

DNMI

DET NORSKE METEOROLOGISKE INSTITUTT

klima

HANØYTANGEN , JULY 1994

Knut A. Iden

RAPPORT NR. 31/94 KLIMA



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HANØYTANGEN , JULY 1994

PREPARED BY

Knut A. Iden

ORDERED BY

KVÆRNER CONCRETE CONSTRUCTION
CONTRACT NO: KCC/PAC004/001

SUMMARY

Monthly summary based on the meteorological data
measured at the building site of Kværner at
Hanøytangen, Askøy near Bergen.

SIGNATURE

Knut A. Iden
.....

Knut A. Iden
PROJ. RESPONSIBLE

Bjørn Aune
.....

Bjørn Aune
HEAD OF DIVISION

MONTHLY REPORT JULY 1994

CLIENT : DNMI
CONTRACT NO. : KCC/PAC004/001
PROJECT NO. :
DOCUMENT NAME : RAPPJULY.94
PROJ. MANAGER : Knut A. Iden
EXECUTED BY : Bjørn. H. Halvorsen and Knut A. Iden
APPROVED BY : Bjørn Aune *Bjørn Aune*
COMPLETION DATE : SEPT. 02 1994
REV 1. :

DSU : serial no. 6601
Received : AUGUST 5 1994

Comments regarding the data :

The DSU serial no.6601 contains data for the period 08/7/94 to 03/8/94.

The DSU is read by the standard software (P3059) delivered from Aanderaa a/s. The calibration factors applied is provided by Aanderaa in a fax dated January 21 1994.

The processing is based on this data set and the following steps are conducted :

- . A SAS data set of the data for JULY is generated

In this step 10 min mean wind speed > 35 m/s and gust wind speed > 40 m/s are replaced with missing values. The wind speed in 30 m is also compared to the wind speed measured 18 m above the ground. If deviation is 10 m/s above or 5 m/s below the wind speed measured in 18 m, the wind speed in 30 m is replaced by missing value. The reason for this handling is there seem to be some disturbances connected to the measurements in the top of the mast (30 m above the ground).

The other meteorological parameters are checked to be inside reasonable intervals. The original data which is replaced due to the specified criterions are saved for an assessment. Appendix 2 gives a listing of these records.

- . Plots of the time series are generated and examined.
- . Un physical values (spikes) are eliminated.
- . Final plots of the time series are generated.
- For wind speed and wind direction 10 min values are plotted. For the parameters air temperature (T), humidity (UU) and air pressure reduced to mean sea level (QFF), hourly means are plotted. The hourly mean for 11.00^h is defined by the measurements for 10.30^h, 10.40^h, 10.50^h, 11.00^h, 11.10^h and 11.20^h.
- . Distribution tables wind speed /direction are generated. 22.5° intervals are applied for the direction. N='348.76° - 11.25', NNE = '11.26 - 33.75' ...
- . Wind roses are generated.
- . Coefficient transfert tables are generated.
- . Duration table are generated.
- . Climatological summary table are updated.
- . Preliminary estimates for 10/100 year values for the wind are computed.

Logging each 10 minute

WIND

Parameter	Height	Cover.	Unit	Mean	ST.D.	Max	Dir ¹	D.:Hour	Min	Dir ¹	D.:Hour
Wind speed	30 m	100.0 %	m/s	3.8	2.2	14.4	188	26:1624	0.4	316	03:2114
Wind speed	18 m	100.0 %	m/s	3.7	2.2	14.4	N/A	26:1624	0.4	N/A	03:2114
Wind speed	10 m	100.0 %	m/s	3.6	2.1	14.4	198	26:1624	0.4	295	09:0337
Wind gust	30 m	100.0 %	m/s	5.0	2.6	18.6	194 ²	26:1554	0.4	316 ²	03:2114
Wind gust	18 m	100.0 %	m/s	4.9	2.6	17.7	N/A	26:1604	0.4	N/A	09:0759
Wind gust	10 m	100.0 %	m/s	4.9	2.6	18.3	185 ²	26:1604	0.4	295 ²	09:0759

OTHER METEOROLOGICAL DATA

Parameter	Height	Cover.	Unit	Mean	ST.D.	Max	D.:hour	Min	D.:hour
Air Temp.	2. m ³	98.6 %	C	15.8	3.2	26.4	31:1104	8.7	01:0414
Rel. Hum.	2. m ³	98.6 %	%	72	13.5	91	02:0604	25	24:1804
Air pr.	0. m ³	98.6 %	hPa	1019.3	3.3	1026.4	01:1054	1010.8	26:1454

- 1 Direction is referenced to True North (accuracy +- 2°)
- 2 Direction of gust wind is not measured. The mean wind direction for the ten minute period when it has occurred is applied.
- 3 Air temperature sensor and humidity sensor are placed in the mast 2 m above the reference point on the ground while the pressure sensor have the same height as the reference.

The reference point on the ground is located 15.64 m above the mean sea level (NGO).

The time for the logging this month is not 00,10,20,30... as should be the case. In the beginning of the month the logging is made 04,14,24.. Later in the month the logging is made 09,19,29 ... giving some problems to the computing of the hourly means strictly after the definition given.

Due to the burning of waste materials near the measuring mast, unphysical values/variations are encountered in the data. Obvious spikes have been removed from the data and replaced by a missing value notation.

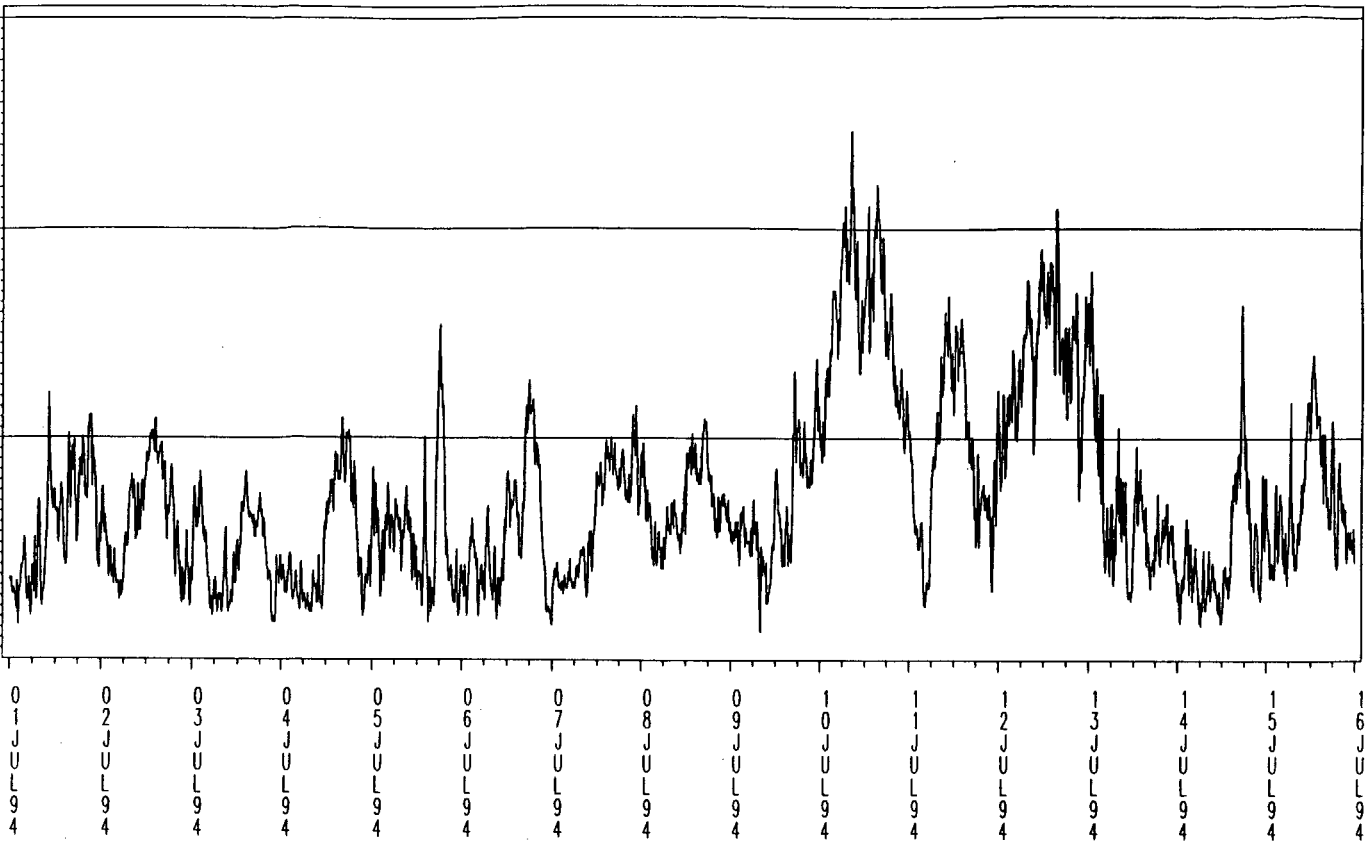
However, the false heating is a random variabel leaving questions to the reliability of the measured air temperature and relative humidity. The actual air temperature is used in the algorithm to compute the air pressure at sea level.

The minimum of the wind speed (0.4 m/s) has occurred several times this month. It is the first occurrence which is given in the table.

