Environmental conditions on Potential Observatories

Gamsberg (NAMIBIA) 2350 m
$16^o 2' E$ $23^o 3' S$
Distance to coast: 200 km

for the months of **July 1994** to **July 1995**

Automatic meteorological stations, microthermal sensors, and Differential Image Motion Monitors (DIMM) have been used to monitor environmental conditions at the Gamsberg plateau.

10 m level: Microthermal sensor
5.5 m level: Microthermal sensor
3.5 m level: Microthermal sensor, Wind direction and velocity
3.0 m level: Temperature, Humidity and Solar/Lunar radiation
2.0 m level: Seeing and scintillation (DIMM1)

Due to power availability, meteorological measurements are taken during nighttime only. The microthermal data are stored every minute along with humidity, wind speed and direction. Temperature is read every 10 minutes.

The seeing is measured at 2.0 m above ground and defined as the Full Width Half Maximum of a stellar image observed with a perfect large telescope, at $0.5\mu m$ wavelength and at zenith. It is measured over periods of a few minutes all night long. Maximum wind speed for operation is about 15 m/s and sky must be clear in the zenith area. Seeing averages every 2 mn are plotted on Fig. 1. Individual measurements are grouped into 10 mn bins to produce the yearly statistics

Precipitable Water Vapor is computed from the sky emissivity at 18.5 microm. Measurements are taken every two hours at nighttime (from 18h UT to 04h UT) when the zenith area is free of clouds (Fig. 2).

Temperature and humidity age given in Figures 3 and 4

The resolution of the various sensors is the following:
-Wind direction: $\pm 4^o$ at 2 m/s, $\pm 2^o$ above 5 m/s (threshold: 1 m/s)
-Wind speed: accuracy $\pm 2\%$ (threshold: 1 m/s)
-Temperature: accuracy $\pm 0.1^o$
-Humidity: $\pm 2\%$
-Seeing: better than 10% above 0.25 arcsec

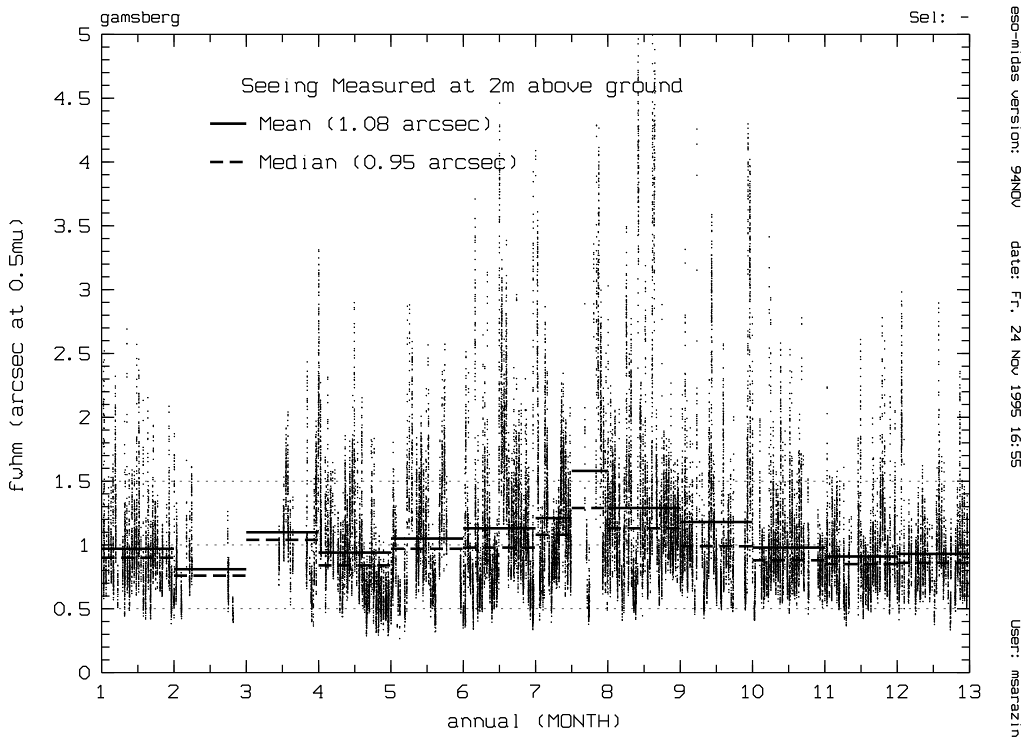

Figure 1: Seeing at 2 m above ground recorded at Gamsberg from mid-July 1994 to mid-July 1995

