An aerial photograph of a vast, undulating landscape of snow-covered dunes in Antarctica. The dunes are illuminated by a low sun, creating long, soft shadows and highlighting the textures of the snow. The overall color palette is a range of blues and whites, from deep cerulean to bright, almost white highlights.

Validation of MAR at Dome C

(Hubert Gallée and Vito Vitale)

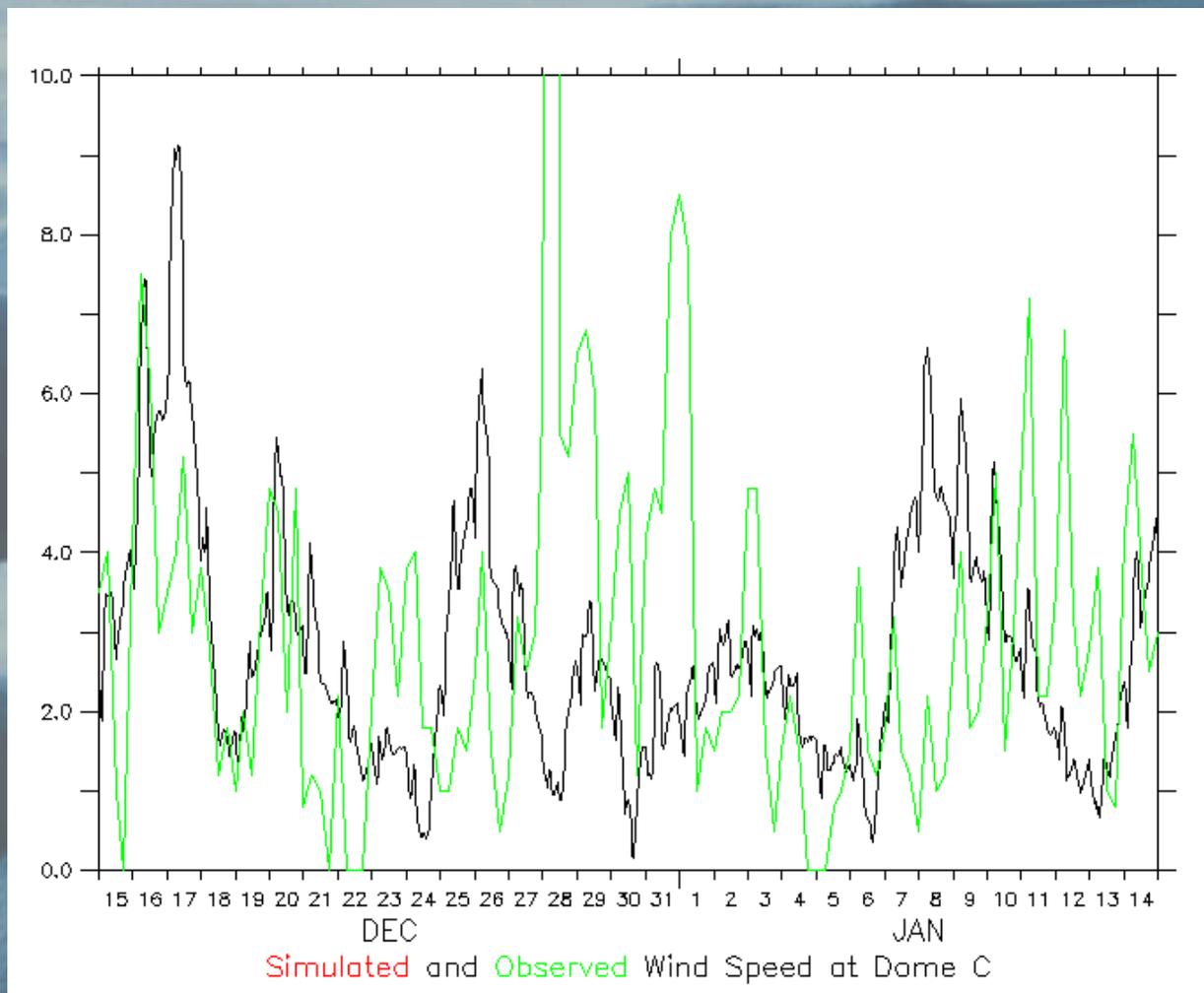
- Regional Climate Model MAR is
 - set up over the whole antarctic ice sheet
 - results analyzed for Dome C

Overview of summer 2005 – 2006

Warm and cold events during winter 2006

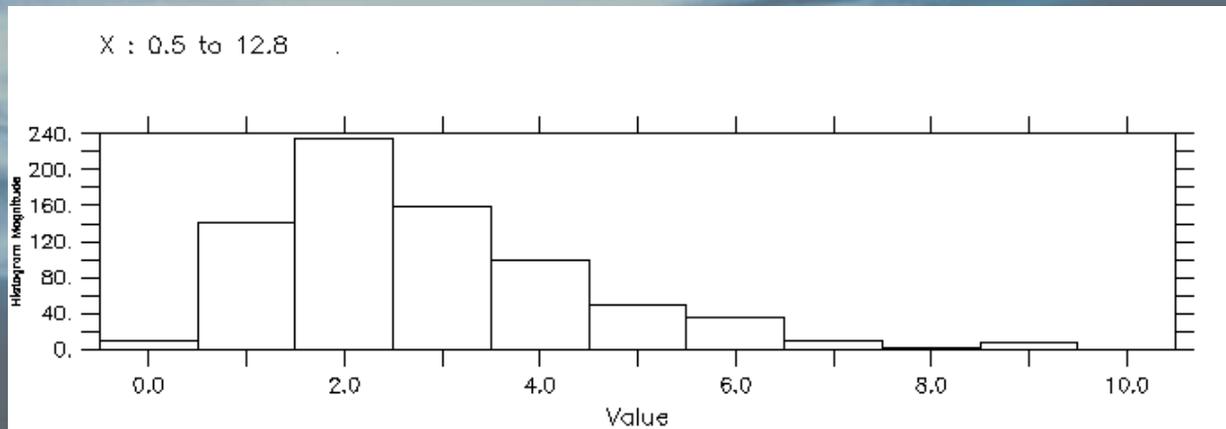
Summer at Dome C

Wind Speed:



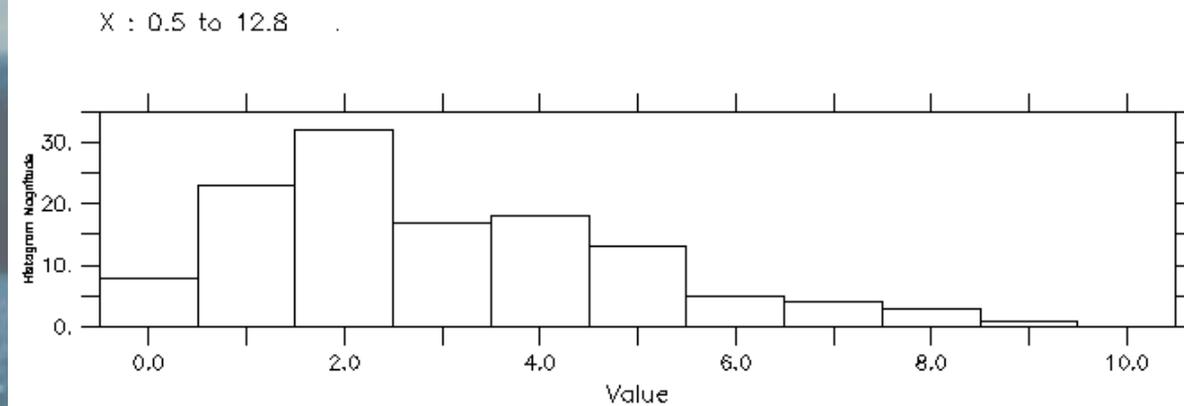
Summer at Dome C

Wind Speed:



Dome C Wind Speed Histogram 15 Dec 2005 – 15 Jan 2006 **(MAR)**

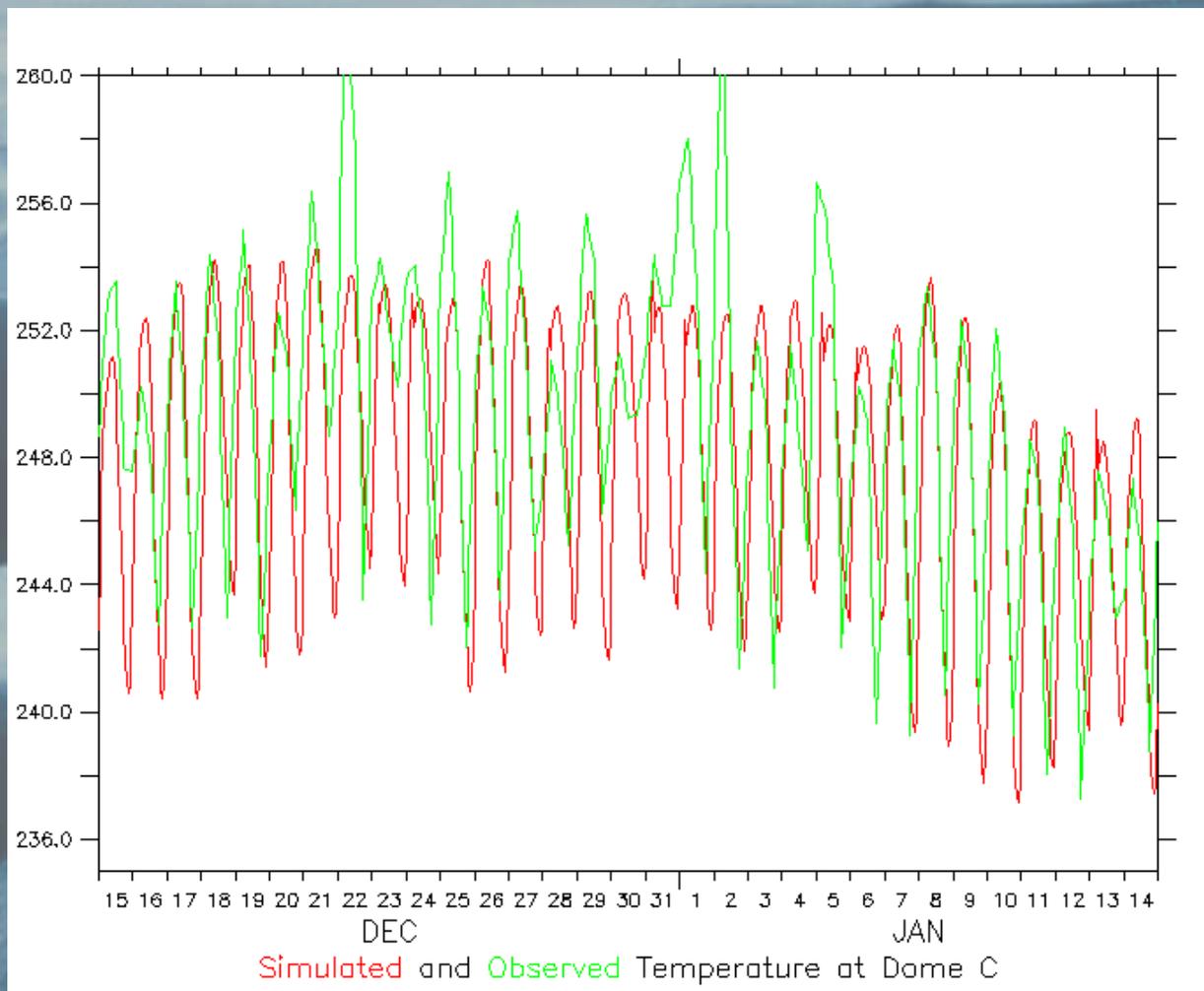
FERRET Ver. 3.01
NOAA/PMEL TMAP
Jun 25 07 12:42:03



