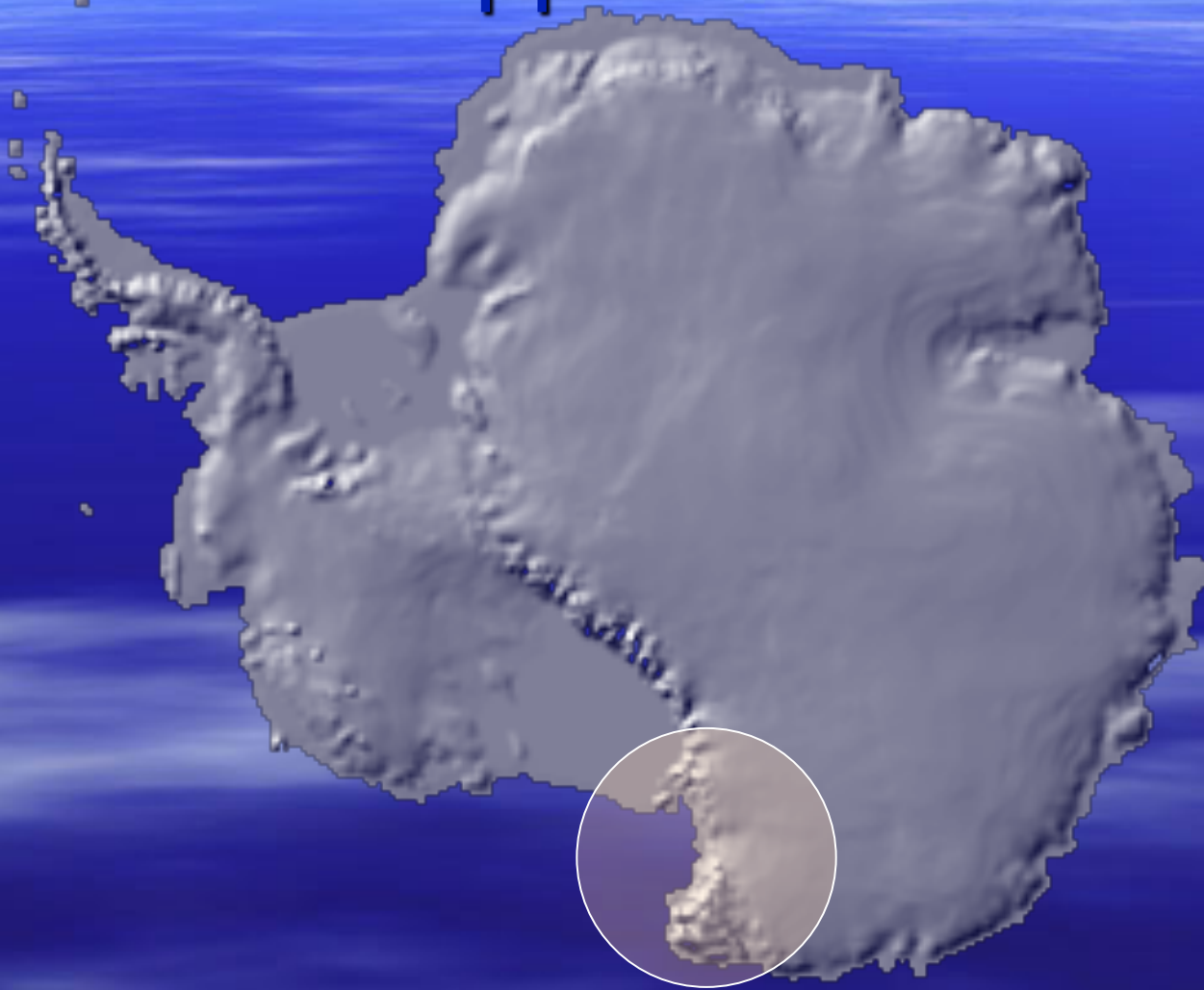


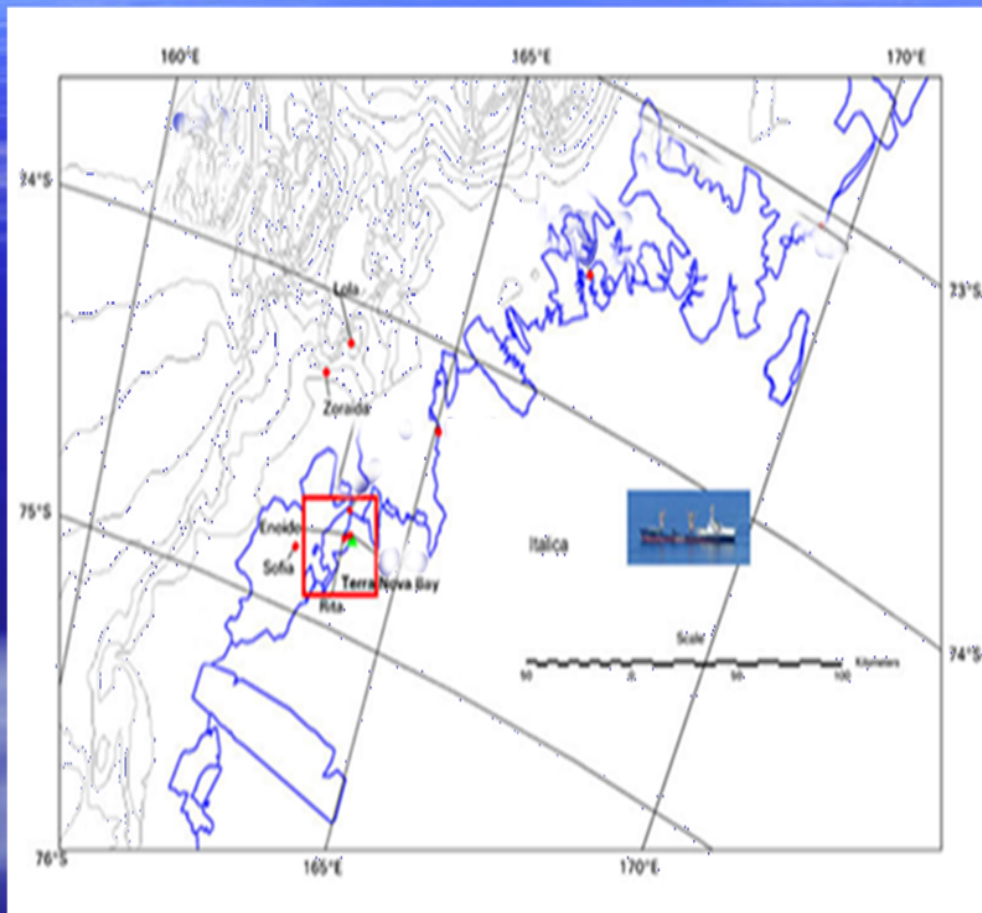
**COMPARISON OF THE MAR MODEL TO  
AWS OBSERVATIONS  
AND RADIOSOUNDINGS**

G. Clai  
A. Pellegrini

# General Application Area .....



# ... spot area.



	ID	LATITUDE	LONGITUDE
ENEIDE	7353	74° 41'	164° 05'
RITA	7354	74° 43'	164° 01'
SOFIA	7350	74° 48'	163° 19'

# Aim of the Study:

Analysis and comparison of the  
MAR model  
against AWSs  
And Radiosoundings

# Case study

**AWS Data**

16 – 22/01/02

16 – 22/06/02

**Radiosoundings**

16 - 17/01/02

**Horizontal Resolution :**

10 Km

5 Km

2 Km



# MAR Model

Mesoscale Model(Gallée & Schayes, 1994, UCL-  
ASTR)

Vertical coordinate : normalized pressure,

$$\sigma = (p-p_t)/(p_s-p_t)$$

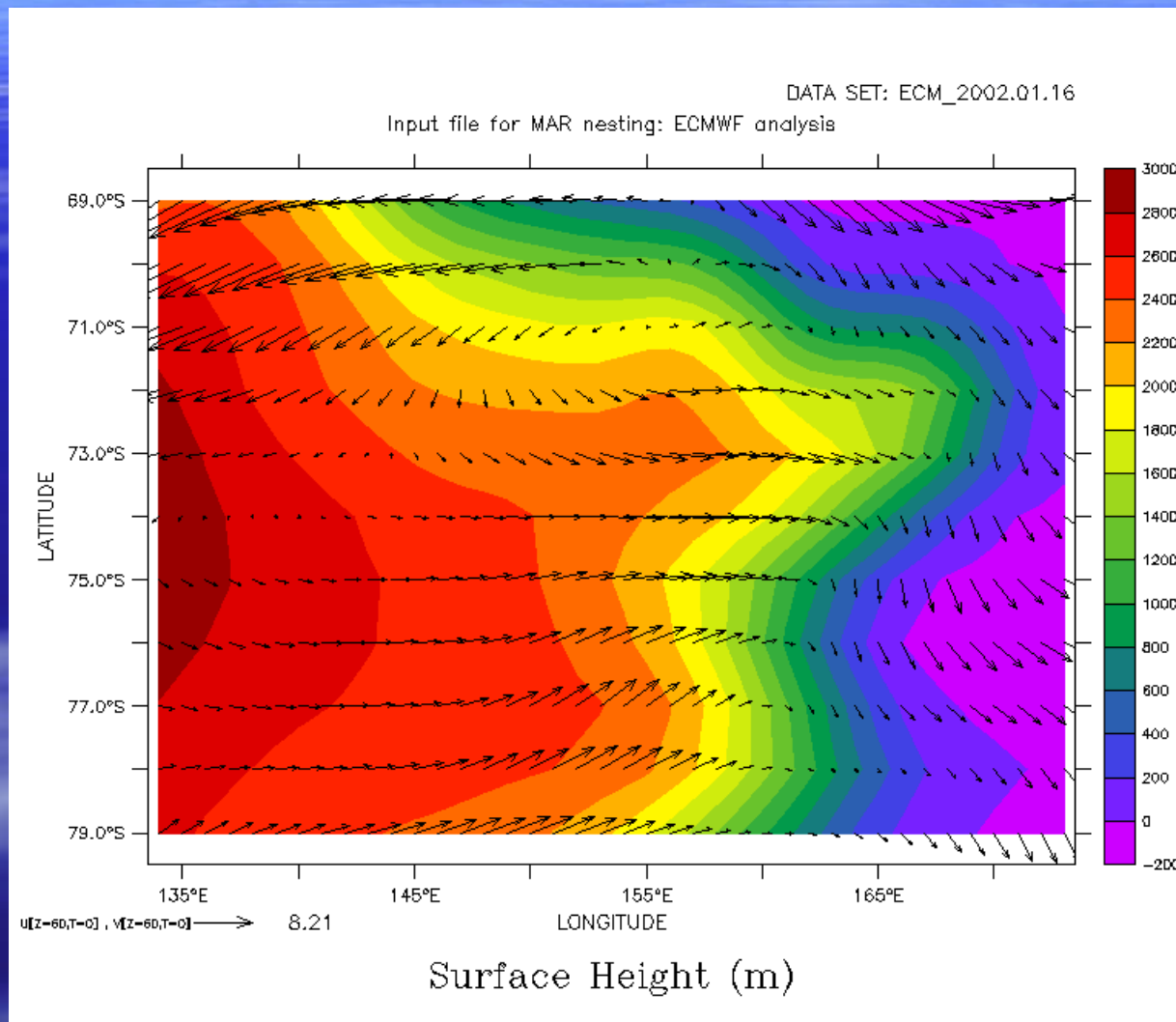
Coupled with

- SISVAT model (Soil Ice Snow  
Vegetation Atmosphere Transfer)
- Polynya model

# Input Data

- ERA-40 Reanalysis
  - 16-22 January 2002
  - 16-22 June 2002
- Radar Antarctic Mapping Project – Digital Elevation Model

