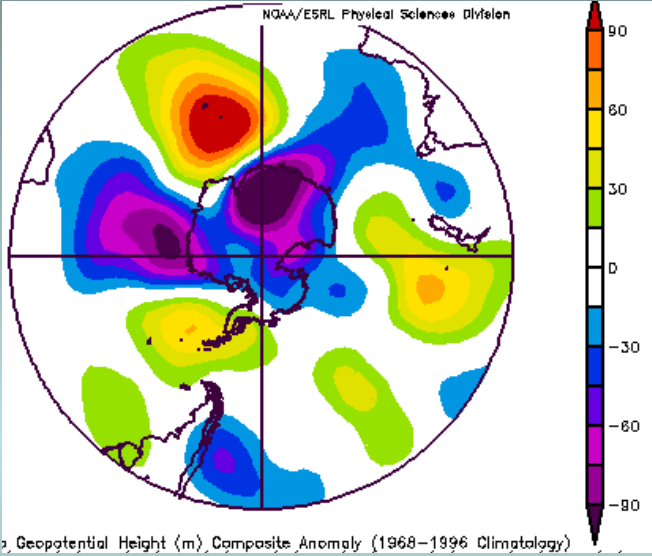
University of Wyoming

# 500 and 850 mb geopotential height climatology (1968-1996) and composite of record cold anomalies from NCEP reanalysis

## Climatology

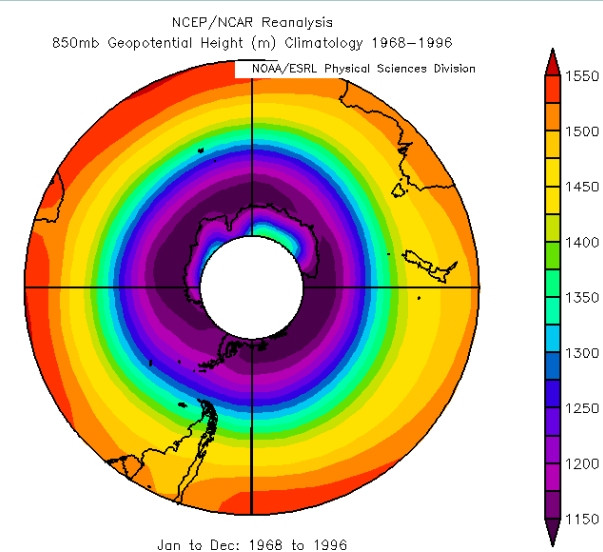


## Anomaly

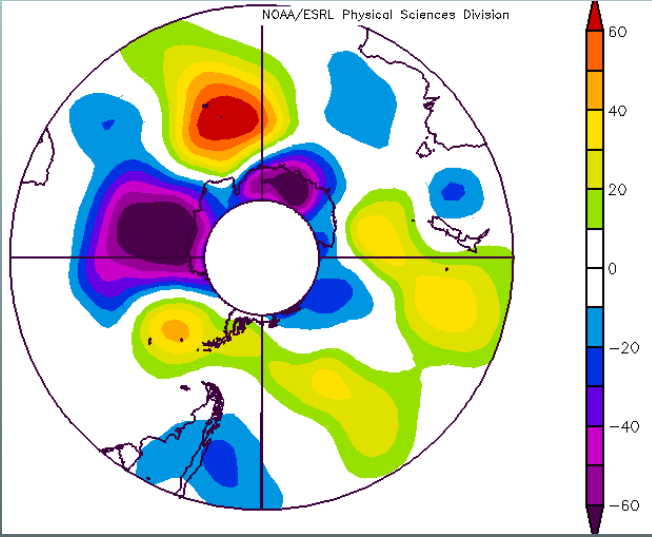


b m005

## Climatology



## Anomaly



b m058

# Thank You



Scott Carpentier  
Forecaster, Tasmania/Antarctica  
Region

June 2011



**Australian Government**  

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**Bureau of Meteorology**



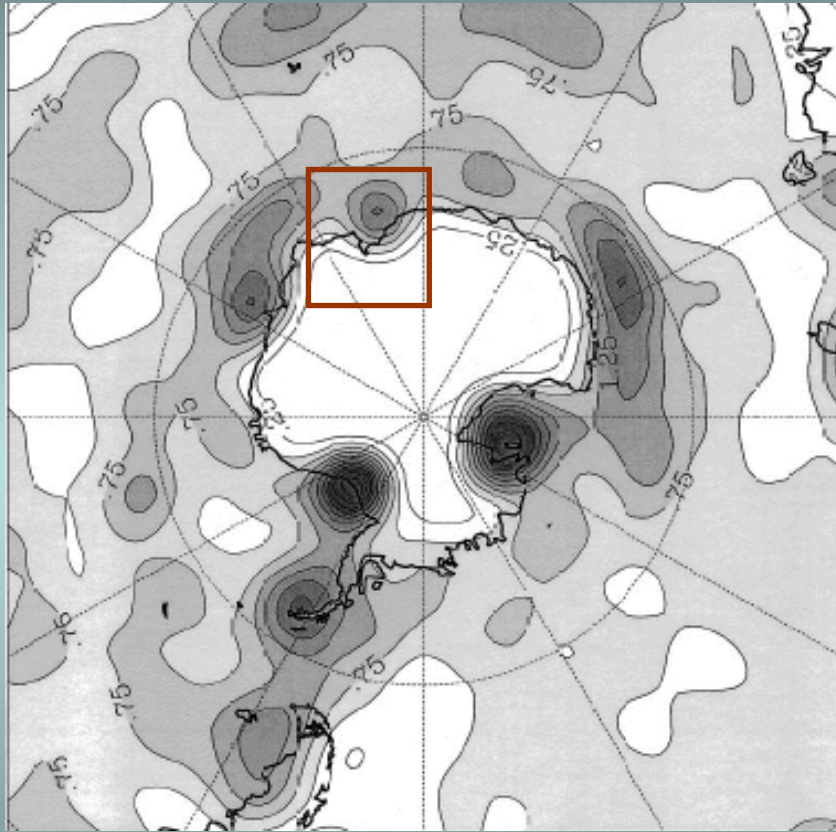