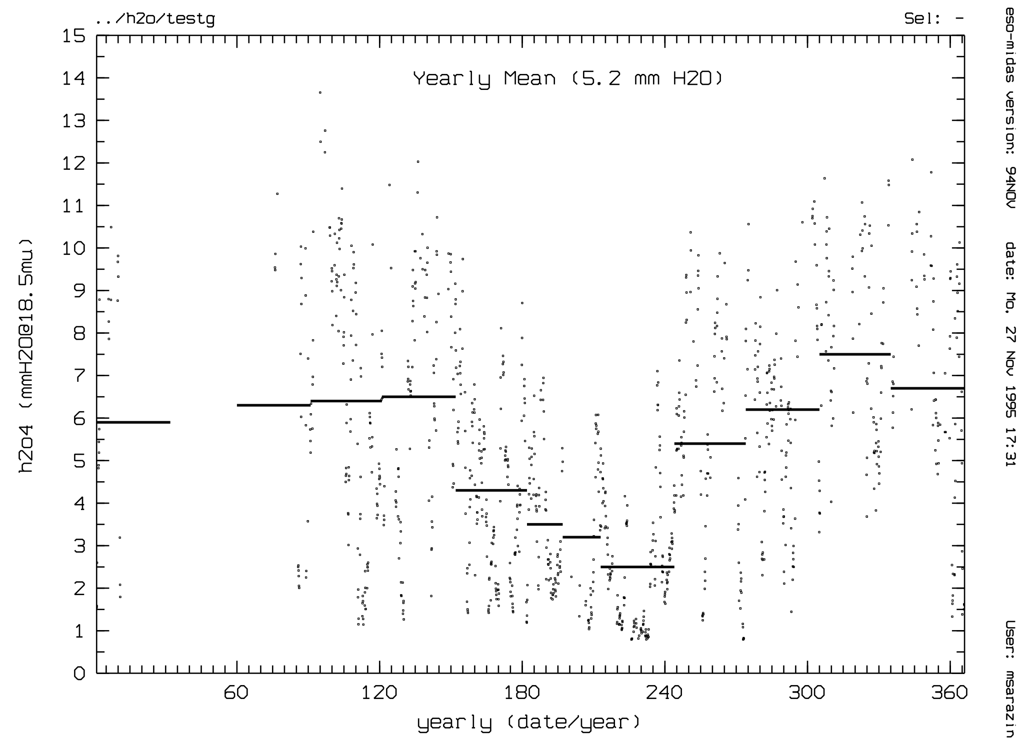

Figure 2: Precipitable Water Vapour recorded at Gamsberg from mid-July 1994 to mid-July 1995 in photometric sky.

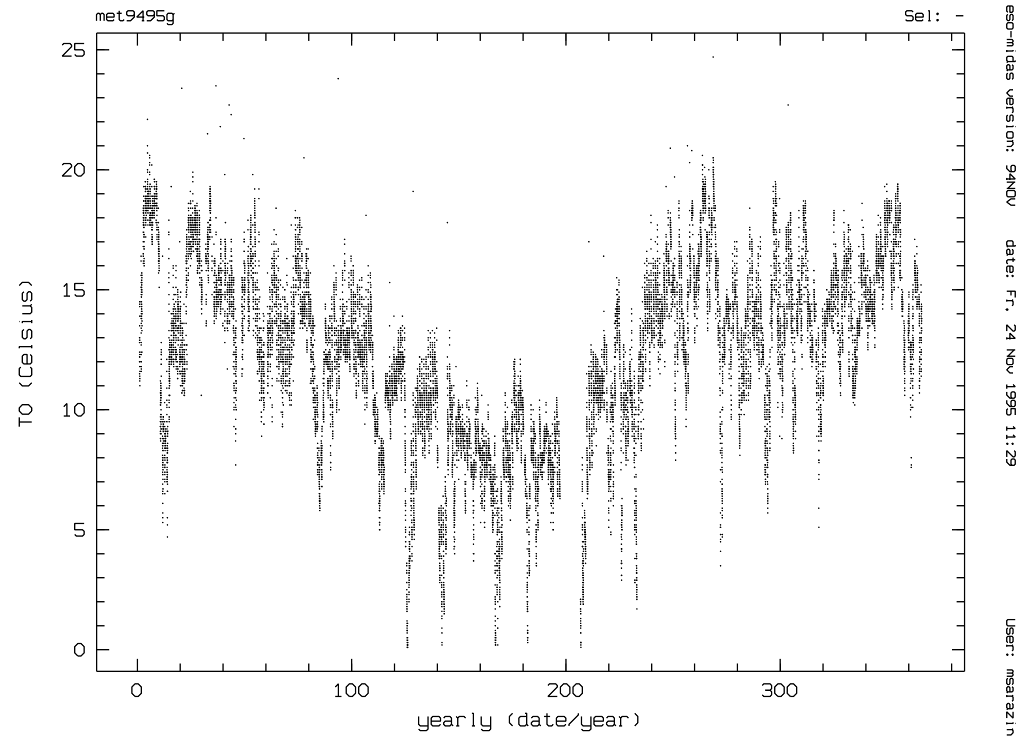

Figure 3: Nighttime Temperature recorded at Gamsberg from mid-July 1994 to mid-July 1995 every 10 minutes.