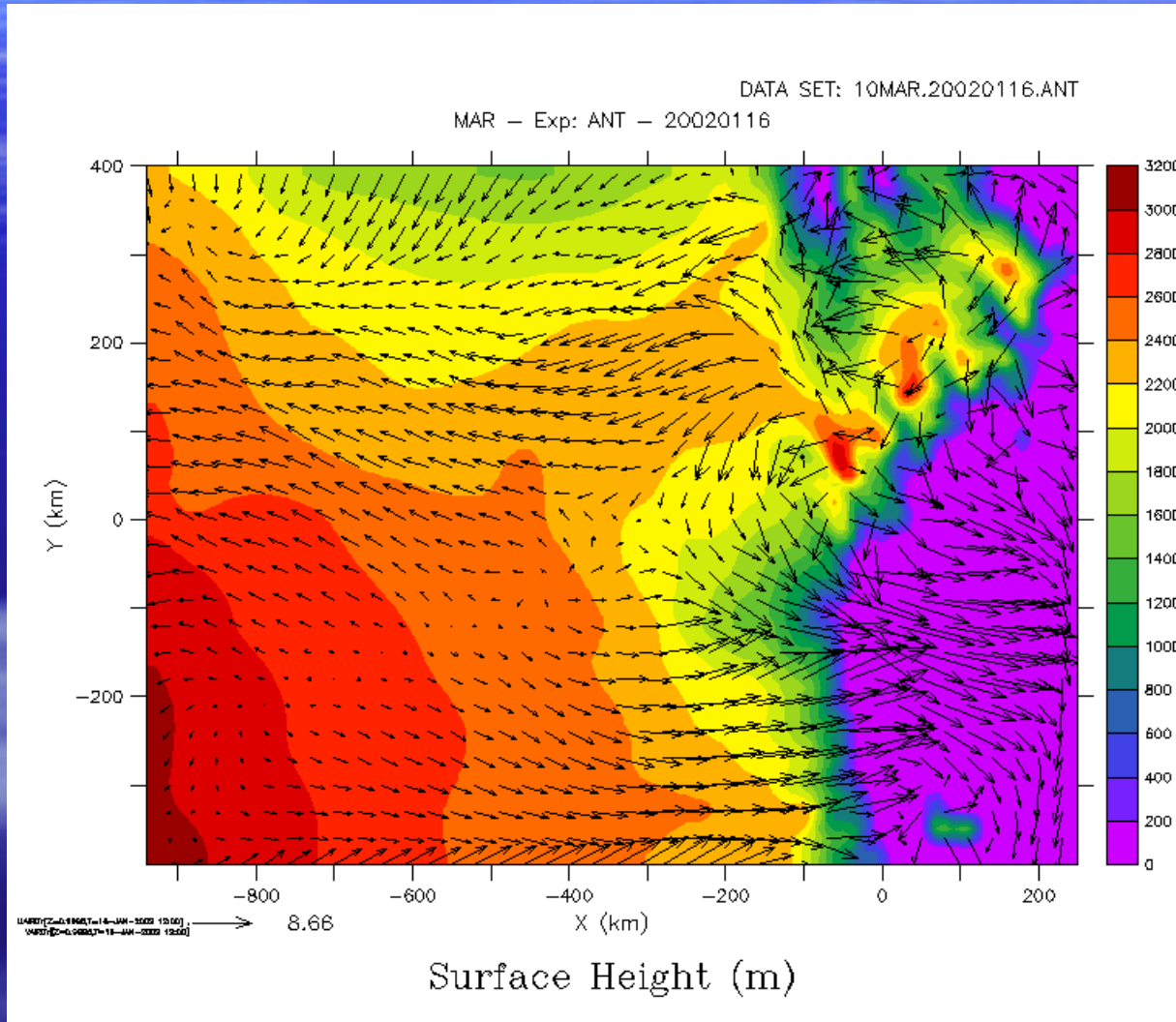
# ECMWF data





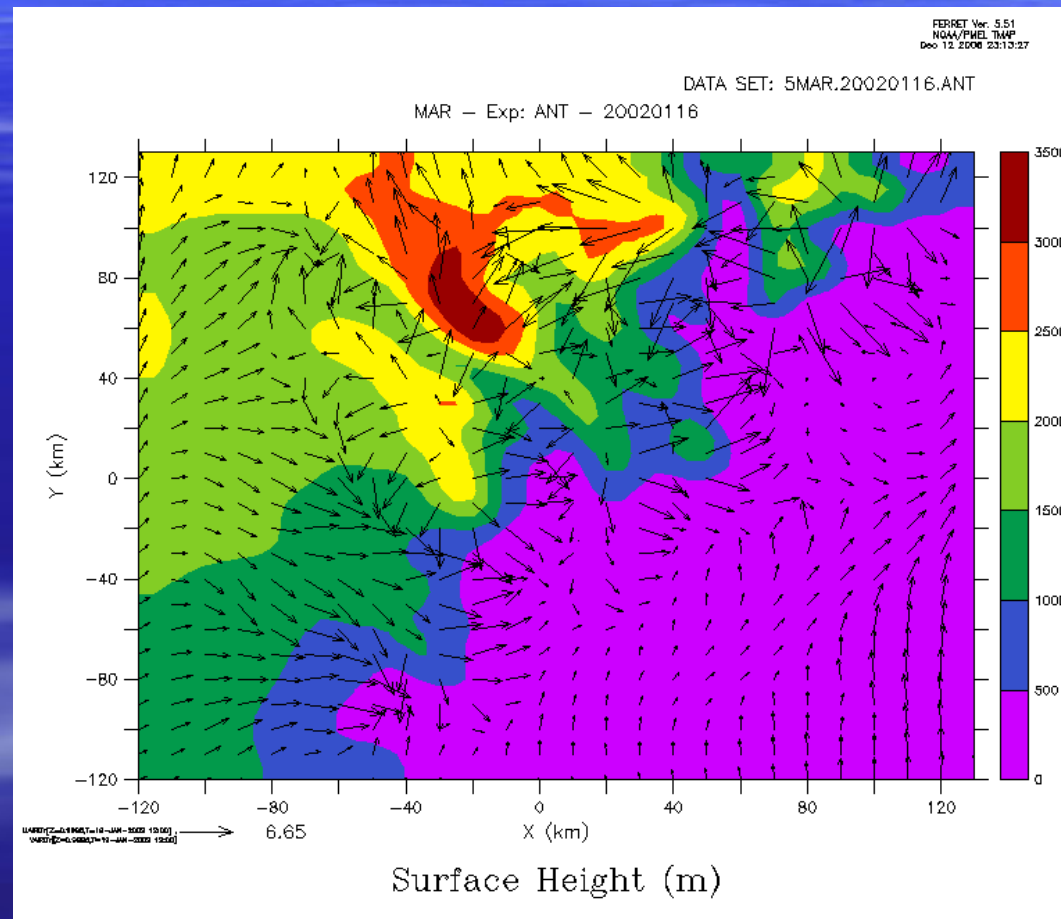
# 10 km MAR Simulation

16/01/02 h 12



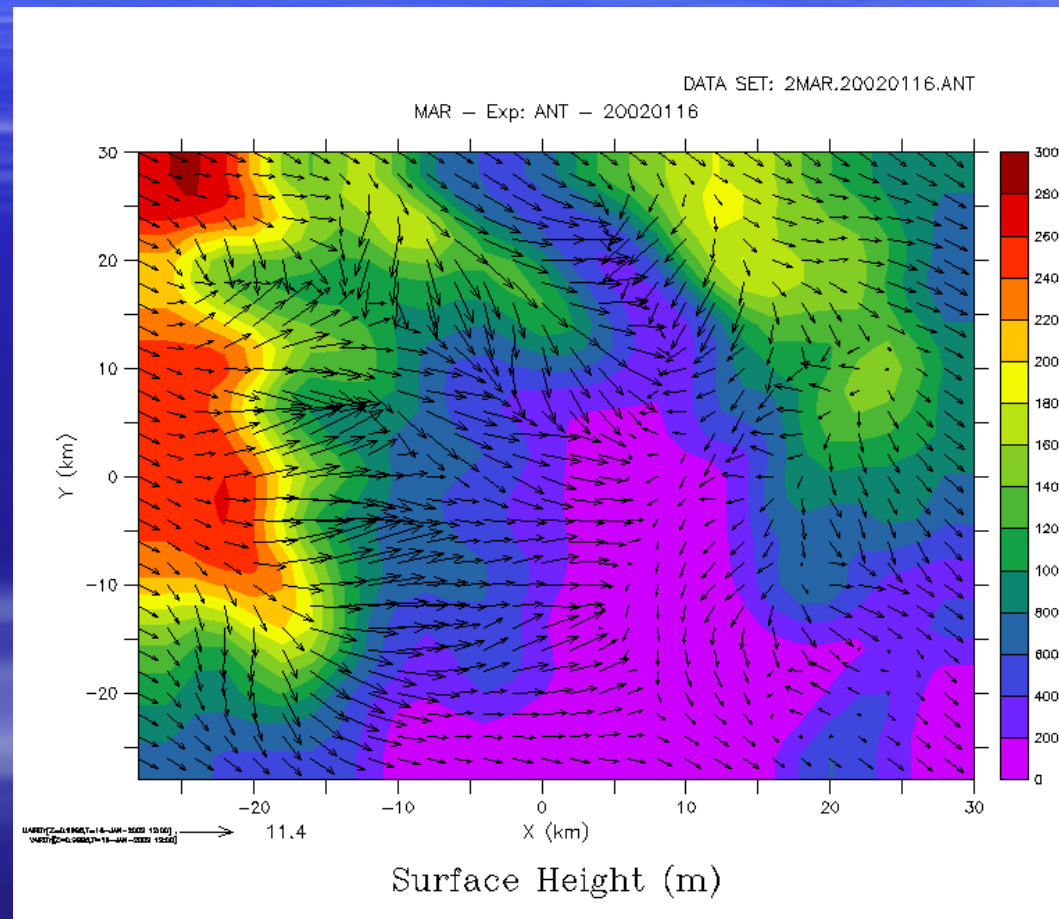
# 5 km MAR Simulation

16/01/02 h 12



# 2 km MAR Simulation

16/01/02 h 12



## AWS Comparison :

Temperature [ $^{\circ}\text{K}$ ]