PLOT OF TIME SERIES

HANØYTANGEN 1994

Wind speed 10 m above the ground (m/s)

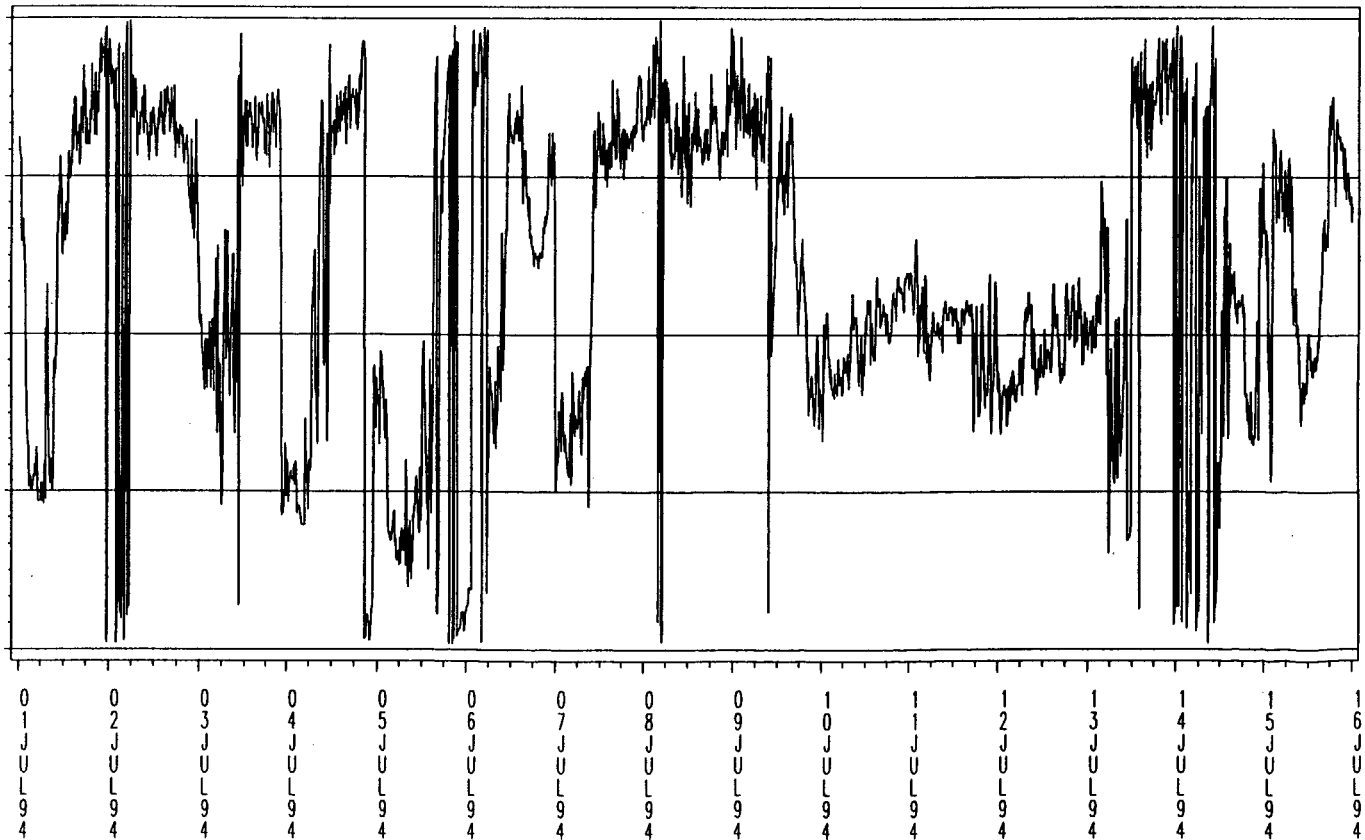


DAY

DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1994

Wind direction 10 m above the ground

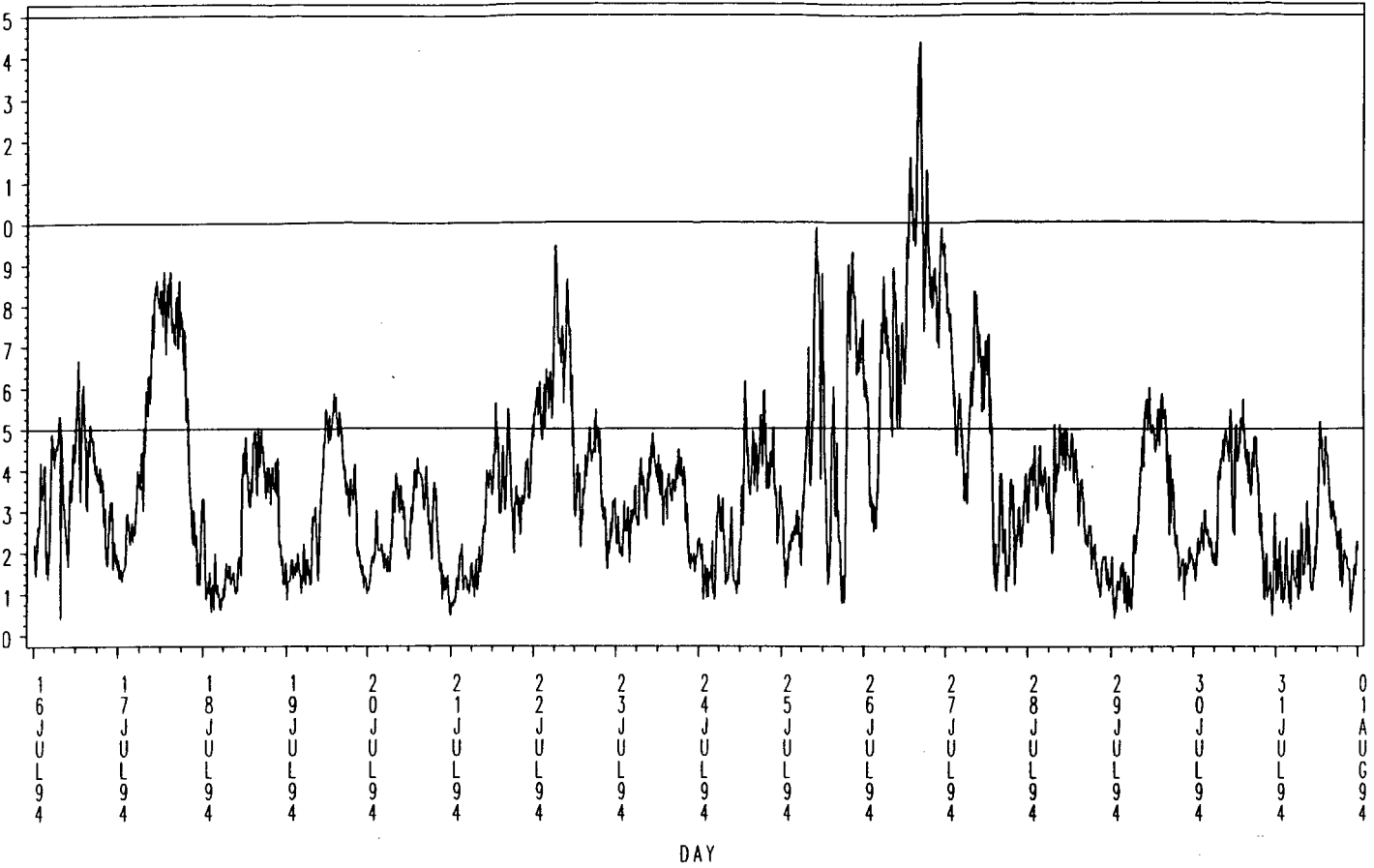


DAY

DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1994

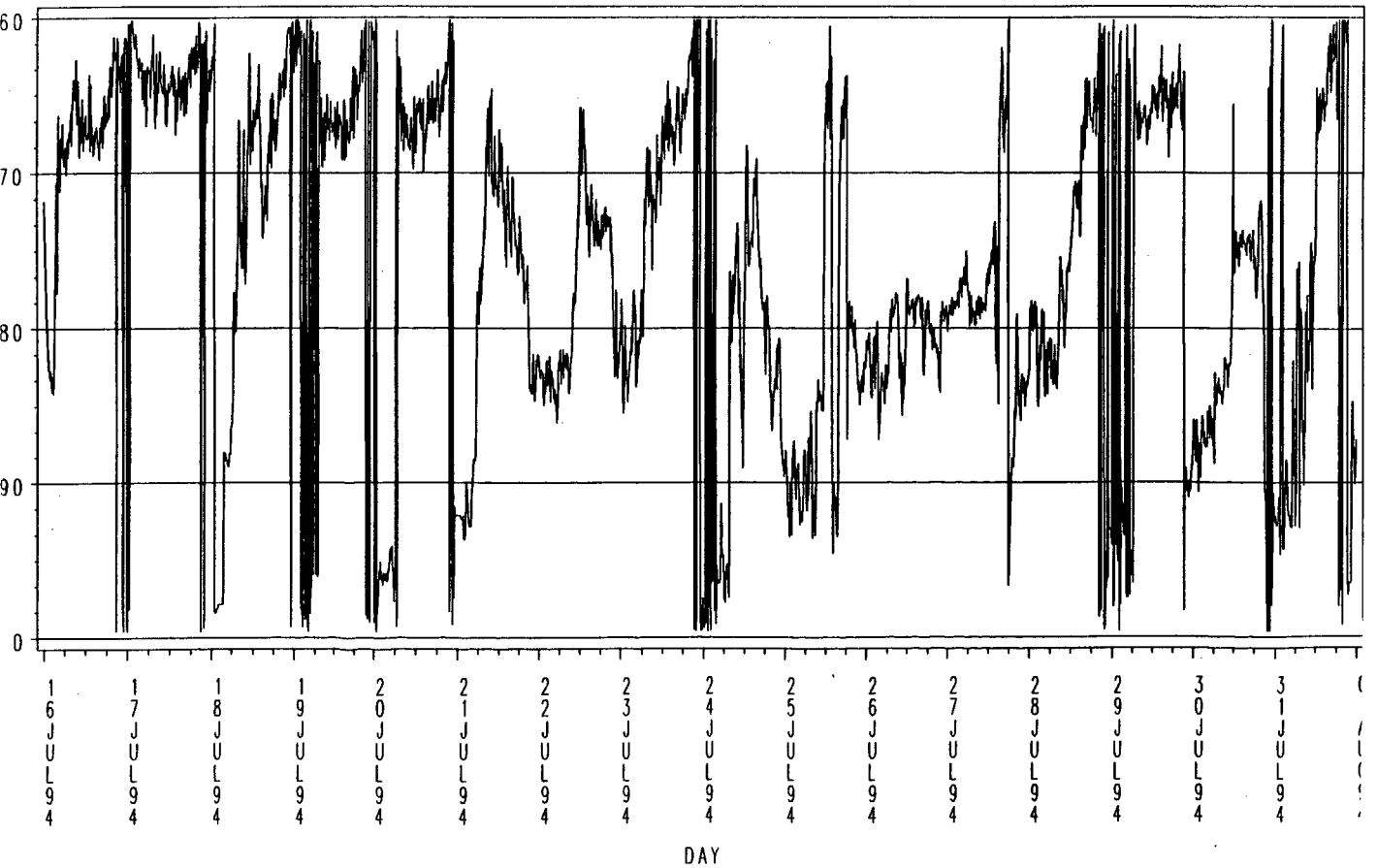
Wind speed 10 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