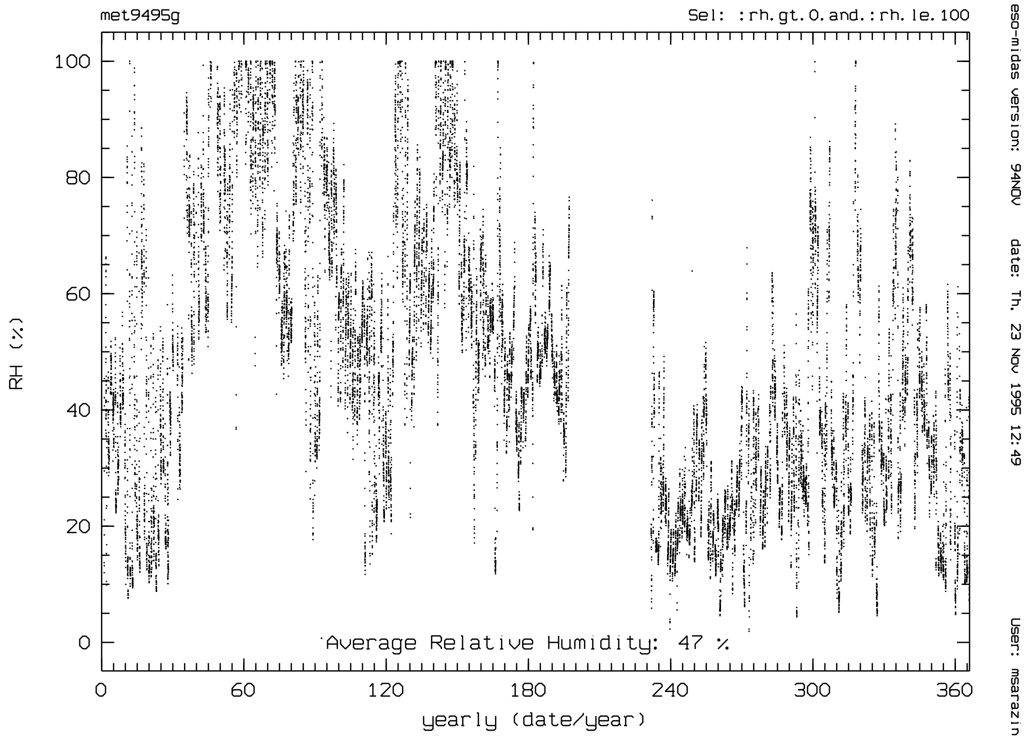

Figure 4: Nighttime humidity recorded at Gamsberg from mid-July 1994 to mid-July 1995 every 10 minutes.

Parameter	min	5%	Median	Average	95%	Max	nr. samples
Seeing (arcsec) at 2.5 m	0.27	0.55	0.94	1.08	2.06	5.04	13332 (10mn)
Seeing corrected for 5.5 m	0.26	0.51	0.90	1.05	2.10	4.97	9644 (10mn)
Seeing corrected for 10 m	0.20	0.48	0.86	1.01	2.03	4.82	9609 (10mn)
Wind night only (m/s)	0	0.5	3.4	3.5	7.3	14.8	21327 (10mn)
Rel. Humidity (night, %)	1	14	44	47	91	100	20441 (10mn)
Prec. Water Vapour	0.7	1.2	5.0	5.2	10.0	13.7	1126

Table 1: Yearly statistics of key parameters at Gamsberg.

Parameter	% of observed nightime bins Gamsberg
Seeing < 0.5 arcsec	3 (4% at 5.5 m, 6% at 10 m)
Wind < 20 m/s	100
Wind < 10 m/s	99
Humidity < 90 %	94
Photometric nights	54
Water Vapour < 2mm	2

Table 2: Summary of limit conditions at Gamsberg site

Month	Seeing (median/average)	% photometric nights (mm rain)	Water Vapour average (mm)
July 94 (15th onwards)	1.29/1.58	100 (0)	3.2
August 94	1.13/1.18	90 (0)	2.5
September 94	0.99/1.18	40 (0)	5.4
October 94	0.88/0.98	61 (0)	6.2
November 94	0.85/0.91	43 (0)	7.5
December 94	0.86/0.93	32 (0)	6.7
January 95	0.90/0.97	48 (0)	5.9
February 95	0.76/0.81	7 (110)	-
March 95	1.04/1.10	13 (173)	6.3
April 95	0.84/0.94	77 (3)	6.4
May 95	0.97/1.05	52 (0)	6.5
June 95	0.98/1.13	97 (0)	4.3
July 95 (up to 16th)	1.08/1.21	75 (0)	3.5

Table 3: Monthly summary of conditions at Gamsberg site