Pressure [hPa]

Wind Speed [ $\text{ms}^{-1}$ ]

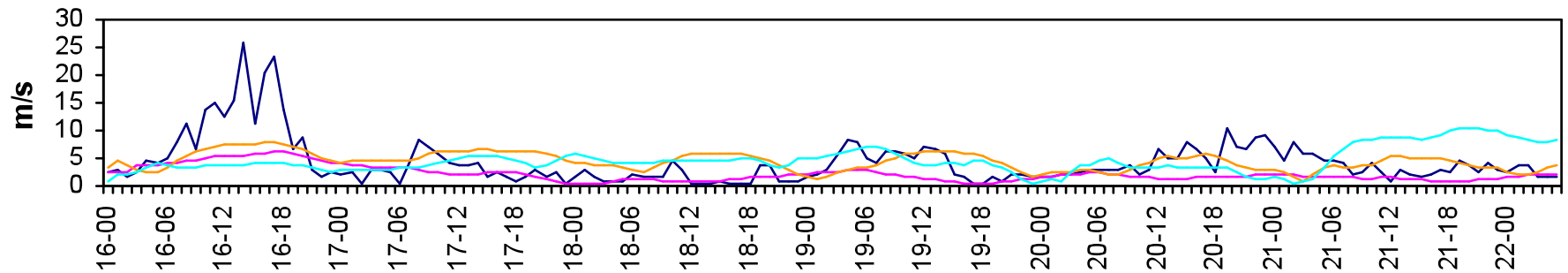
## Radiosoundings Comparison :

Temperature [ $^{\circ}\text{K}$ ]

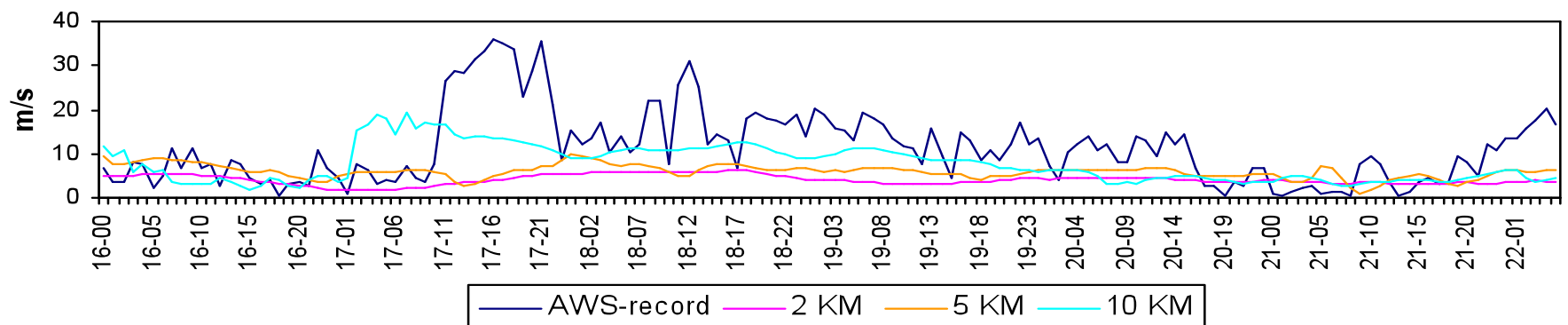
Wind Speed components [ $\text{ms}^{-1}$ ]