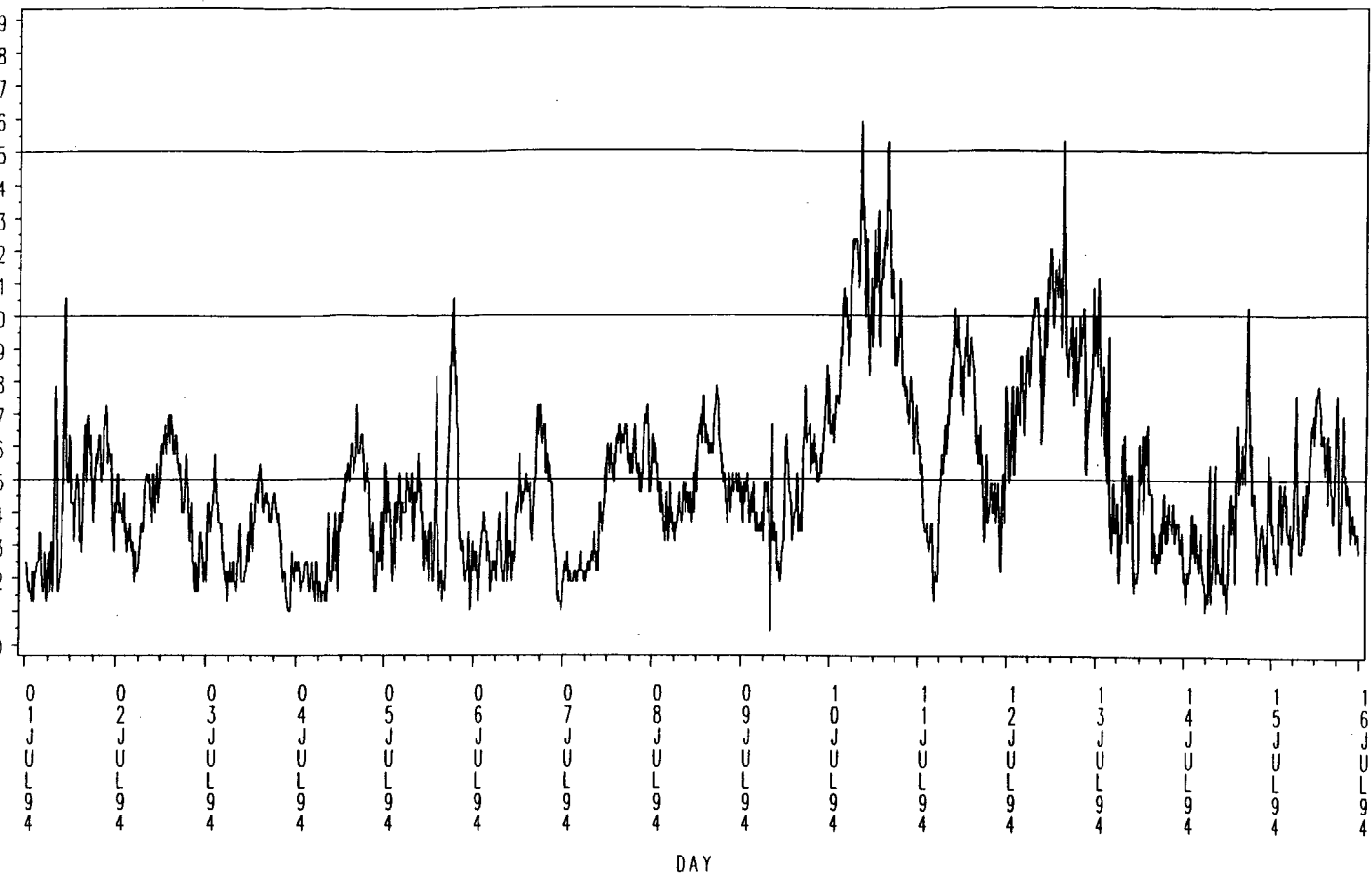
HANØYTANGEN 1994

Wind direction 10 m above the ground



HANØYTANGEN 1994

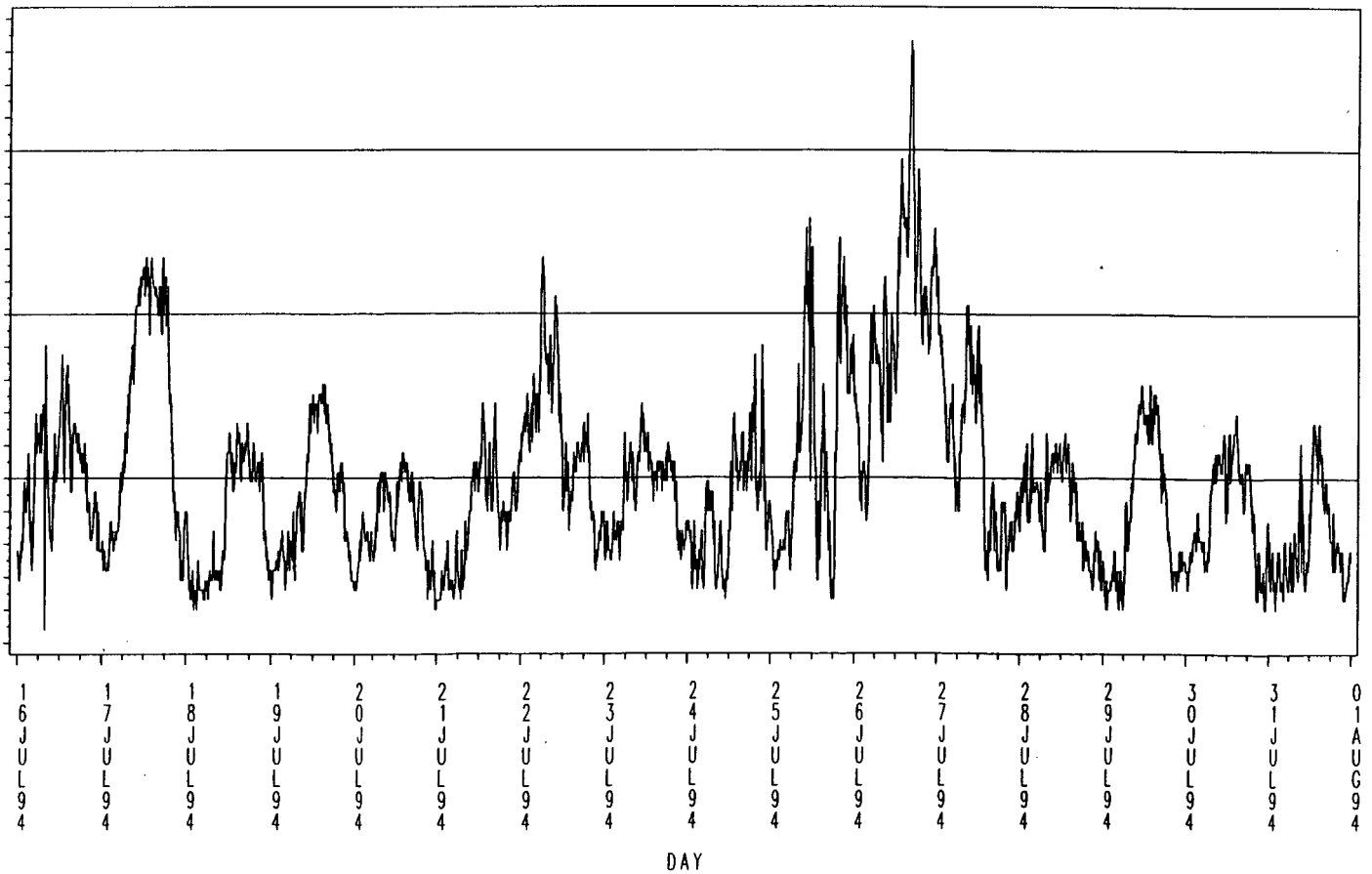
Gust wind speed 10 m above the ground (m/s)