Dome C Wind Speed Histogram 15 Dec 2005 – 15 Jan 2006 **(AWS)**

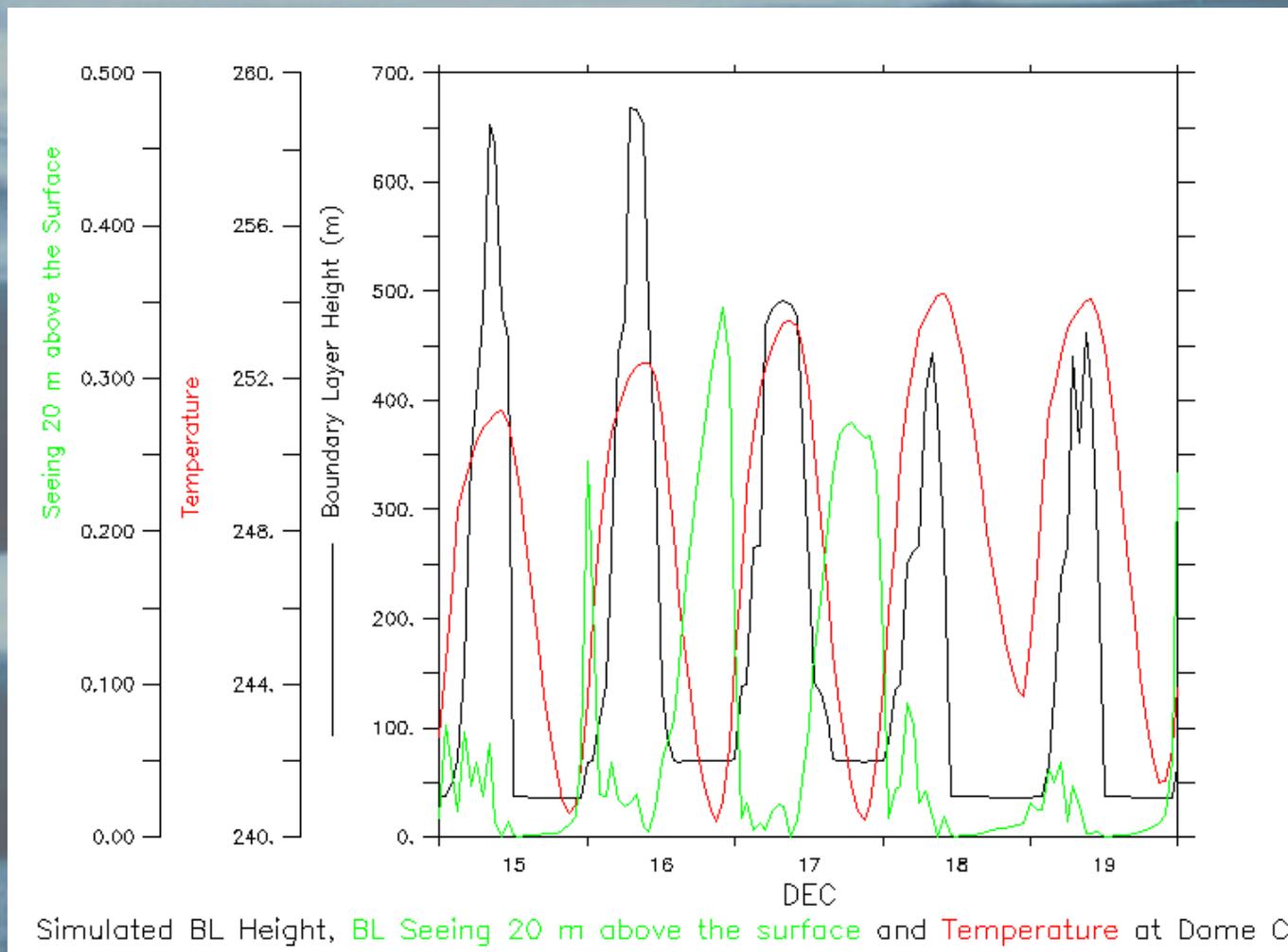
Summer at Dome C

Temperature:



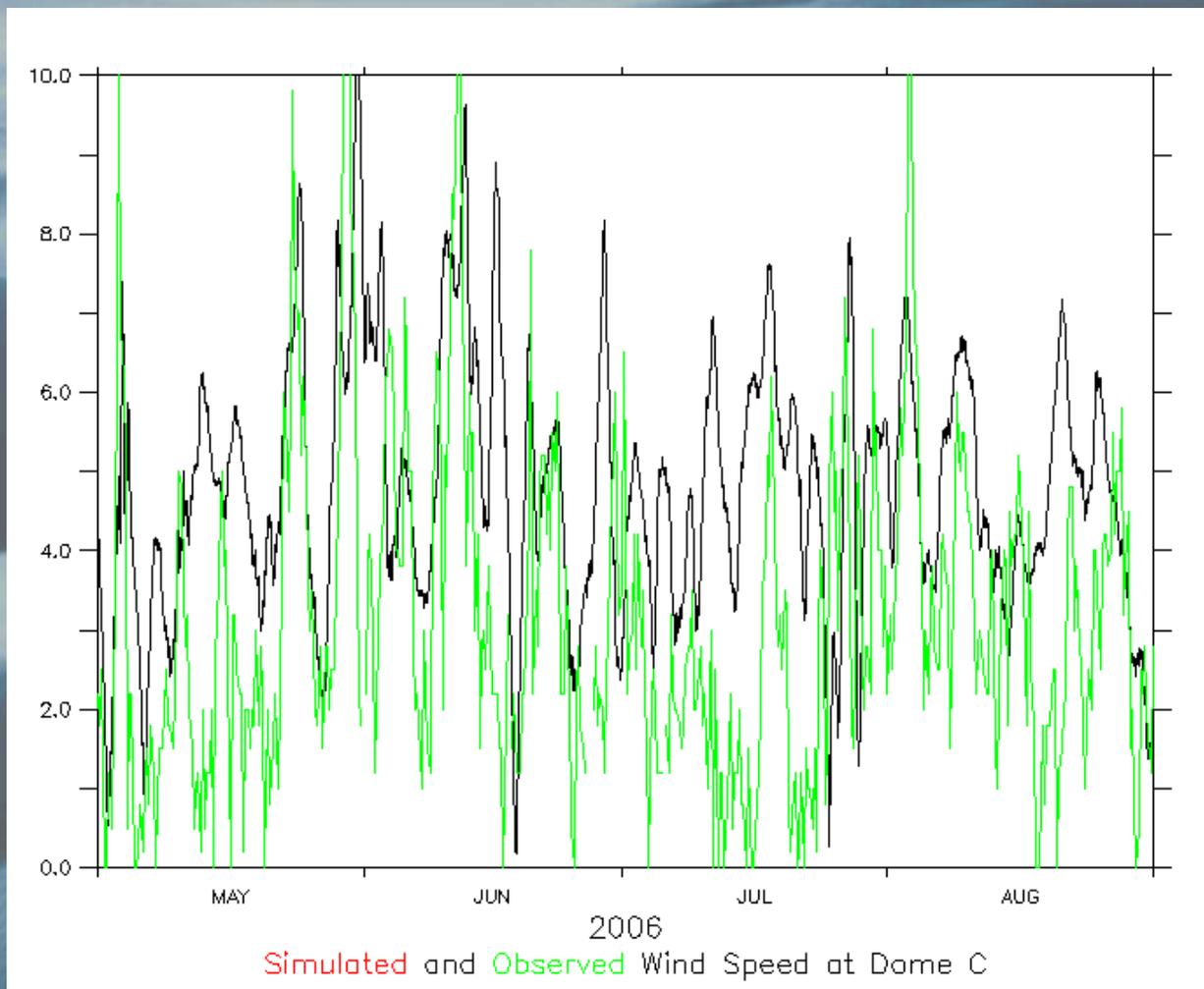
Summer at Dome C

Temperature, Boundary Layer Height and Seeing:



Winter at Dome C

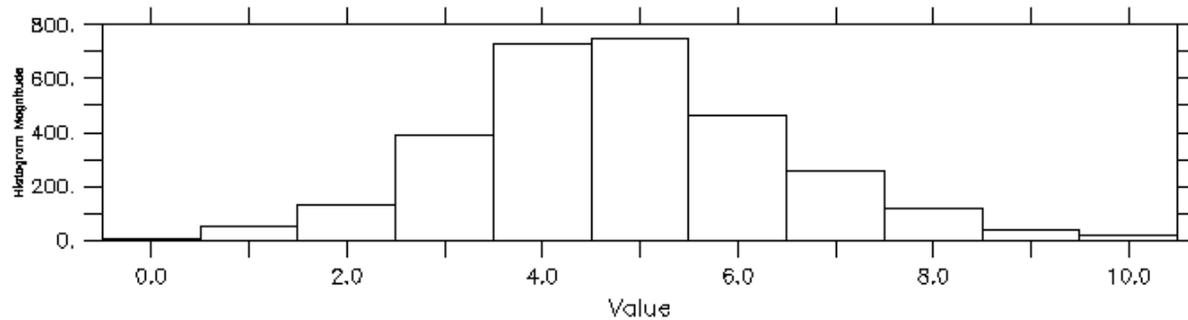
Wind Speed:



Winter at Dome C

Wind Speed:

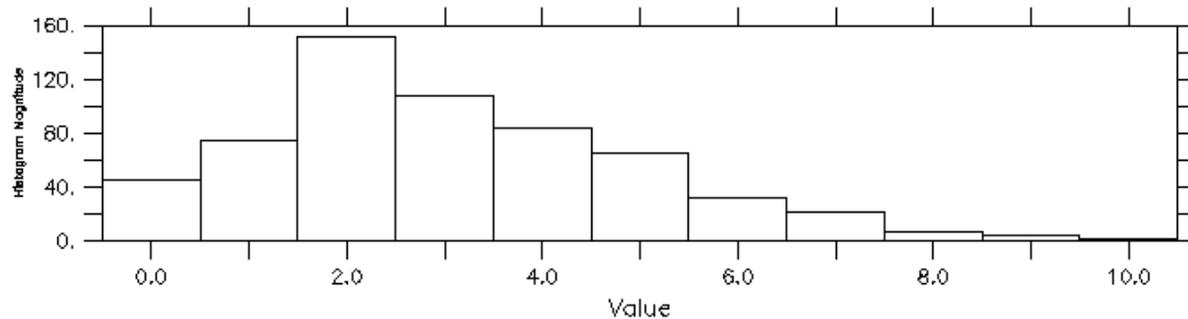
X : 0.5 to 12.8



Dome C Wind Speed Histogram 01 May 2006 – 30 Sep 2006 **(MAR)**

FERRET Ver. 3.01
NOAA/PMEL TMAP
Jun 23 07 13:05:08

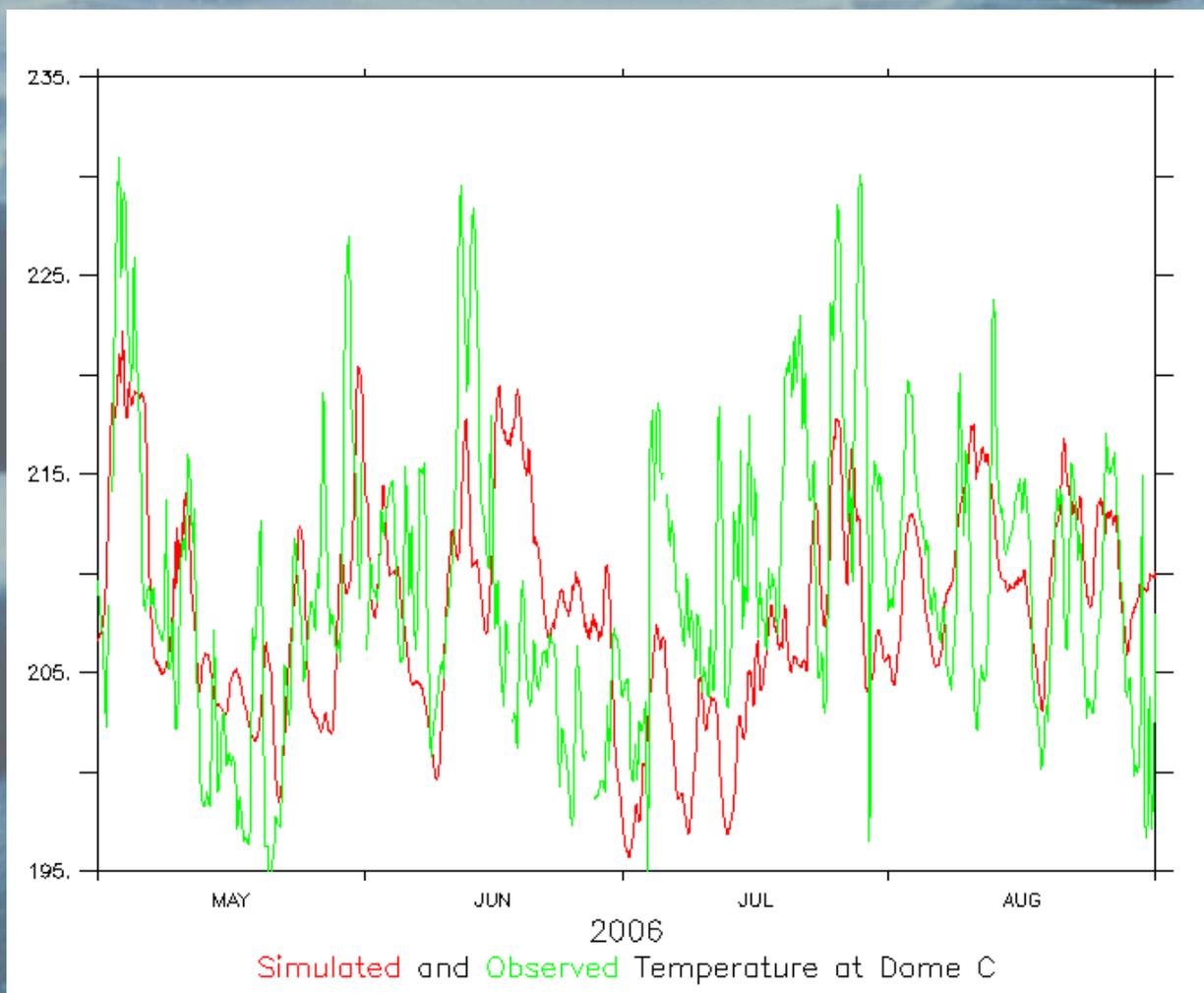
X : 0.5 to 12.8



Dome C Wind Speed Histogram 01 May 2006 – 30 Sep 2006 **(AWS)**