# Wind Speed

ENEIDE JANUARY 2002: WIND SPEED



ENEIDE JUNE 2002: WIND SPEED

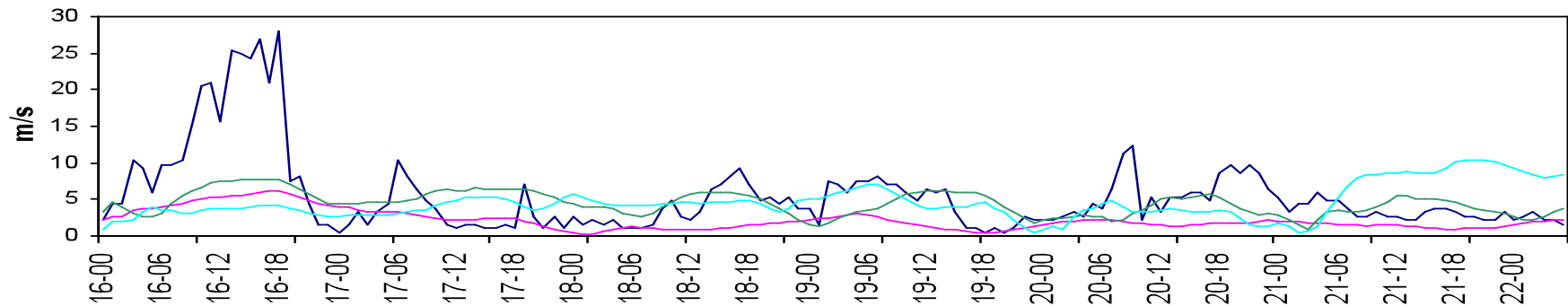


— AWS-record — 2 KM — 5 KM — 10 KM

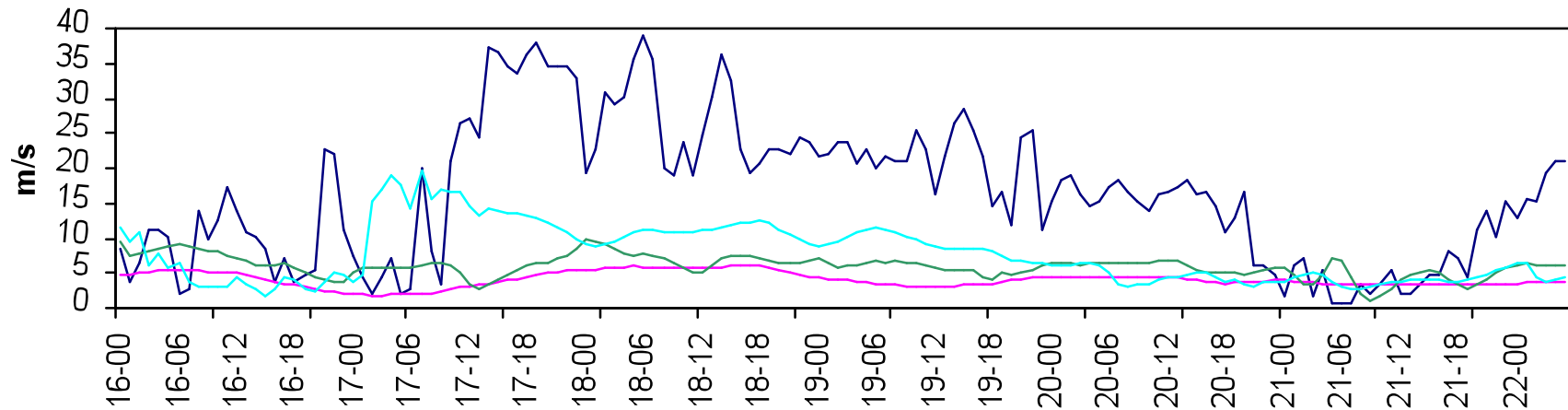


# Wind Speed (2)

RITA JANUARY 2002: WIND SPEED



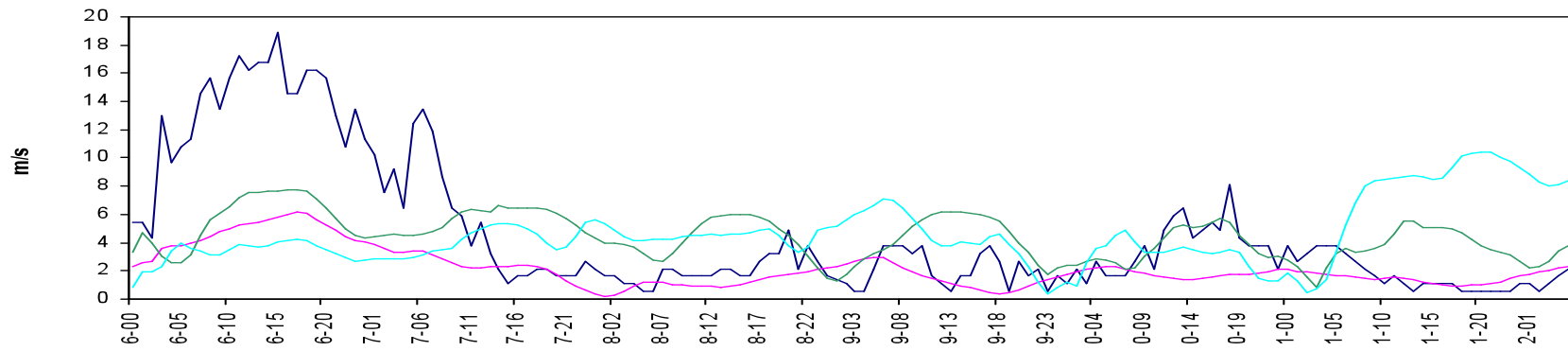
RITA JUNE 2002: WIND SPEED



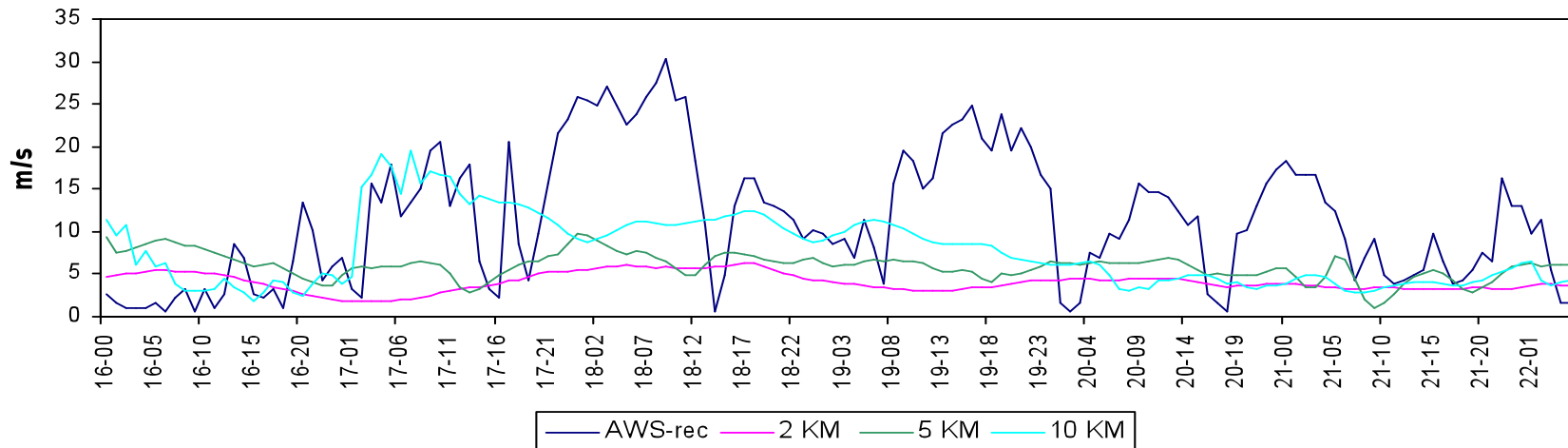
— AWS-rec — 2 Km — 5 Km — 10 Km

# Wind Speed (3)

SOFIA JANUARY 2002: WIND SPEED

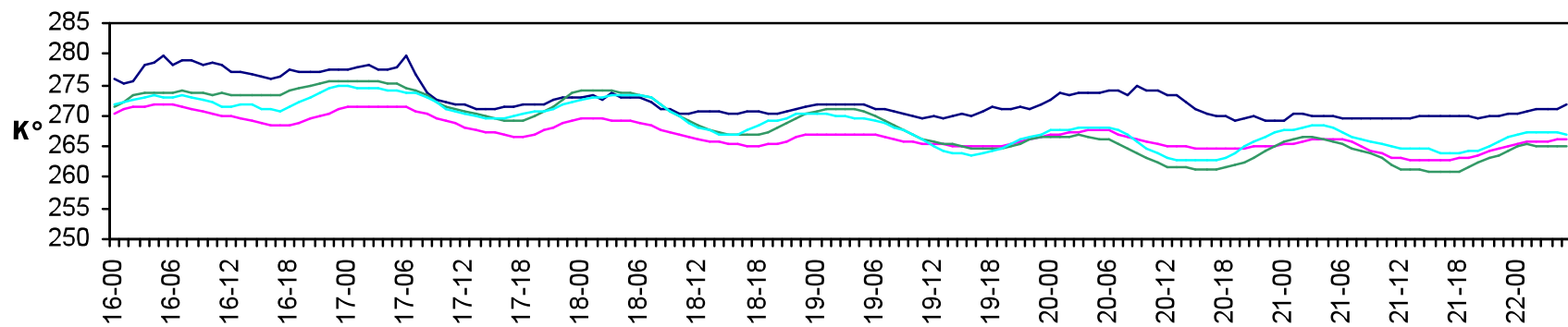


SOFIA JUNE 2002: WIND SPEED

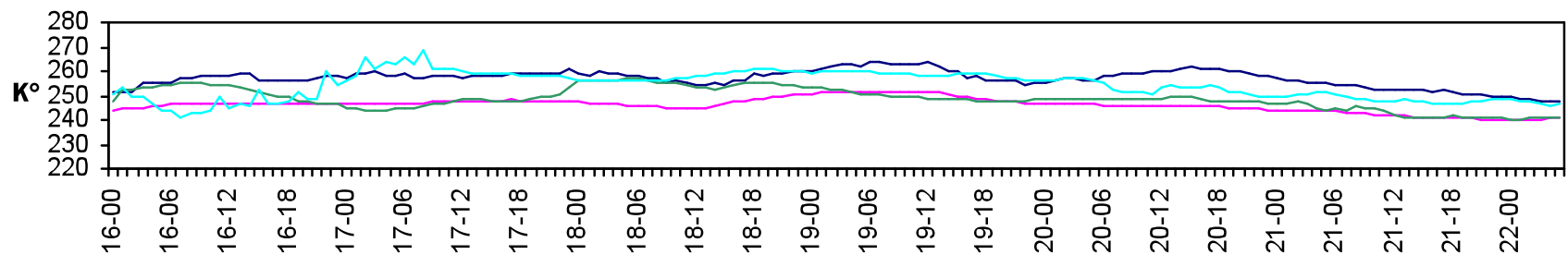


# Temperature

ENEIDE JANUARY 2002: TEMPERATURE



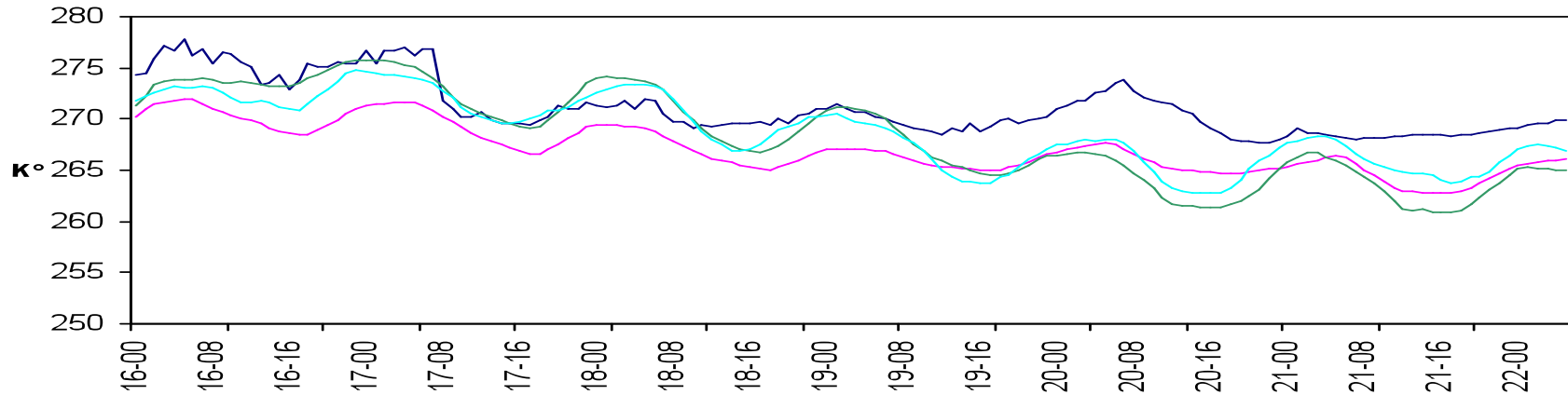
ENEIDE JUNE 2002: TEMPERATURE



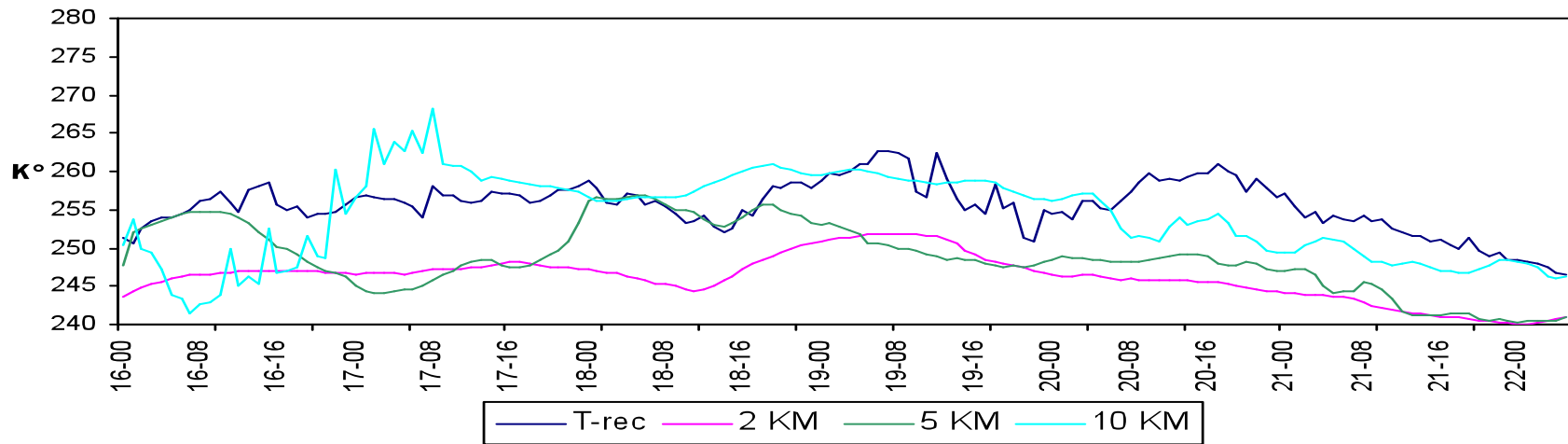
— REG. — 2 KM — 5 KM — 10 KM

# Temperature (2)

RITA JANUARY 2002: TEMPERATURE

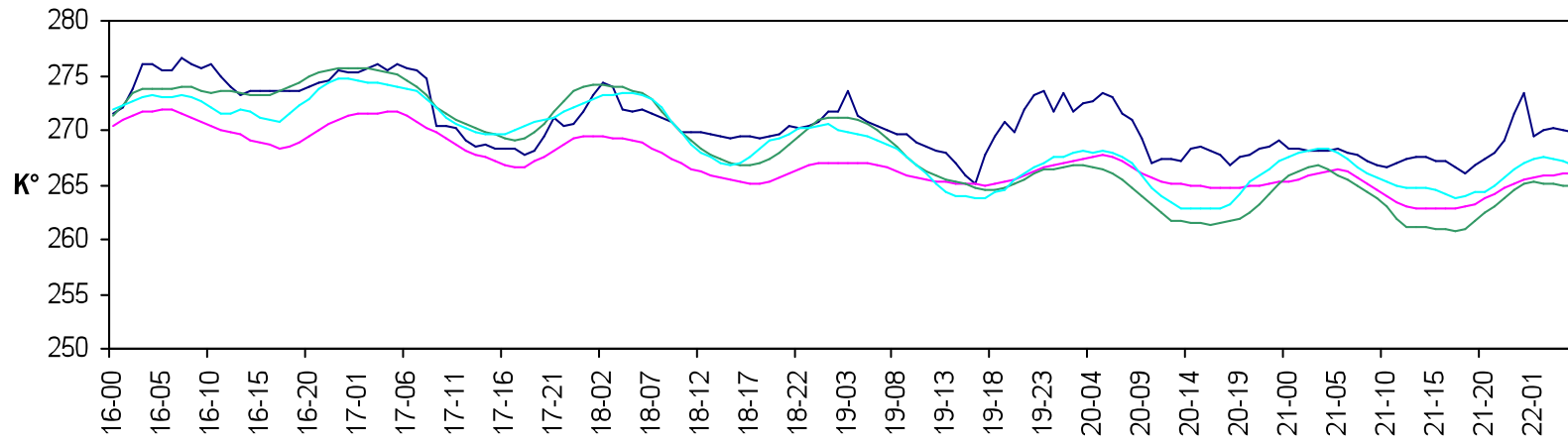


RITA JUNE 2002: TEMPERATURE