DNMI - KLIMADELINGEN

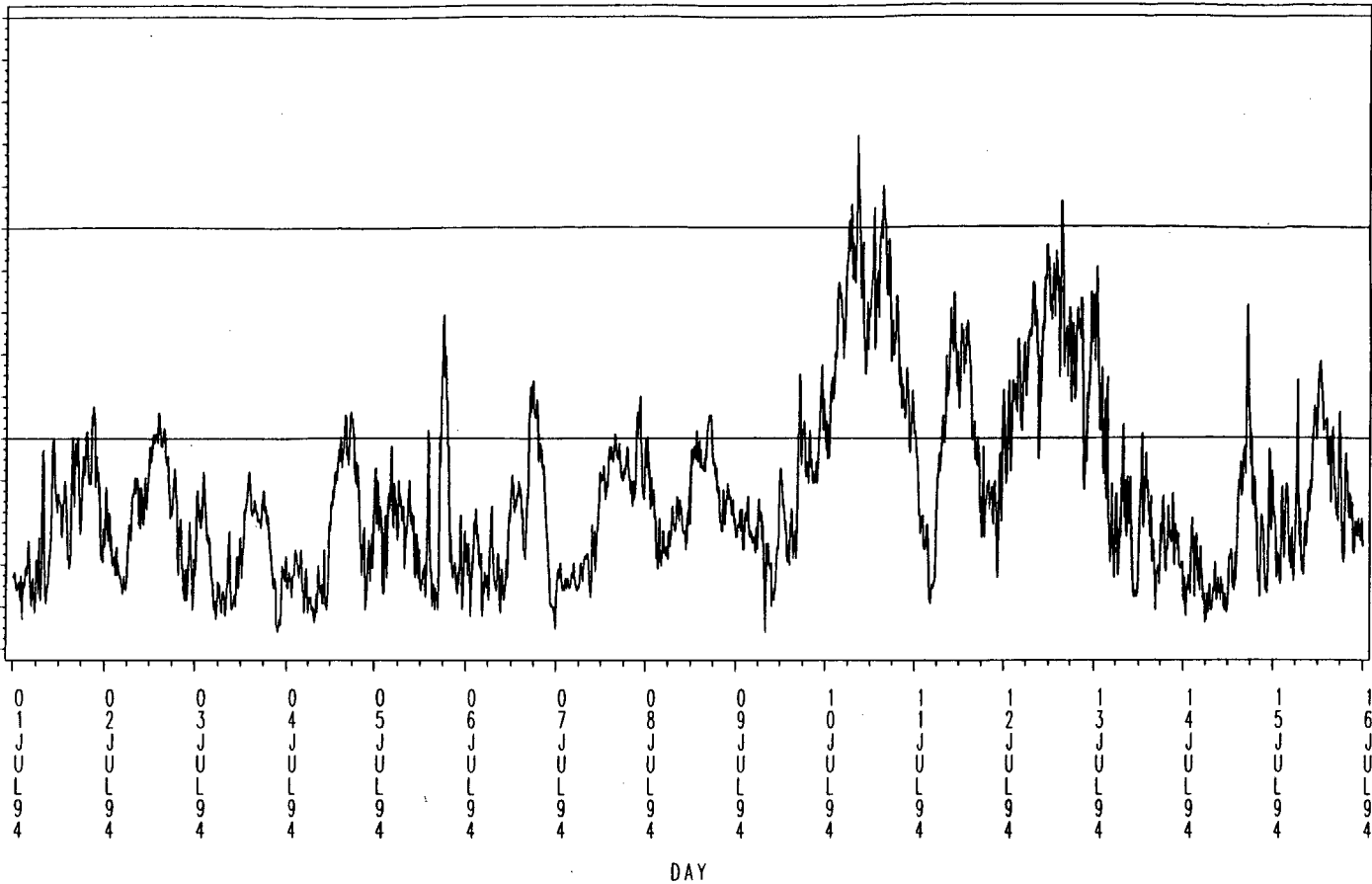
HANØYTANGEN 1994

Gust wind speed 10 m above the ground (m/s)



HANØYTANGEN 1994

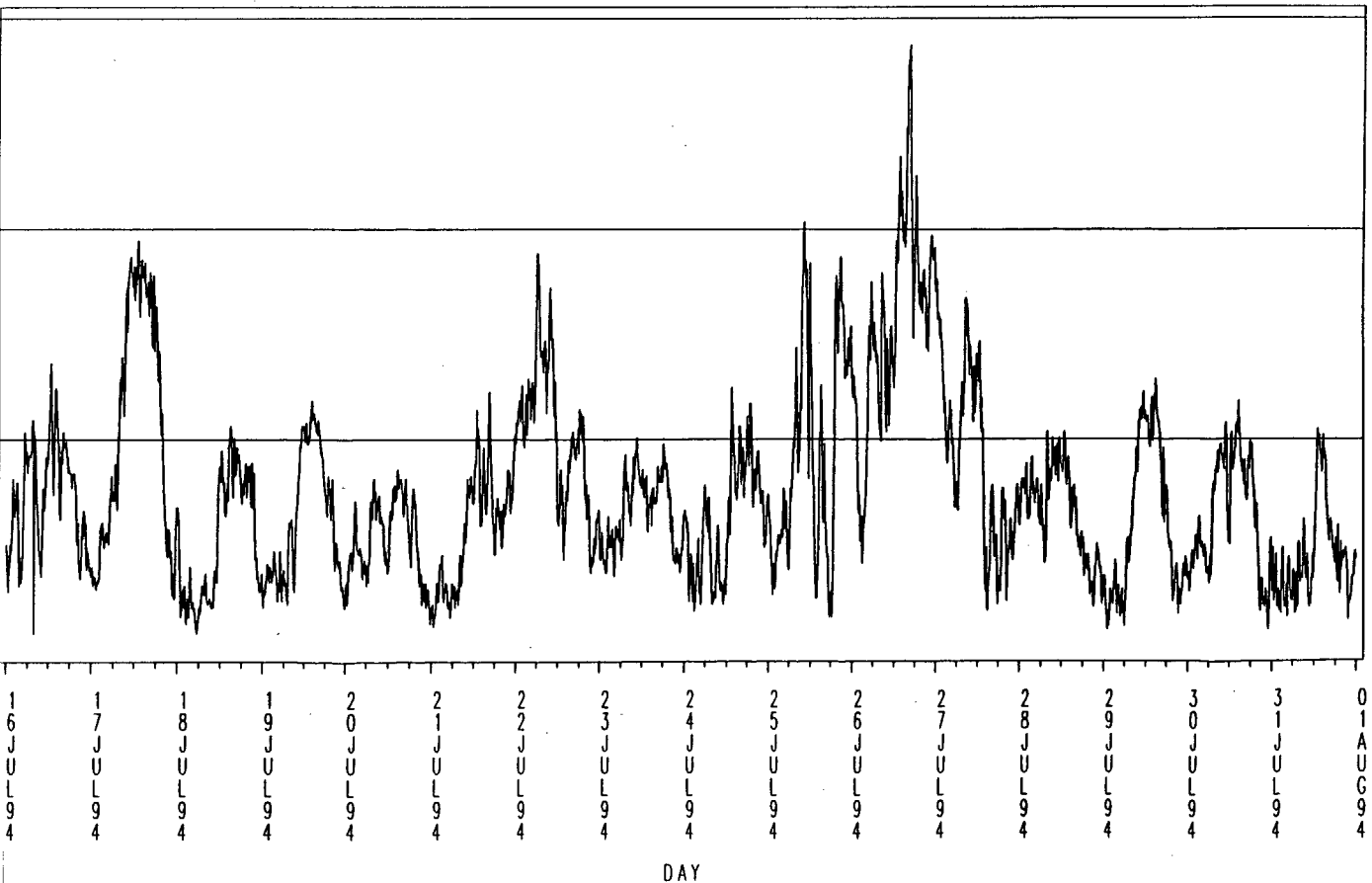
Wind speed 18 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

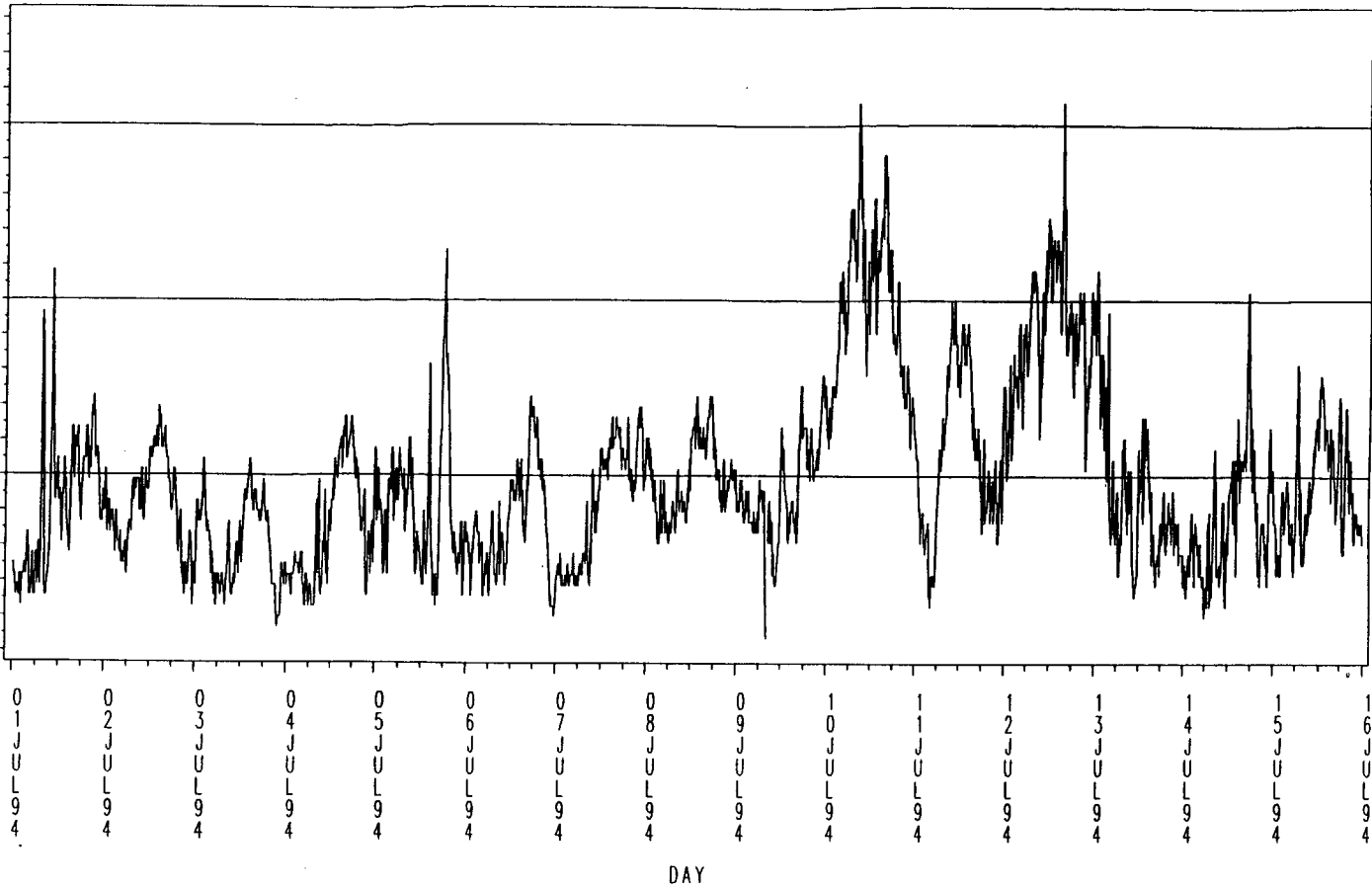
HANØYTANGEN 1994

Wind speed 18 m above the ground (m/s)