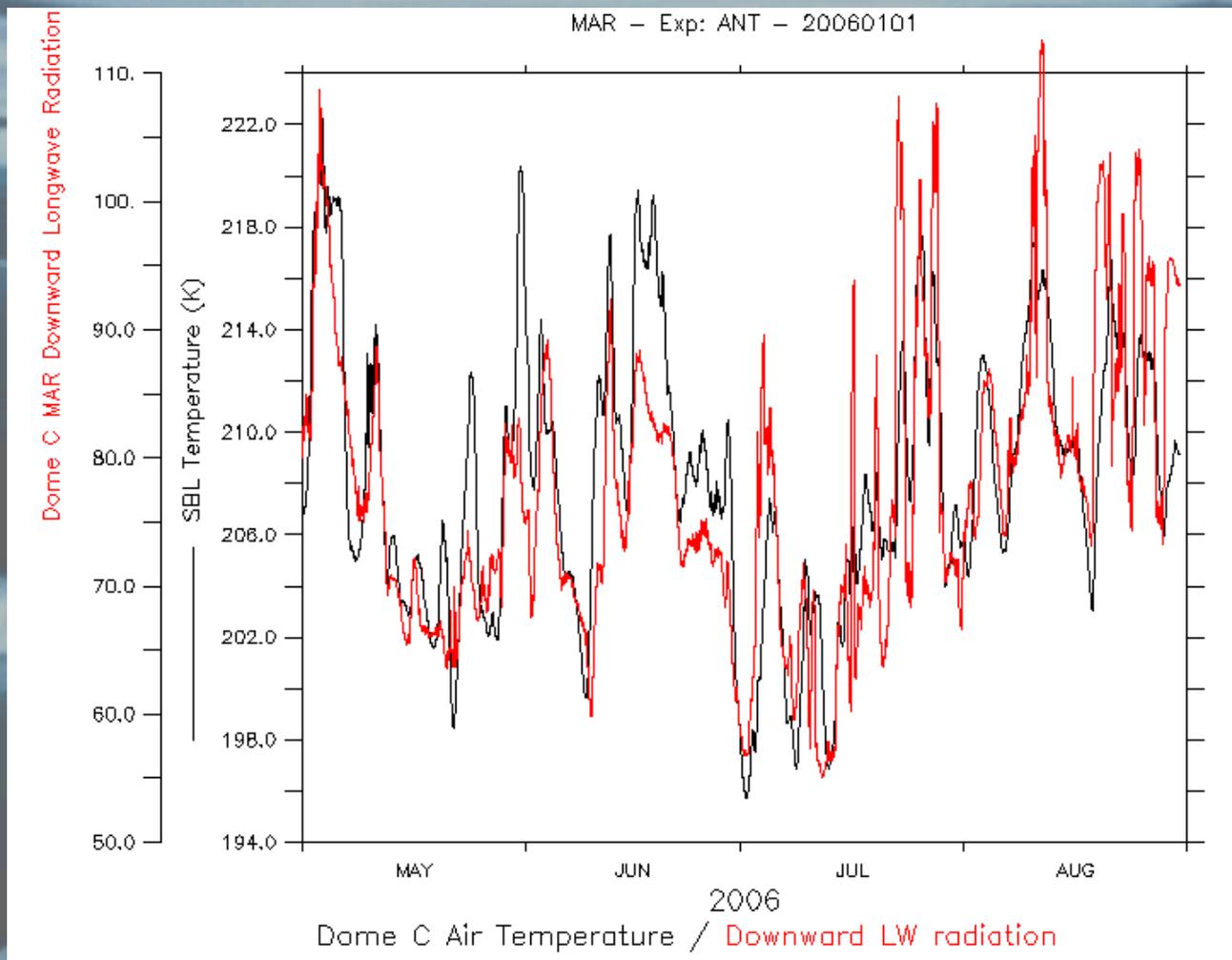
Winter at Dome C

Temperature: time average: **Observed** 209.6 K
Simulated 208.2 K



Winter at Dome C

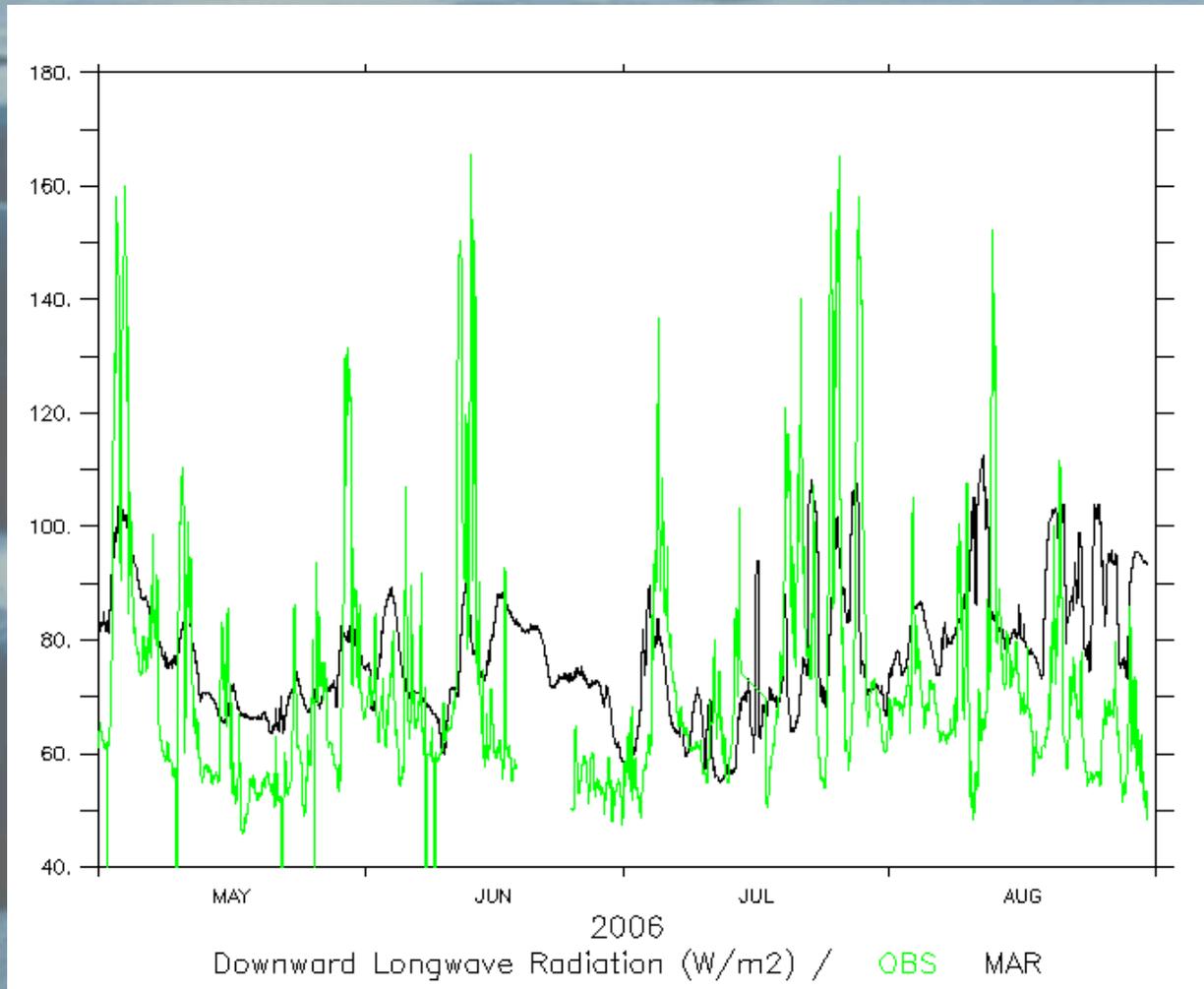
Simulated Temperature and Downward Longwave Radiation:



High Lwd
corresponds to
high t°

Winter at Dome C

Downward Longwave Radiation: time average: **Obs. 59 W/m²**
Sim. 78 W/m²

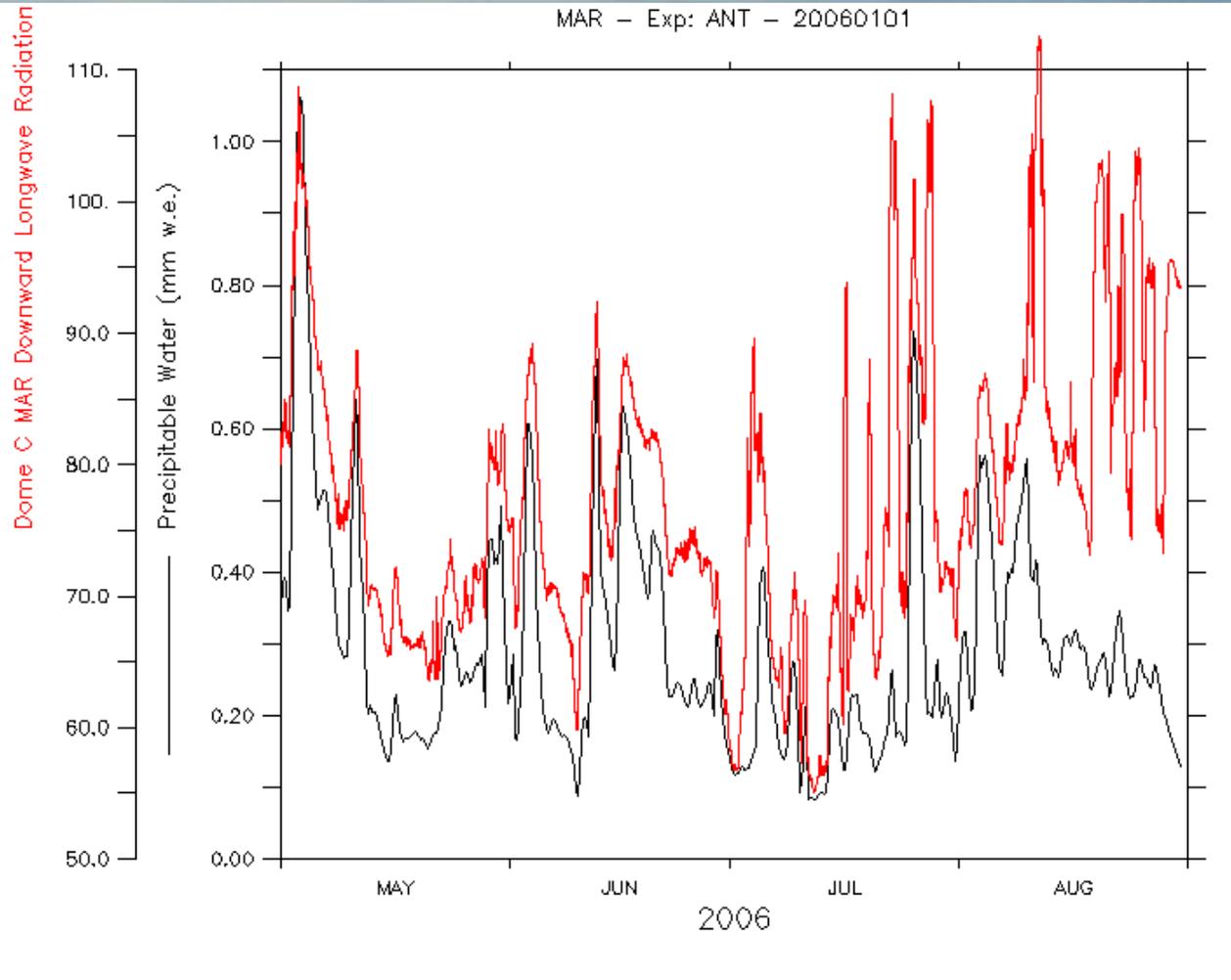


Slight overestimation of
observed low Lwd

Underestimation of
observed high Lwd

Winter at Dome C

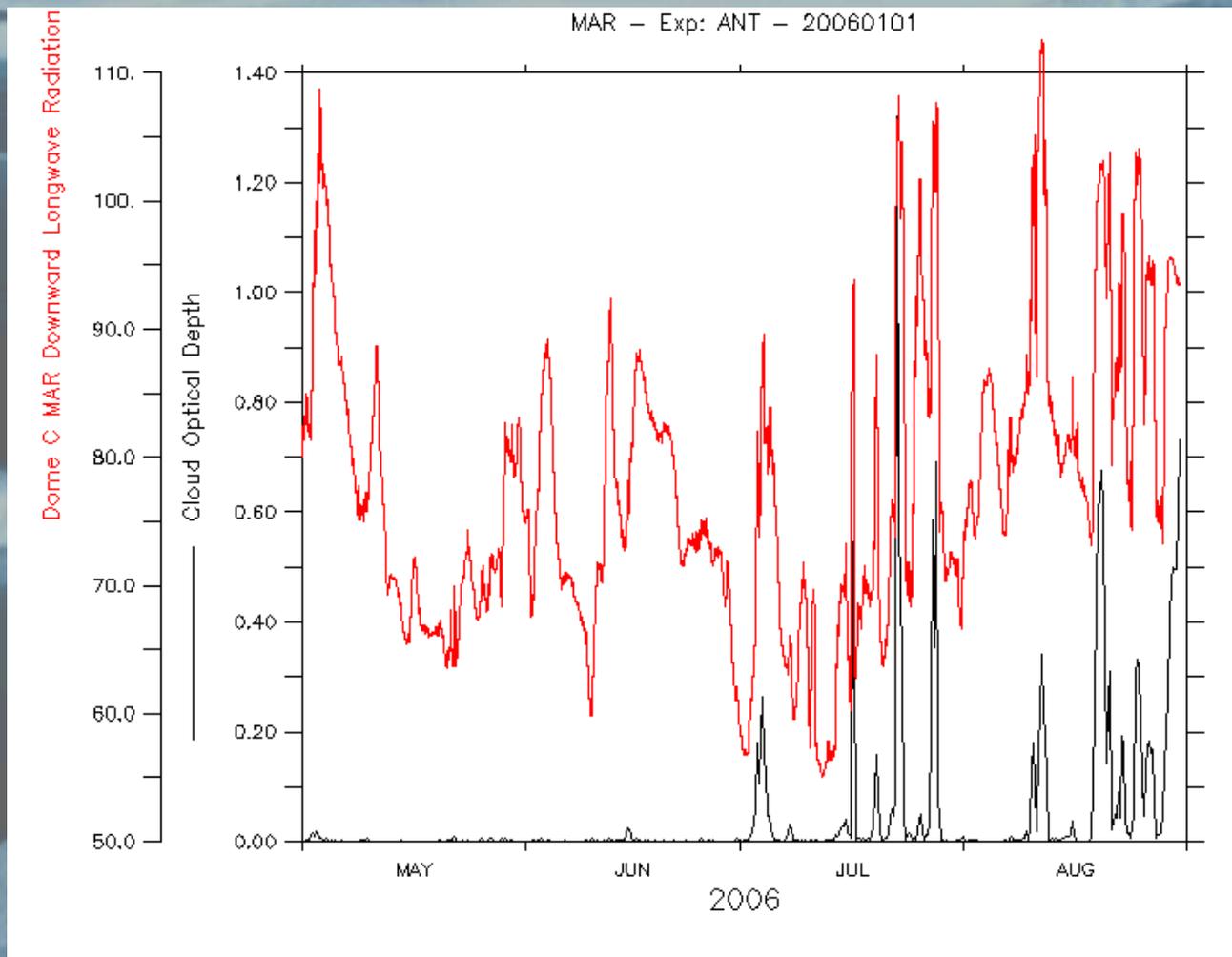
PWV and Downward Longwave Radiation: correlation: 0.6