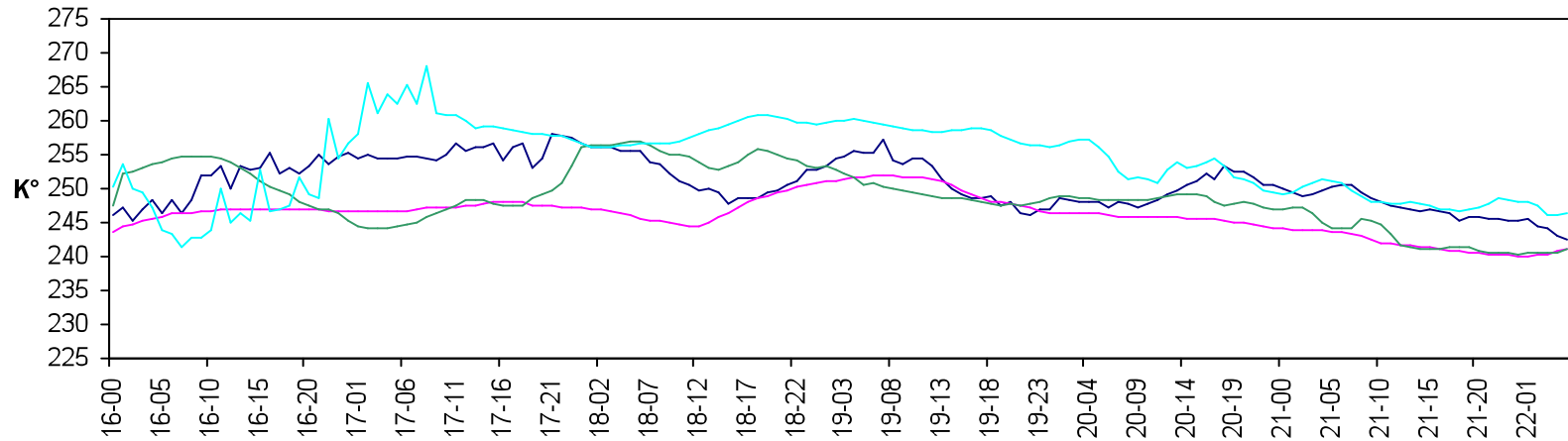


# Temperature (3)

SOFIA JANUARY 2002: TEMPERATURE



SOFIA JUNE 2002: TEMPERATURE

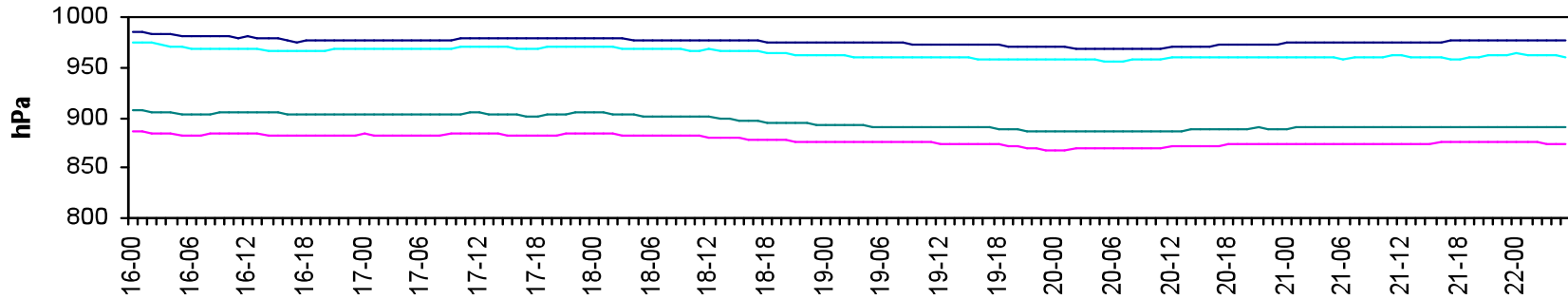


— T-rec — 2 KM — 5 KM — 10 KM

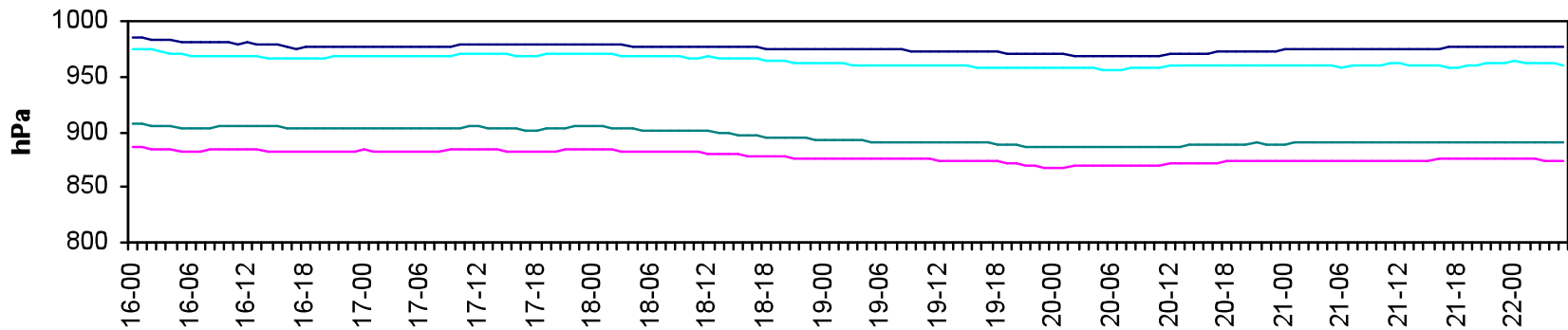


# Pressure

ENEIDEJUNE 2002: PRESSURE



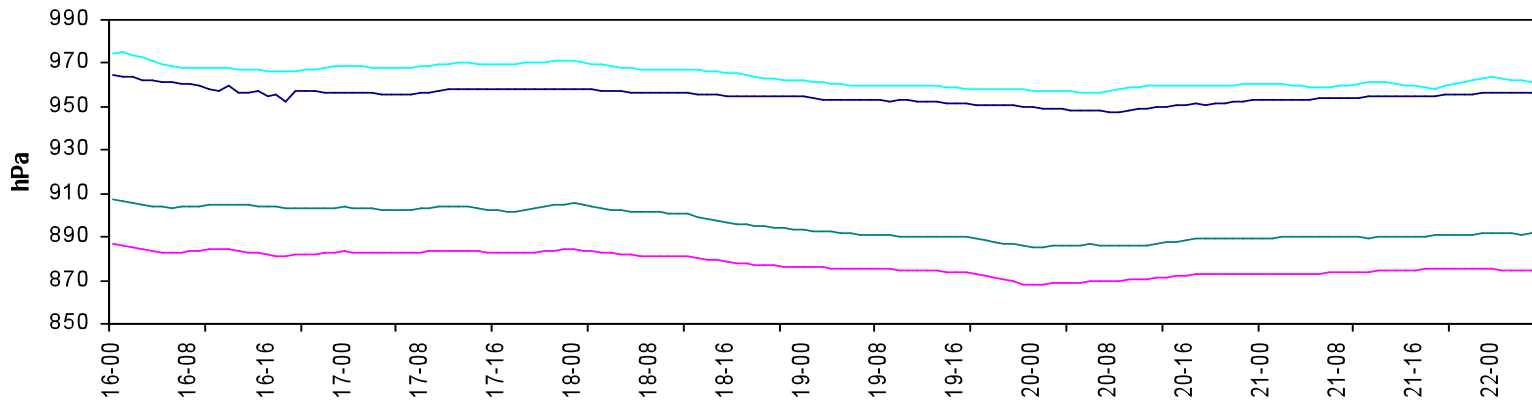
ENEIDEJUNE 2002: PRESSURE



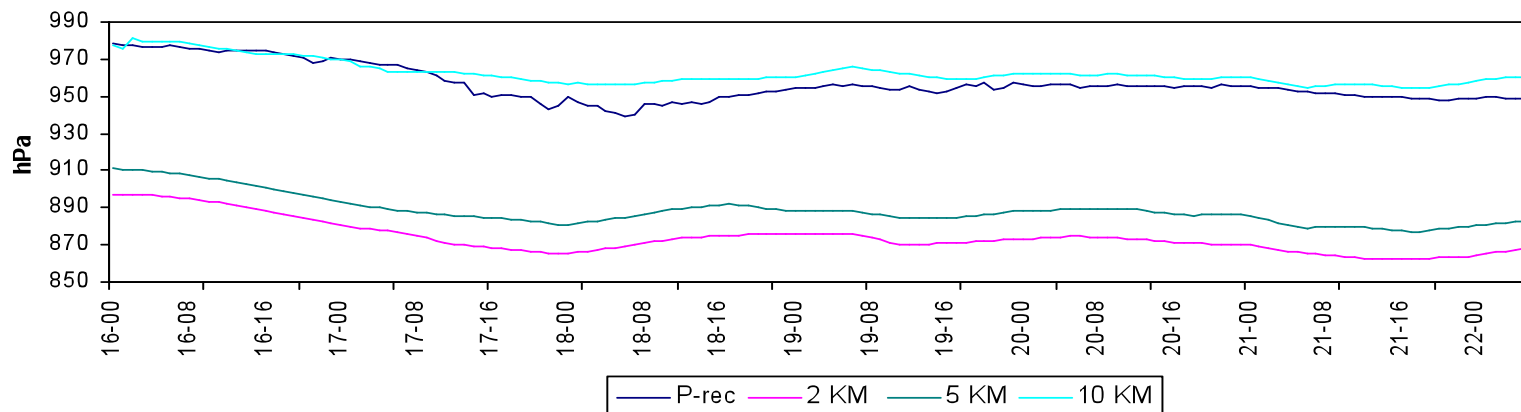
— REG. — 2 KM — 5 KM — 10 KM

# Pressure (2)

RITA JANUARY 2002: PRESSURE



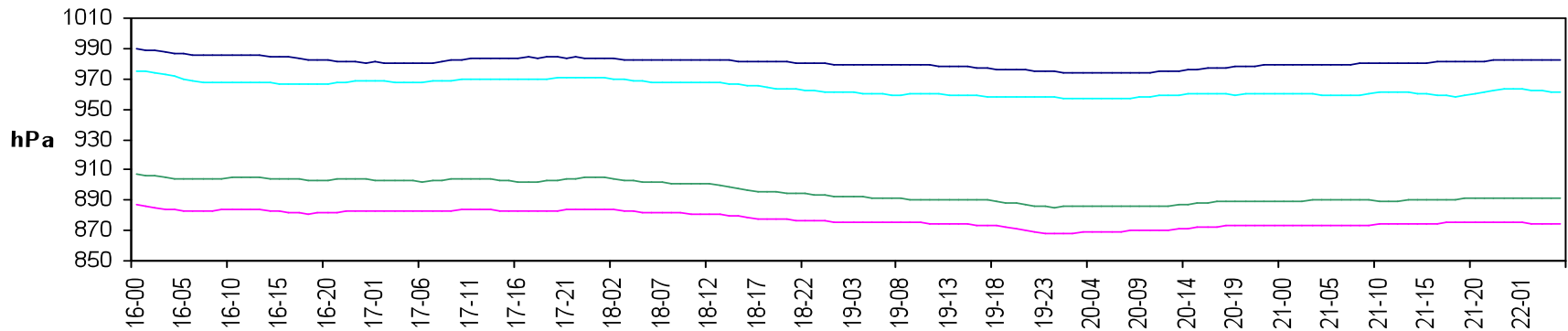
RITA JUNE 2002: PRESSURE



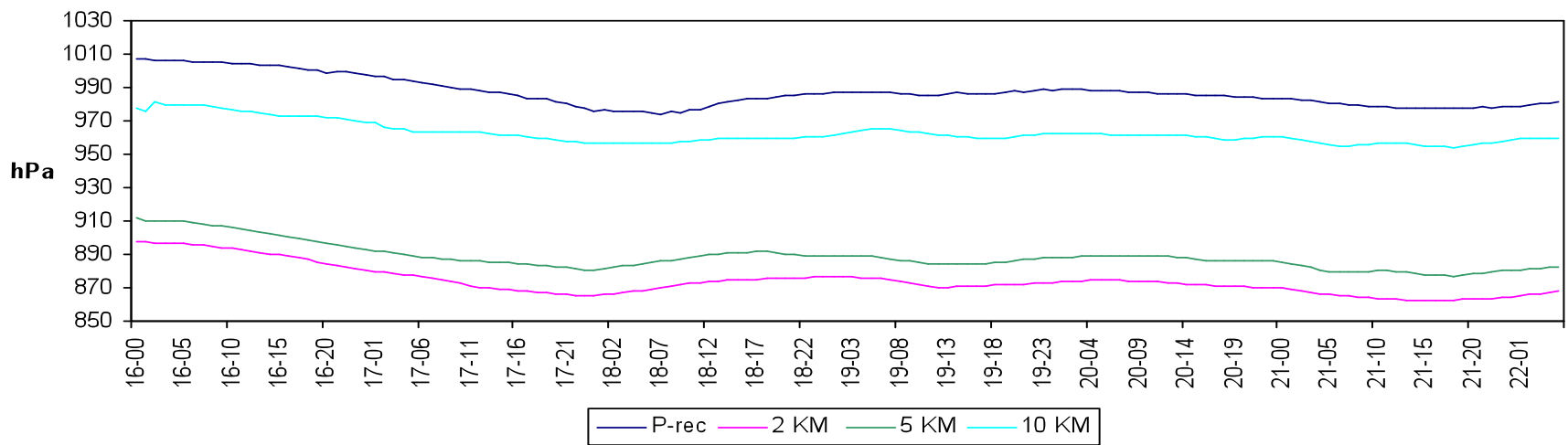
— P-rec — 2 KM — 5 KM — 10 KM

# Pressure (3)

SOFIA JANUARY 2002: PRESSURE



SOFIA JUNE 2002: PRESSURE



	ENEIDE WIND SPEED					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,65	2,09	3,95	0,32	7,20	10,71
5 KM	0,39	-0,18	3,75	0,06	5,31	9,82
10 KM	-0,15	-0,28	4,94	0,48	3,55	8,02