HANØYTANGEN 1994

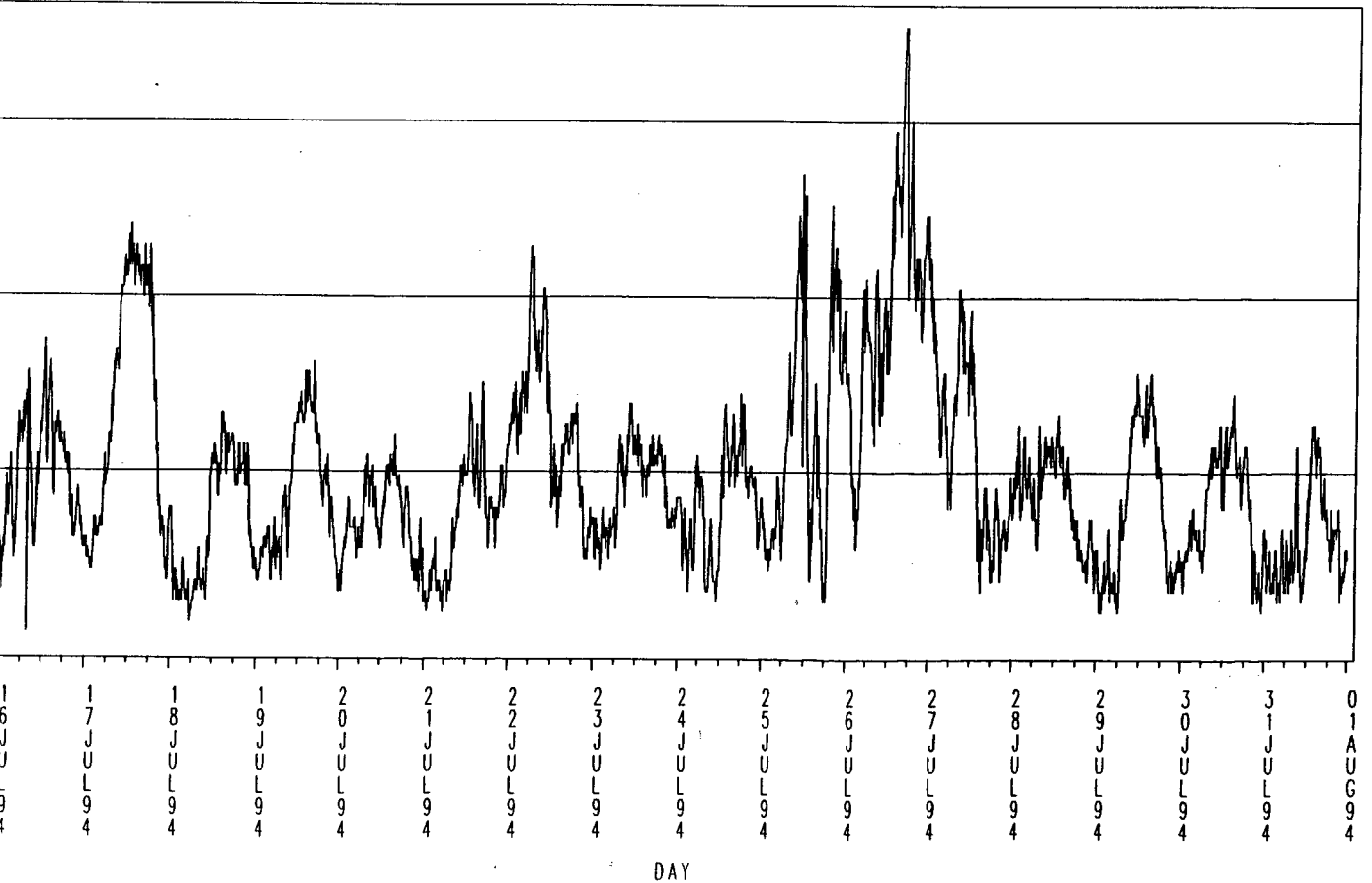
Gust wind speed 18 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

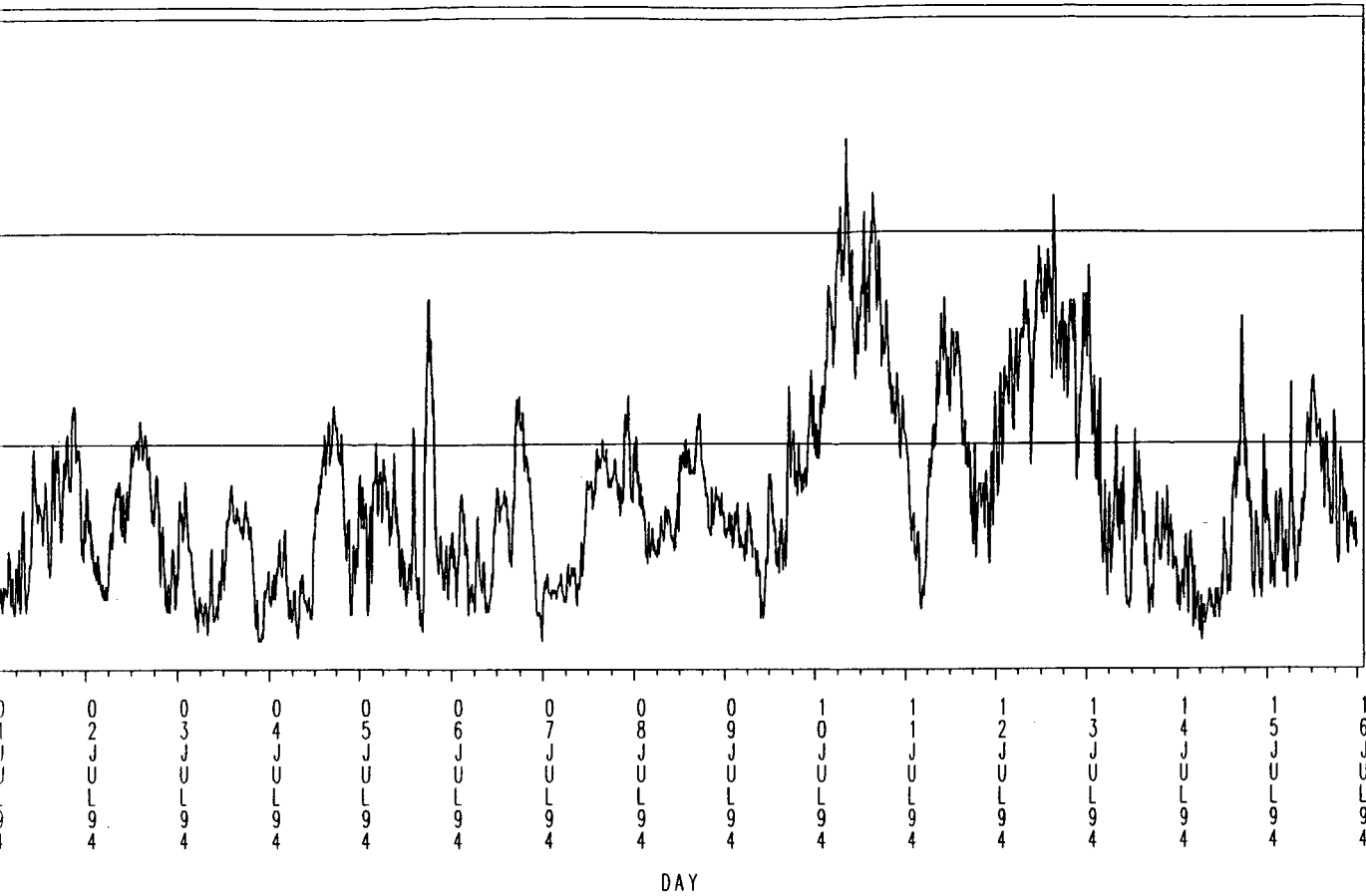
Gust wind speed 18 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