High Lwd
corresponds to
high PWV

Winter at Dome C

Clouds and Downward Longwave Radiation: correlation: 0.56

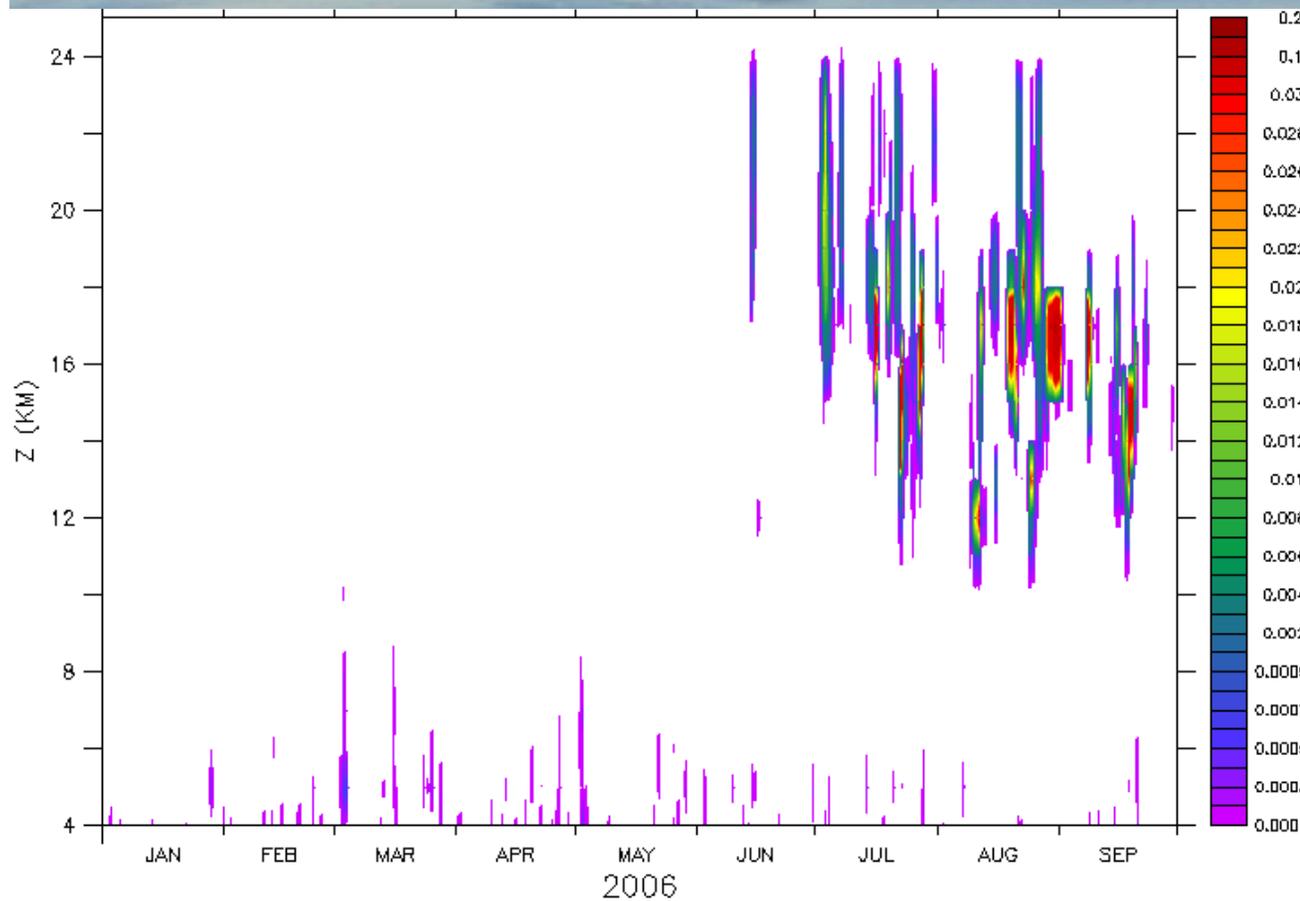


High Lwd
corresponds to
high Cloud OD

Clouds over Dome C

Cloud Ice Particles

PSCs type II

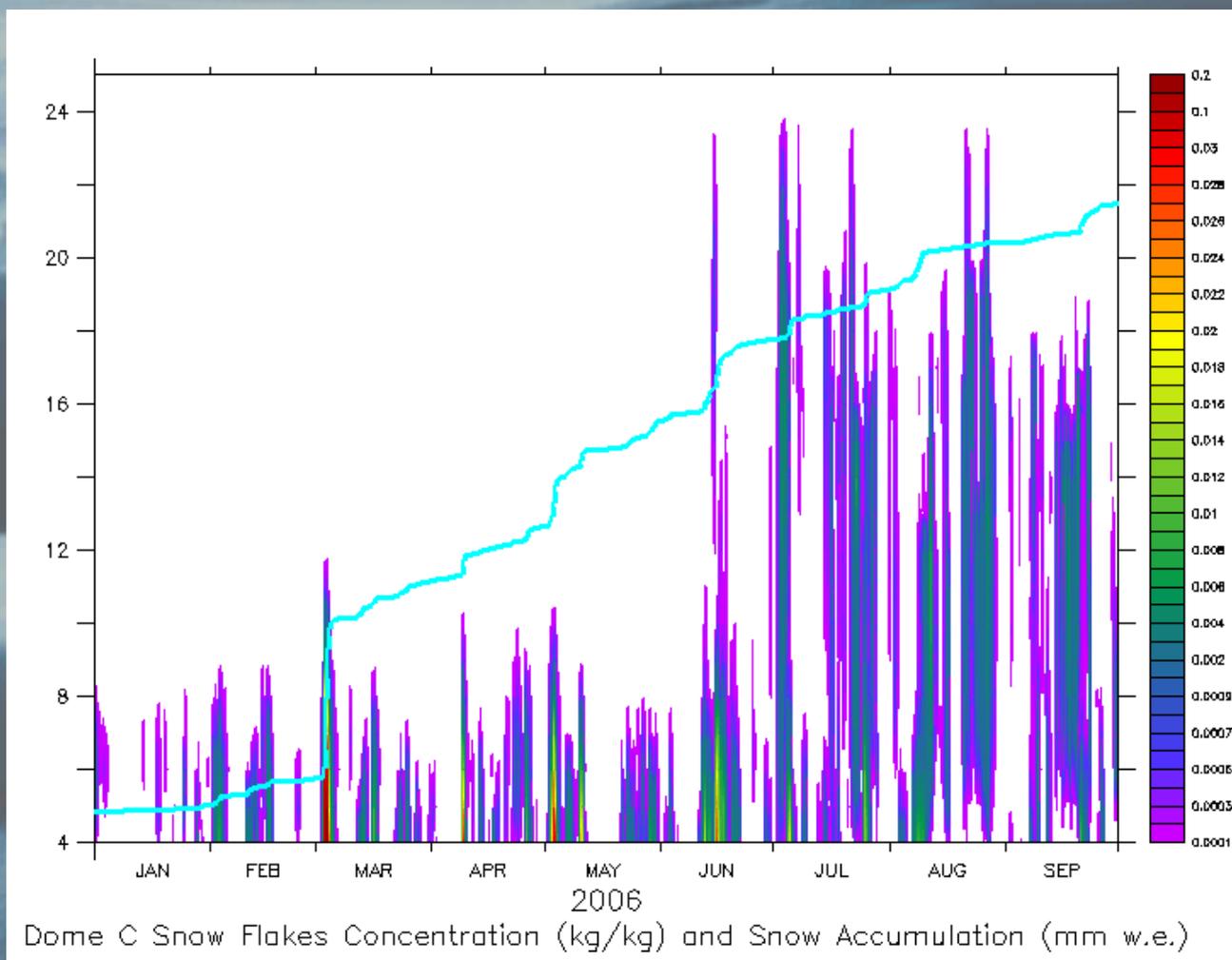


Cloud Particles Concentration (g/kg)



Clouds over Dome C

Snow Flakes



Conclusions

MAR has been validated over Dome C using AWS and Lwd data

- Simulated temperature in relative agreement with the observations
 - summer diurnal cycle is well simulated, with a well mixed layer during daytime.
 - alternance of cold and warm events during winter, warm events associated with advection of warmer, moister air and enhanced cloud formation
 - winter temperature is slightly underestimated by MAR while Lwd is overestimated (Lwd maxima underestimated)
- Wind speed relatively well simulated by MAR during summer but overestimated during winter (model or observation pb?)
- Possible error compensation in MAR:
 - Lwd is too large (too much water vapour?)
 - Surface turbulence may be overestimated
 - => gravity flow and Lwu may be overestimated