	RITA WIND SPEED					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,70	3,31	5,57	0,44	12,39	15,65
5 KM	0,41	1,04	5,00	0,24	10,50	14,33
10 KM	-0,17	0,93	6,18	0,48	8,74	12,38
	SOFIA WIND SPEED					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,88	2,41	4,32	0,17	7,39	10,52
5 KM	0,45	0,14	4,27	0,08	5,51	9,40
10 KM	-0,34	0,03	5,90	0,35	3,74	8,15

	ENEIDE TEMPERATURE					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,87	5,49	5,68	0,85	10,85	11,01
5 KM	0,74	4,19	5,18	0,52	8,21	9,12
10 KM	0,72	3,81	4,50	0,54	2,77	5,46

	RITA TEMPERATURE					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,88	4,03	4,23	0,77	9,39	9,63
5 KM	0,75	2,73	4,07	0,50	6,75	7,84
10 KM	0,73	2,34	3,28	0,46	1,31	5,19

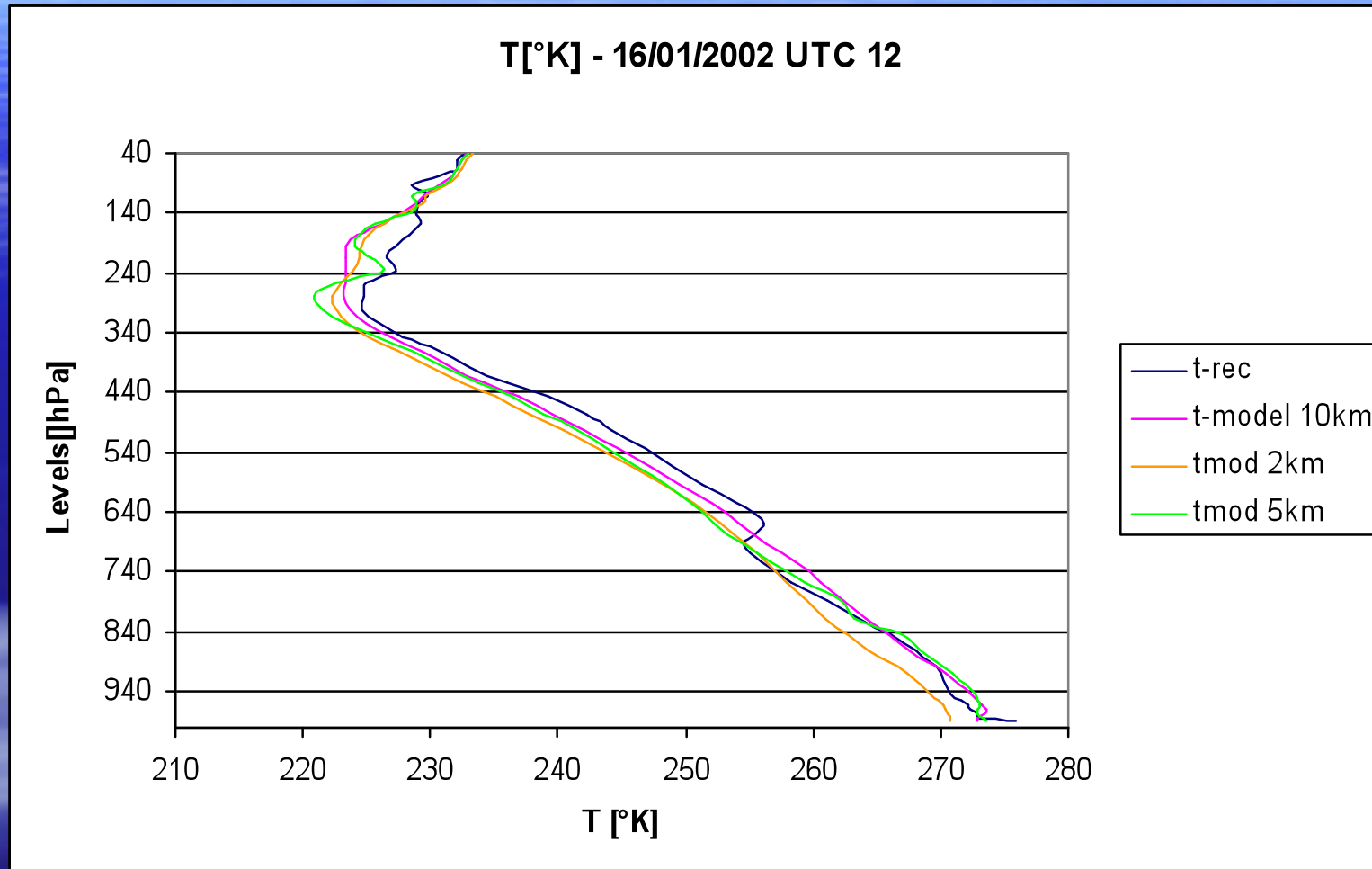
	SOFIA TEMPERATURE					
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,72	3,57	3,84	0,61	4,79	5,63
5 KM	0,81	2,27	3,57	0,39	2,14	5,00
10 KM	0,80	1,89	2,76	0,54	-3,29	5,78