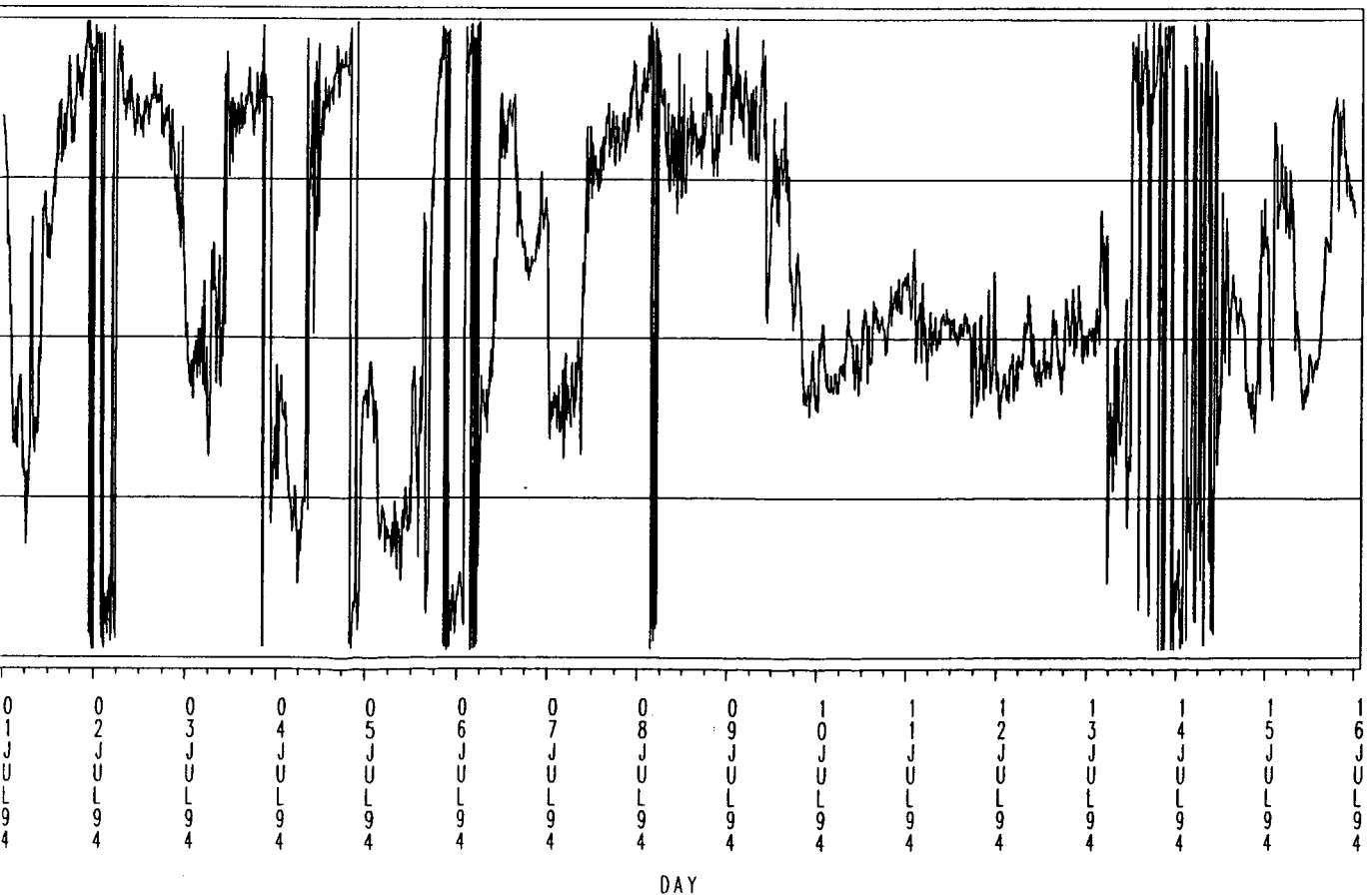
Wind speed 30 m above the ground (m/s)



DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1994

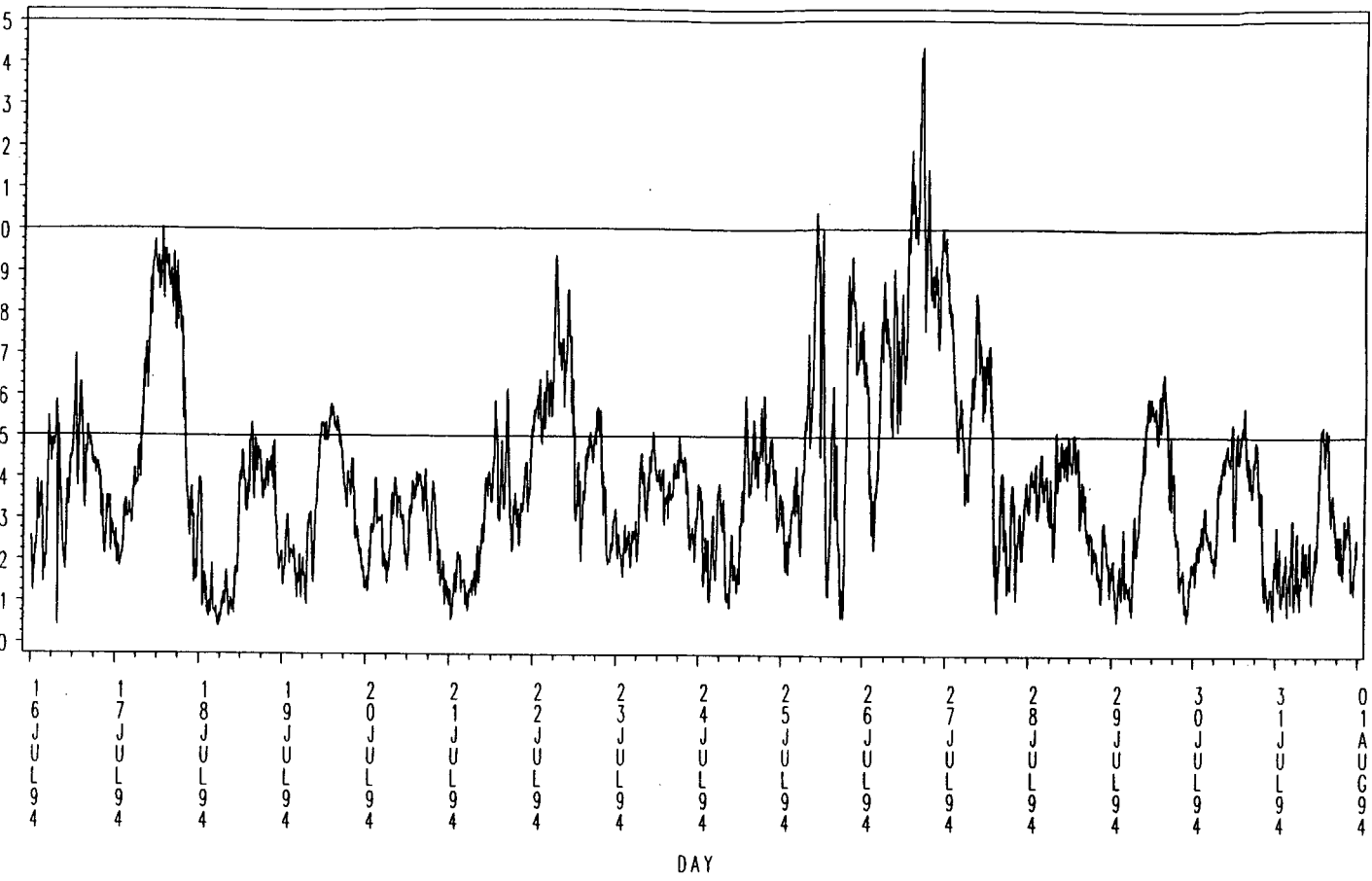
Wind direction 30 m above the ground



DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1994

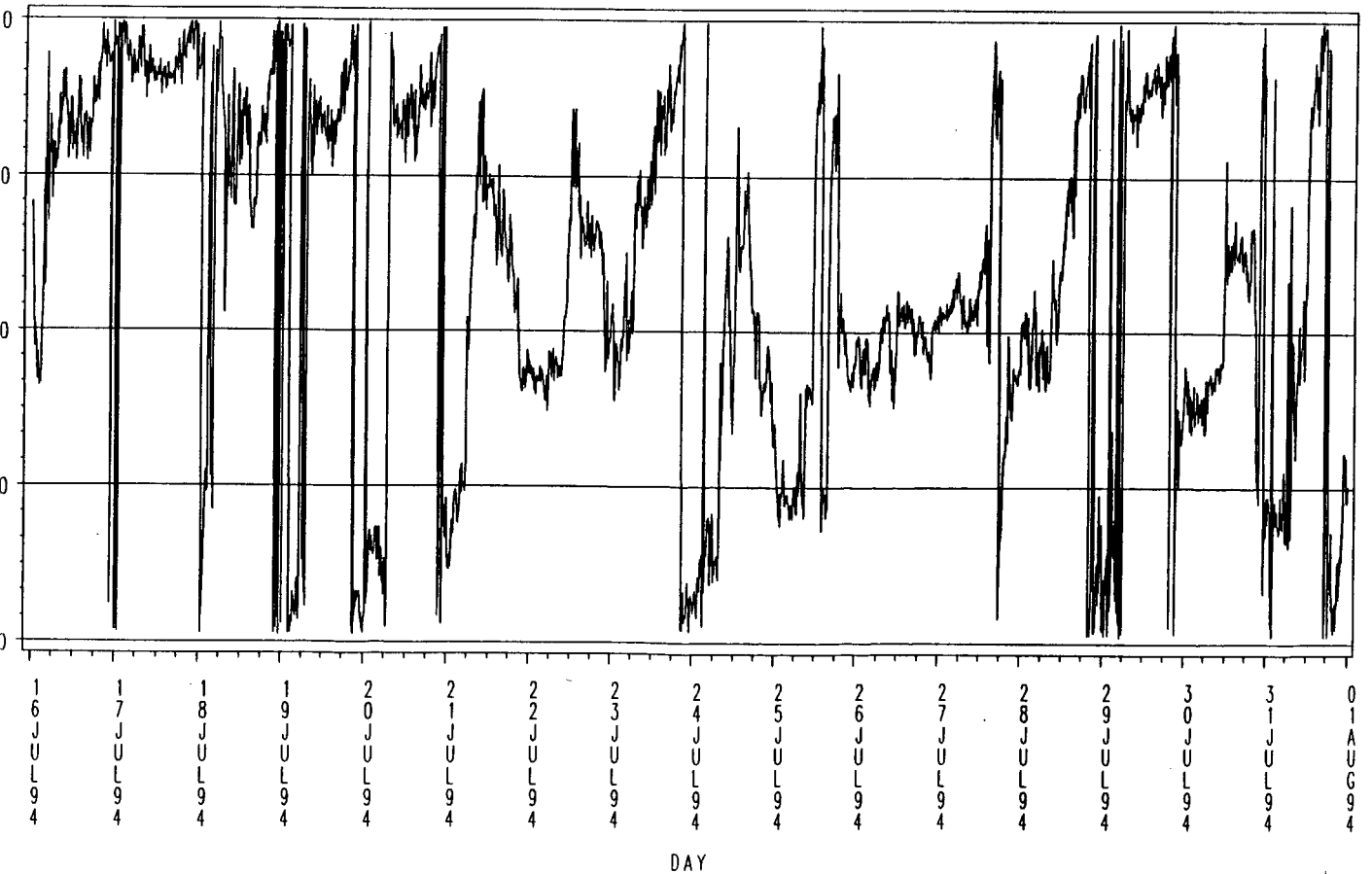
Wind speed 30 m above the ground (m/s)



