10.12 Meteorological data – **.met*

The Carlsberg Automatic Meridian Circle carried out regular meteorological observations in the period 13 May 1984 to 27 May 1998 and the records are more or less continuous in that period. The devices used to measure temperature, pressure, humidity, wind speed and direction are as follows:

Temperature
Analog Devices AD590K
Range: –55° C to +150° C
Calibrated accuracy: 0.1° C
Situation: mast head; 6 metres above ground until 1991 May 16,
then 10.5 metres above ground

Pressure
Ysi Sostman, 2014–19.2/25.7 HA–3–WH aneroid type
barometer
Range: 650–870 mb
Resolution: 0.1 mm Hg
Hysteresis: $\leq$0.1 mm Hg
Situation: inside telescope enclosure (started 1 August 1984)

Humidity
Lambrecht KG, type 800 N 100 hair hygrometer
Range: 0–100% relative humidity
Resolution: 2%
Situation: inside the telescope enclosure until 1987 October 17
when it was moved to the outside north–facing wall of
the telescope enclosure

Wind speed
From 1984 May:

> Malling, system 881.01 and 875 anemometer
> Range: 0–30 m/s
> Accuracy: 1 m/s

From 1988 January:

> Vaisala WAA 12 anemometer
> Range: 0–75 m/s
> Accuracy: $\pm$ 1% below 20 m/s; $\pm$ 2% above 20 m/s

Situation: mast head; 6 metres above ground until 1991 May 16,
then 10.5 metres above ground
NB: Until December 1994, wind speed averaged over several
seconds and therefore insensitive to sudden gusts

Wind direction
Aanderaa, model 2053 (vane type)
Range: 0° – 360°
Accuracy: 5°
Situation: mast head; 6 metres above ground until 1991 May 16, then 10.5 metres above ground

For the years 1984, 1985 and 1986 meteorological readings are only available at 30 minute intervals. From 1987 January, the meteorological sensors were read automatically by a dedicated Olivetti PC. Readings were then made at 5 minute intervals throughout the day and night regardless of whether observing was in progress. Beginning in 1994 December, all readings were made at 20 s intervals and then averaged over 5 minutes. The 5-min averages of wind velocity are thus less prone to erratic fluctuations caused by gusts than single readings at 5 minute intervals.

No readings were available when any one of the computers was "down", or a sensor became faulty, or during periods of routine maintenance or when the telescope was being modified – for example when fitting the new micrometer or the new circle reading system etc. In particular, there are no meteorological data for the following periods:

1984 September 25 to October 8: data were inadvertently deleted from the computer file

1985 December 9 to December 31: technical fault

1986 January 1 to January 11: telescope out of operation due to technical fault

1986 March: no wind direction data because the transducer was broken by heavy icing

1986 September 12 to September 22: telescope out of action due to technical fault

1986 December 18 to December 31: telescope was closed down for this period

1988 February: breaks in the data due to the fitting of the new micrometer

1988 May to August 10: no wind direction values between north and north–east because direction indicator was faulty

1994 January: gaps in the data because some of the sensors broke free from the top of the meteorological mast due to severe icing and strong winds

1995 April: gaps in the meteorological data because a new telescope control system was installed and operation was restricted

1995 September 14 to 1995 November 16: no wind direction values due to a fault in the wind direction device

1995 November 16 to 1996 March 7: A/D converter produced 'noisy' background.

The meteorological data are given in 26 six-monthly files. The number of records in each file is as follows:

1984 Jun–Dec	3541
1985 Jan–Dec	5974
1986 Jan–Dec	7285
1987 Jan–Jun	47349
1987 Jul–Dec	45810
1988 Jan–Jun	50637
1988 Jul–Dec	46556
1989 Jan–Jun	50672
1989 Jul–Dec	51706
1990 Jan–Jun	51974
1990 Jul–Dec	49363
1991 Jan–Jun	50008
1991 Jul–Dec	49571
1992 Jan–Jun	51884
1992 Jul–Dec	51606
1993 Jan–Jun	50622
1993 Jul–Dec	52740
1994 Jan–Jun	50640
1994 Jul–Dec	51173
1995 Jan–Jun	49121
1995 Jul–Dec	53010
1996 Jan–Jun	50989
1996 Jul–Dec	49001
1997 Jan–Jun	50548
1997 Jul–Dec	51899
1998 Jan–May	42033

Format of meteorological data record

Record length = 60 char

Format	Quantity
1X	
I4	Year
1X	
I2	Month
1X	
I2	Day
1X	
I2	Hours UT
1X	
I2	Minutes UT
1X	
I2	Seconds UT
2X	
F5.1	Pressure in millibars
2X	
F6.1	Outdoor temperature in °C
2X	
I2	Wind speed in metres/second
1X	
I3	Wind direction: North is 0°; East is 90°
1X	
I3	Percentage relative humidity: measured inside the dome until 17 October 1987; outdoors thereafter
1X	
F6.1	Temperature inside the dome in °C
1X	
5I1	Acceptance flags for pressure, temperature, humidity, wind speed and wind direction: if 0 – reading ignored if 1 – reading accepted if temperature flag set to 2, then temperature is the indoor temperature as the outside value was unacceptable Inside temperature and acceptance flags are not available for the period June 1984 to December 1986.