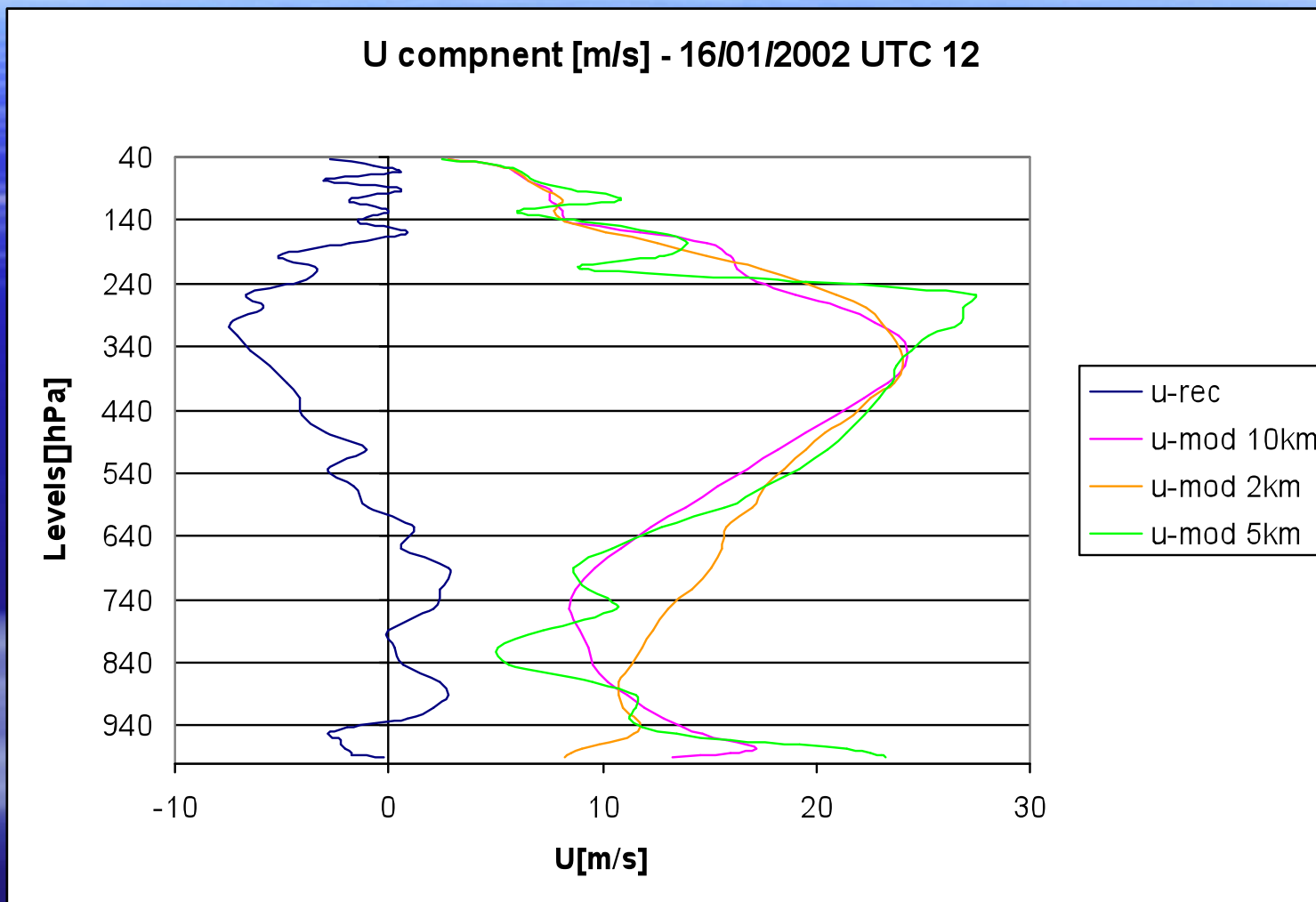
ENEIDE PRESSURE						
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,89	98,14	98,18	0,91	105,03	105,10
5 KM	0,85	79,97	80,09	0,87	90,57	90,69
10 KM	0,88	11,79	12,02	0,93	16,52	17,01
RITA PRESSURE						
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,88	77,40	77,44	0,88	82,51	82,64
5 KM	0,85	59,23	59,40	0,85	68,05	68,24
10 KM	0,88	-8,96	9,27	0,92	-6,00	7,40
SOFIA PRESSURE						
	JANUARY			JUNE		
	CORR.	BIAS	RMSE	CORR	BIAS	RMSE
2 KM	0,88	103,25	103,29	0,93	113,01	113,06
5 KM	0,84	85,08	85,20	0,90	98,55	98,62
10 KM	0,85	16,90	17,09	0,96	24,50	24,69