DNMI - KLIMADELINGEN

HANØYTANGEN 1994

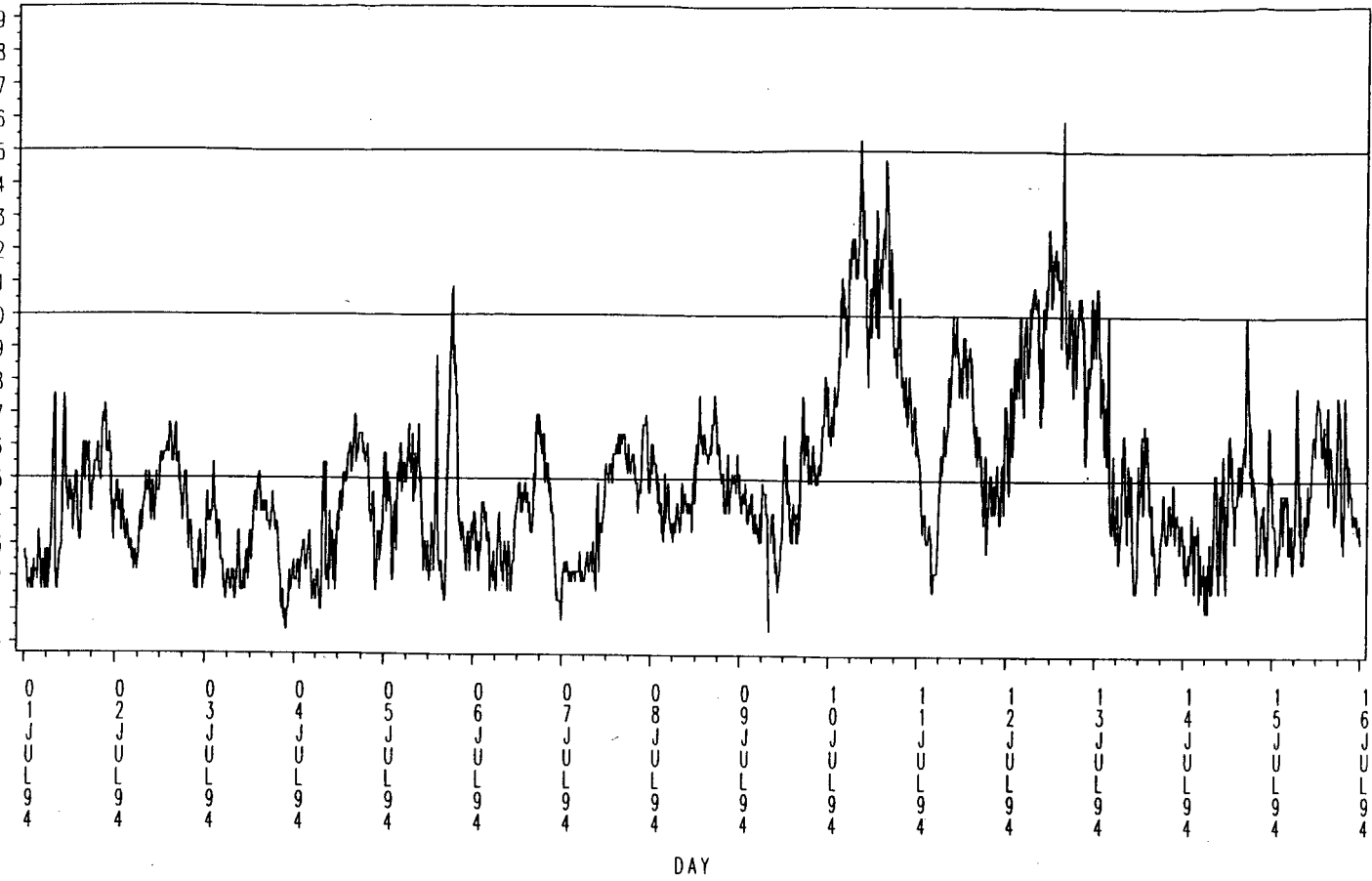
Wind direction 30 m above the ground



DNMI - KLIMADELINGEN

HANØYTANGEN 1994

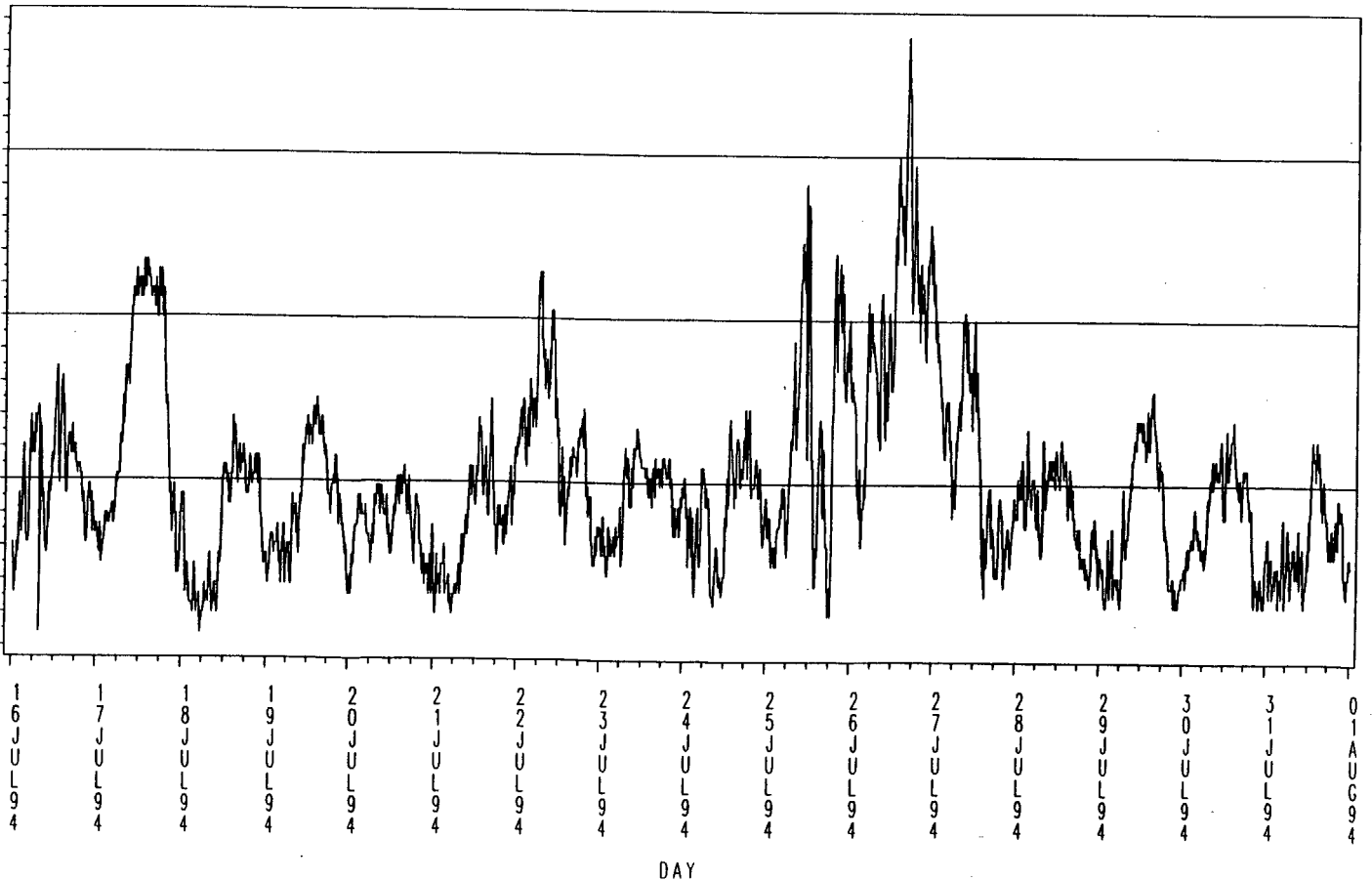
Gust wind speed 30 m above the ground (m/s)