# references

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- van den Broeke M.R. and N.P.M. Van Lipzig (2003). Factors controlling the Near-Surface Wind Field in Antarctica. Monthly Weather Review, V131, issue 4, pp 733-743.

## 2 coldest events per calendar month and SAM indices (24 events)

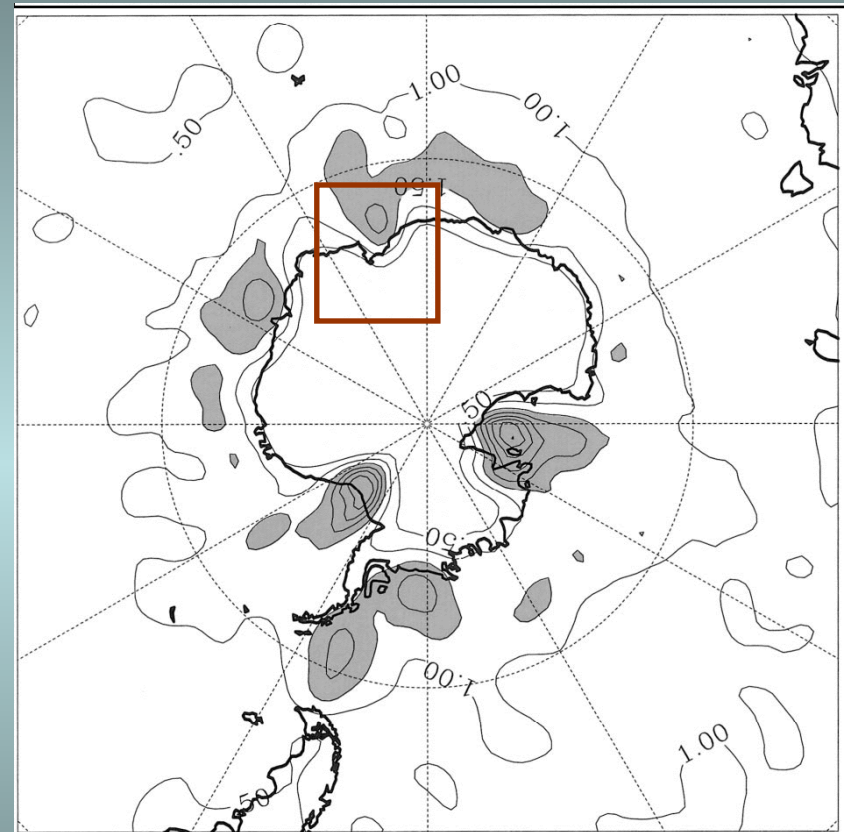
	Day-3	day-2	day-1	day	day+1	day+2	day+3	day+4
SAM average	<b>1.14</b>	<b>0.86</b>	<b>0.91</b>	<b>2.55</b>	<b>1.02</b>	<b>1.00</b>	<b>1.14</b>	<b>0.89</b>
negative SAM events				<b>7.00</b>				
SAM within 1 of average				<b>13.00</b>				
SAM below 1				<b>1.00</b>				
SAM above 1				<b>9.00</b>				

## Cyclogenesis density



Winter: JJA

## Interannual variability (st dev)



Winter: JJA