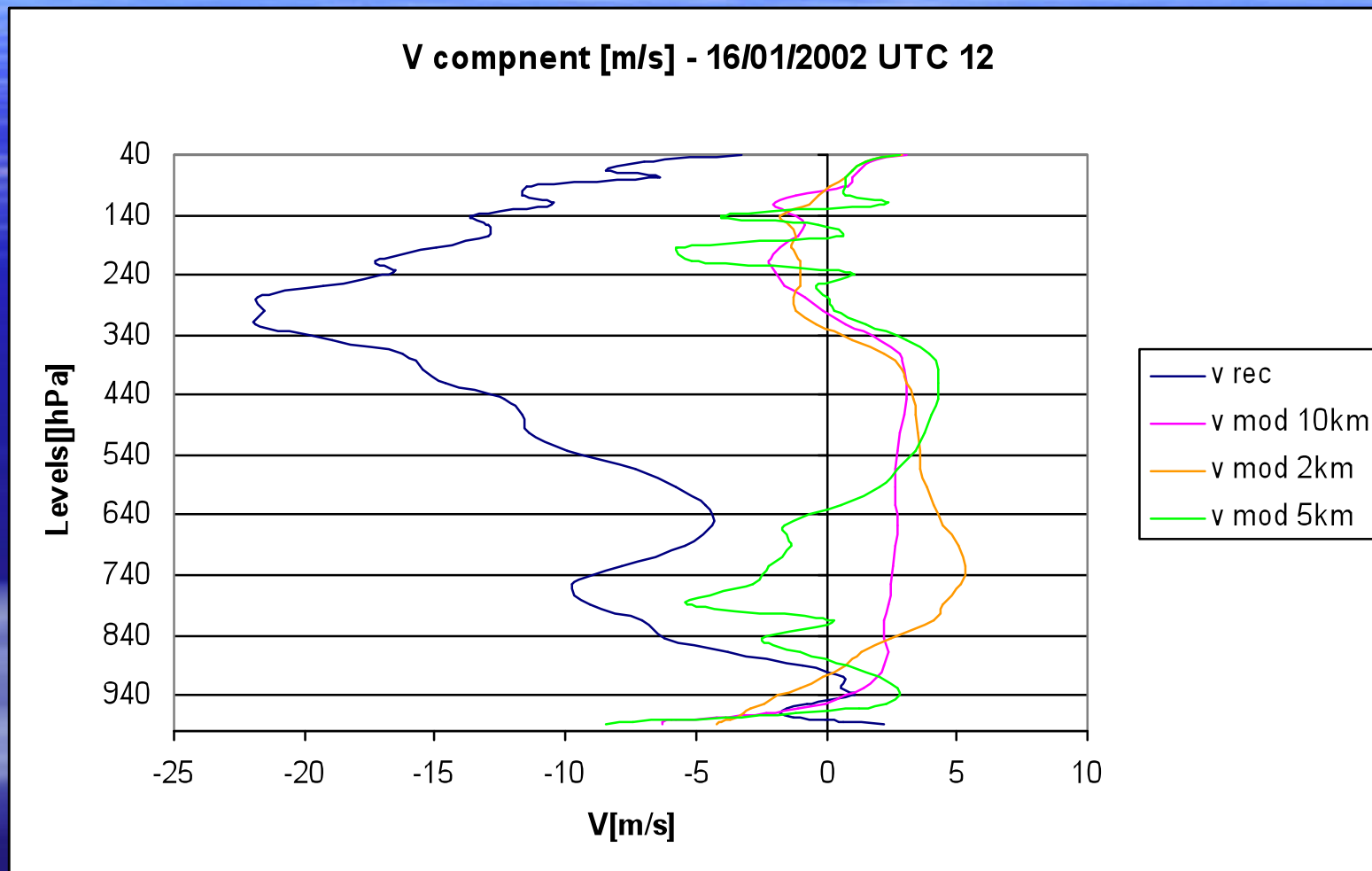
# Temperature – Katabatic event



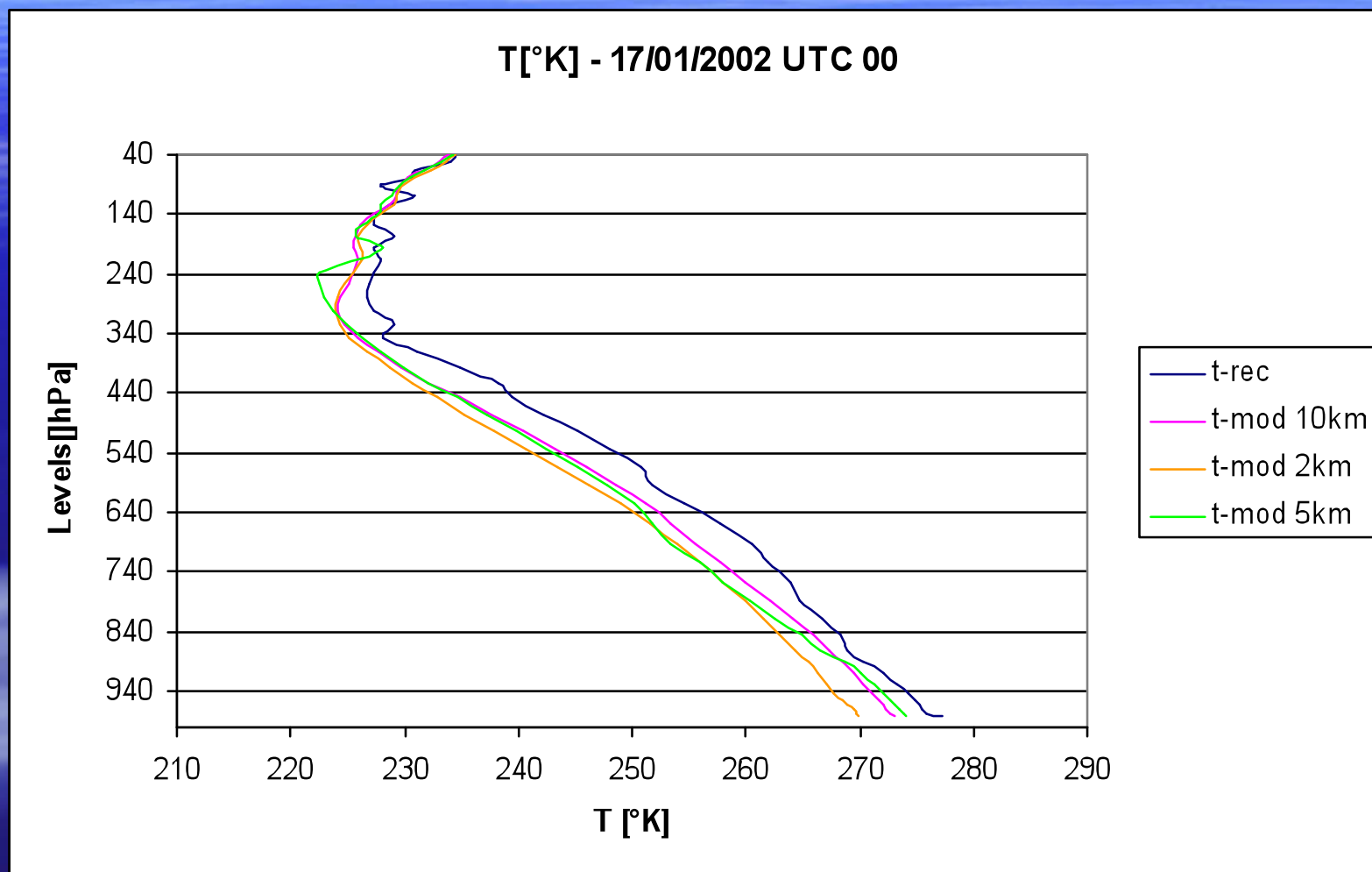
# U - Component– Katabatic event



# V - Component – Katabatic event

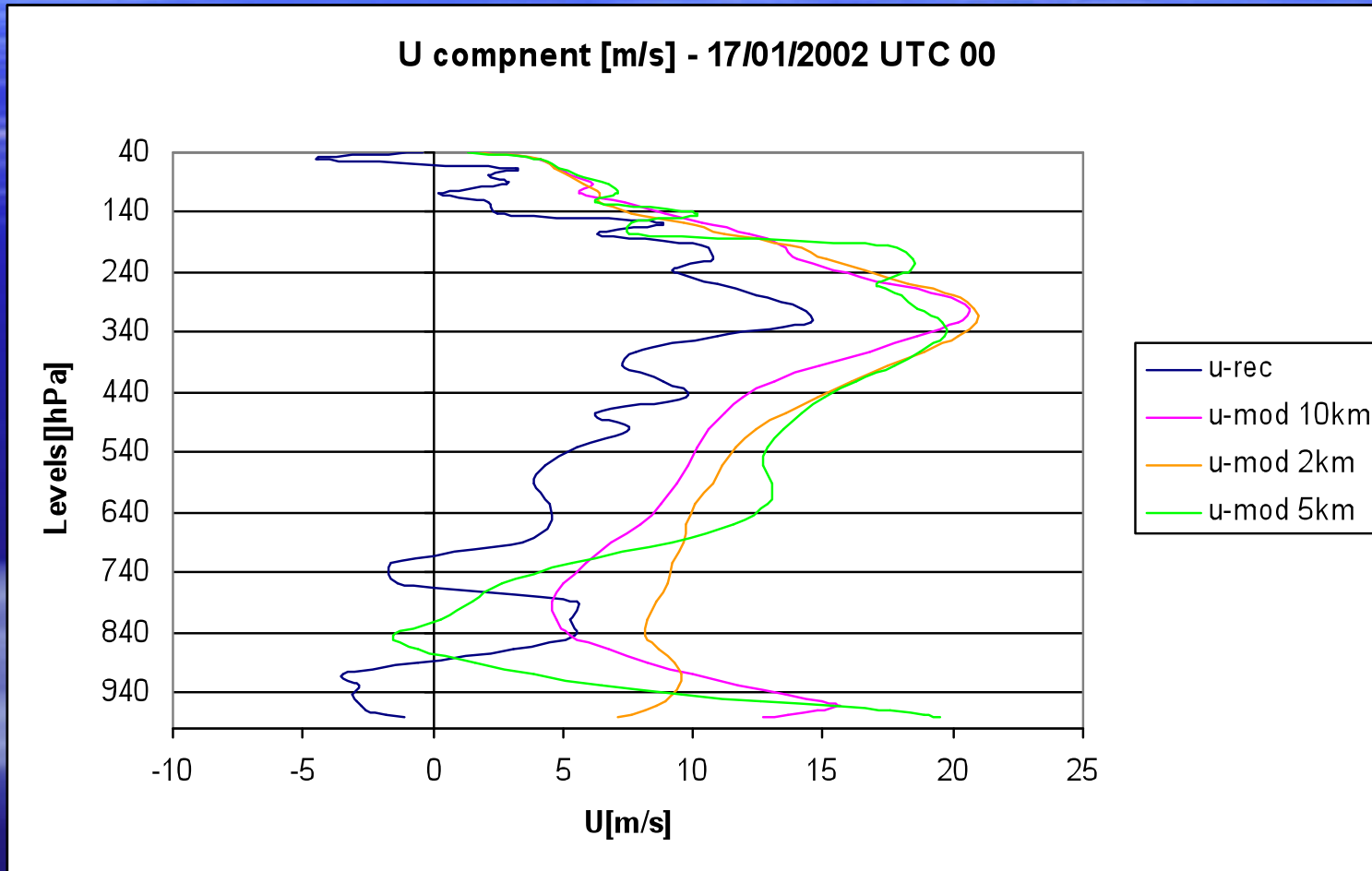


# Temperature

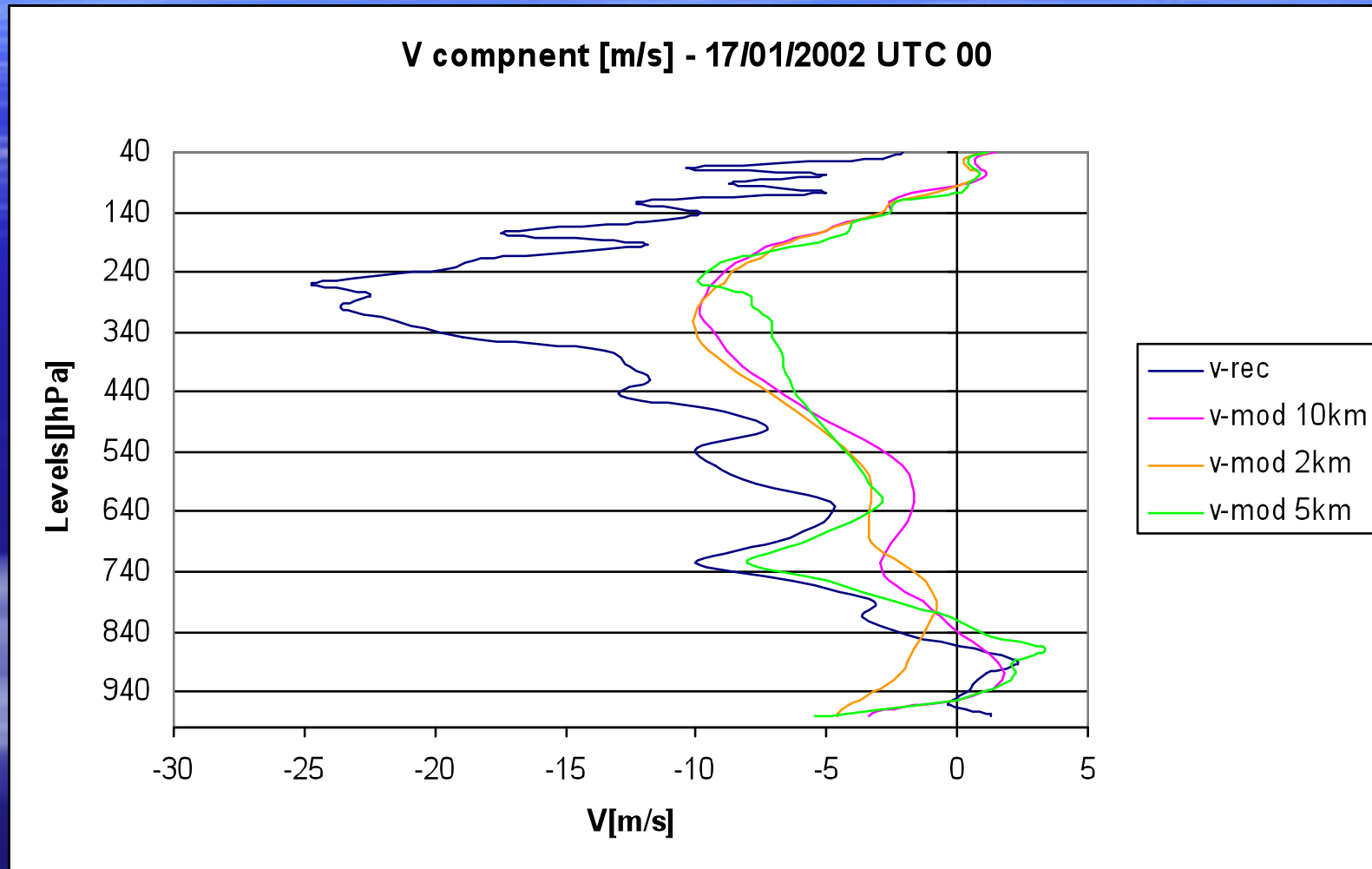




# U – Component



# V - Component



<b>16/01/02 12 UTC: Correlation coefficients</b>			
	<b>T</b>	<b>U</b>	<b>V</b>
<b>2 Km</b>	<b>0,997</b>	<b>-0,598</b>	<b>-0,142</b>
<b>5 Km</b>	<b>0,996</b>	<b>-0,677</b>	<b>-0,223</b>
<b>10 Km</b>	<b>0,997</b>	<b>-0,735</b>	<b>-0,146</b>
<b>17/01/02 00 UTC: Correlation coefficients</b>			
	<b>T</b>	<b>U</b>	<b>V</b>
<b>2 Km</b>	<b>0,993</b>	<b>0,796</b>	<b>0,712</b>
<b>5 Km</b>	<b>0,994</b>	<b>0,476</b>	<b>0,770</b>
<b>10 Km</b>	<b>0,996</b>	<b>0,504</b>	<b>0,848</b>
<b>17/01/02 12 UTC: Correlation coefficients</b>			
	<b>T</b>	<b>U</b>	<b>V</b>
<b>2 Km</b>	<b>0,989</b>	<b>0,867</b>	<b>0,943</b>
<b>5 Km</b>	<b>0,990</b>	<b>0,860</b>	<b>0,897</b>
<b>10 Km</b>	<b>0,993</b>	<b>0,877</b>	<b>0,946</b>

# CONCLUSIONS

- FROM A QUALITATIVE POINT OF VIEW, MAR PERFORMS GOOD REFERRING TO THE CONSIDERED PARAMETERS
- SIGNIFICANT BIASES HAVE BEEN EVALUATED AGAINST BOTH AWS DATA AND RADIOSOUNDINGS
- PRESSURE BIASES SPOT ON DIFFICULTIES WITH TOPOGRAGHY INTEGRATION OR NOT APPOPRIATED INPUT DATA