DNMI - KLIMADELINGEN

HANØYTANGEN 1994

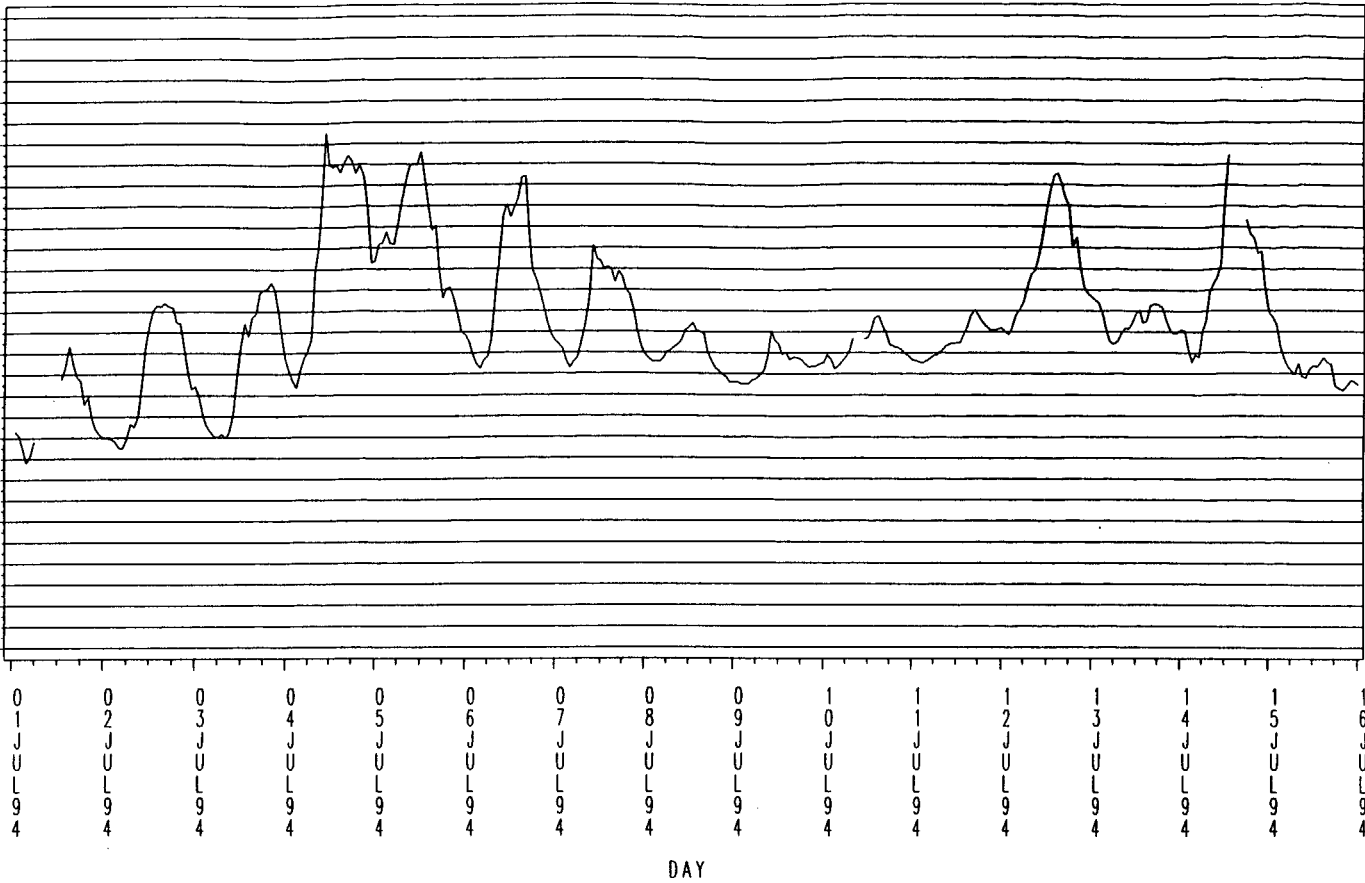
Gust wind speed 30 m above the ground (m/s)



DNMI - KLIMADELINGEN

HANØYTANGEN 1994

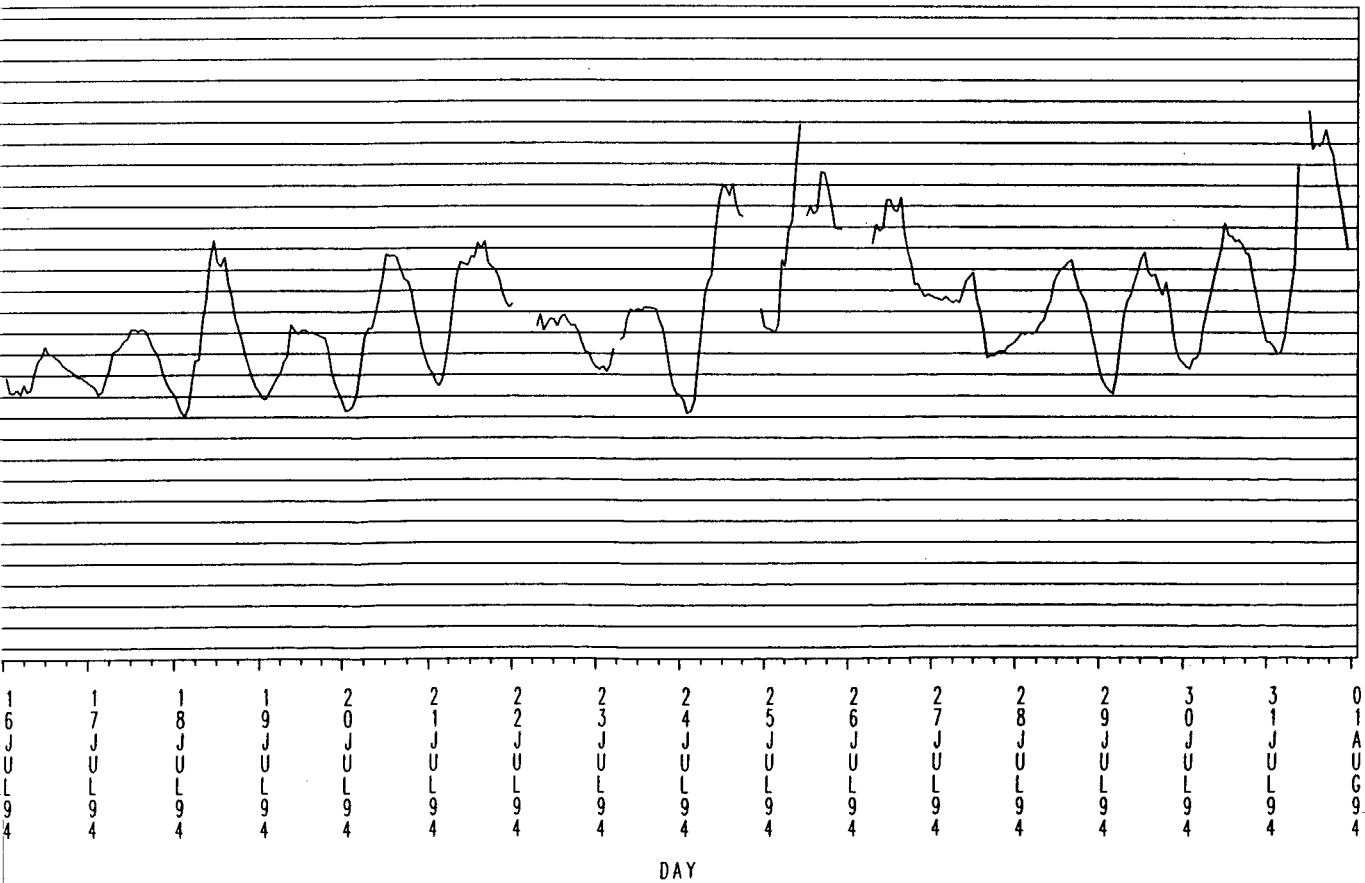
Air Temperature in degrees C (Hourly Means)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1994

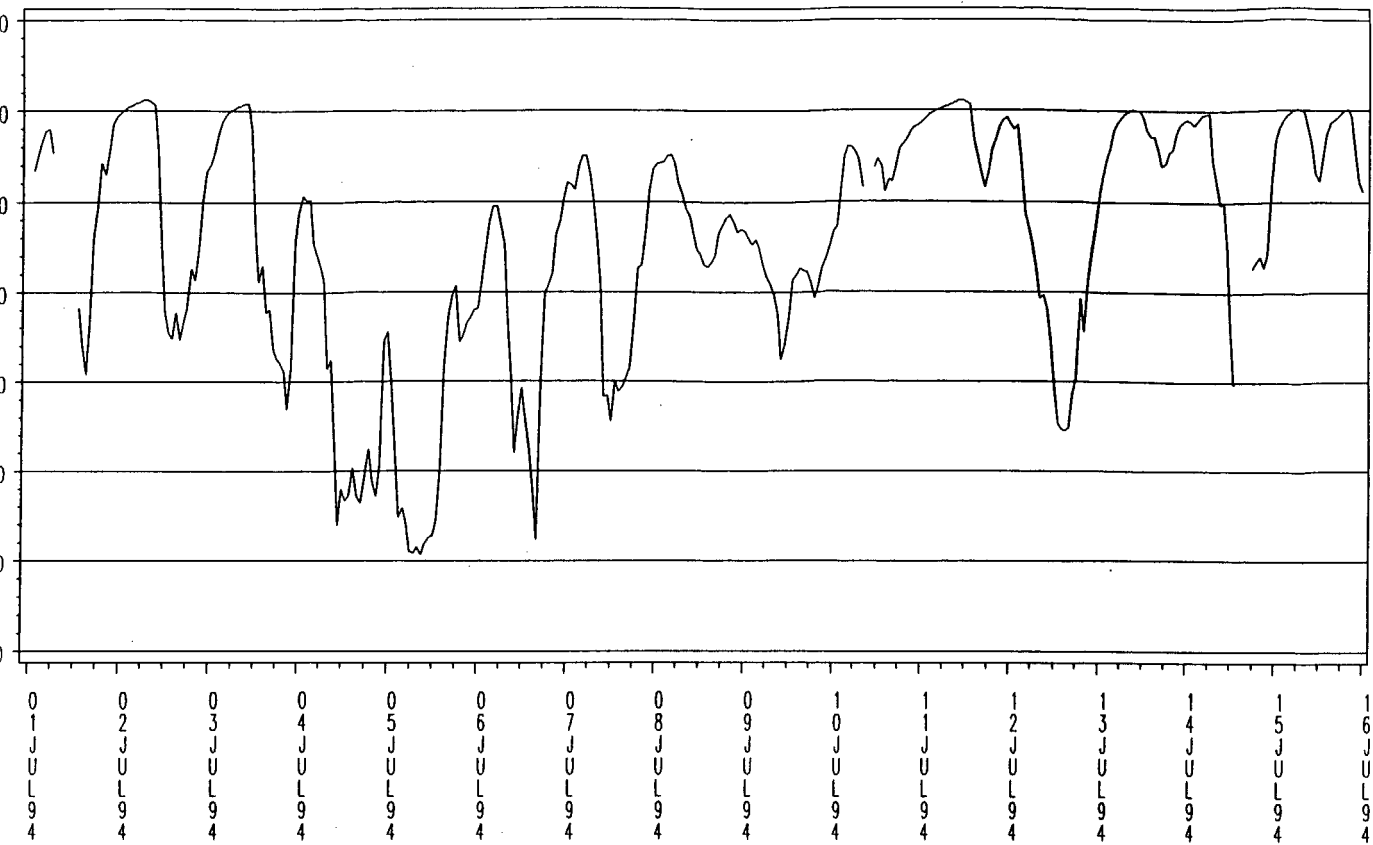
Air Temperature in degrees C (Hourly Means)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1994

Air Humidity in % (Hourly Means)

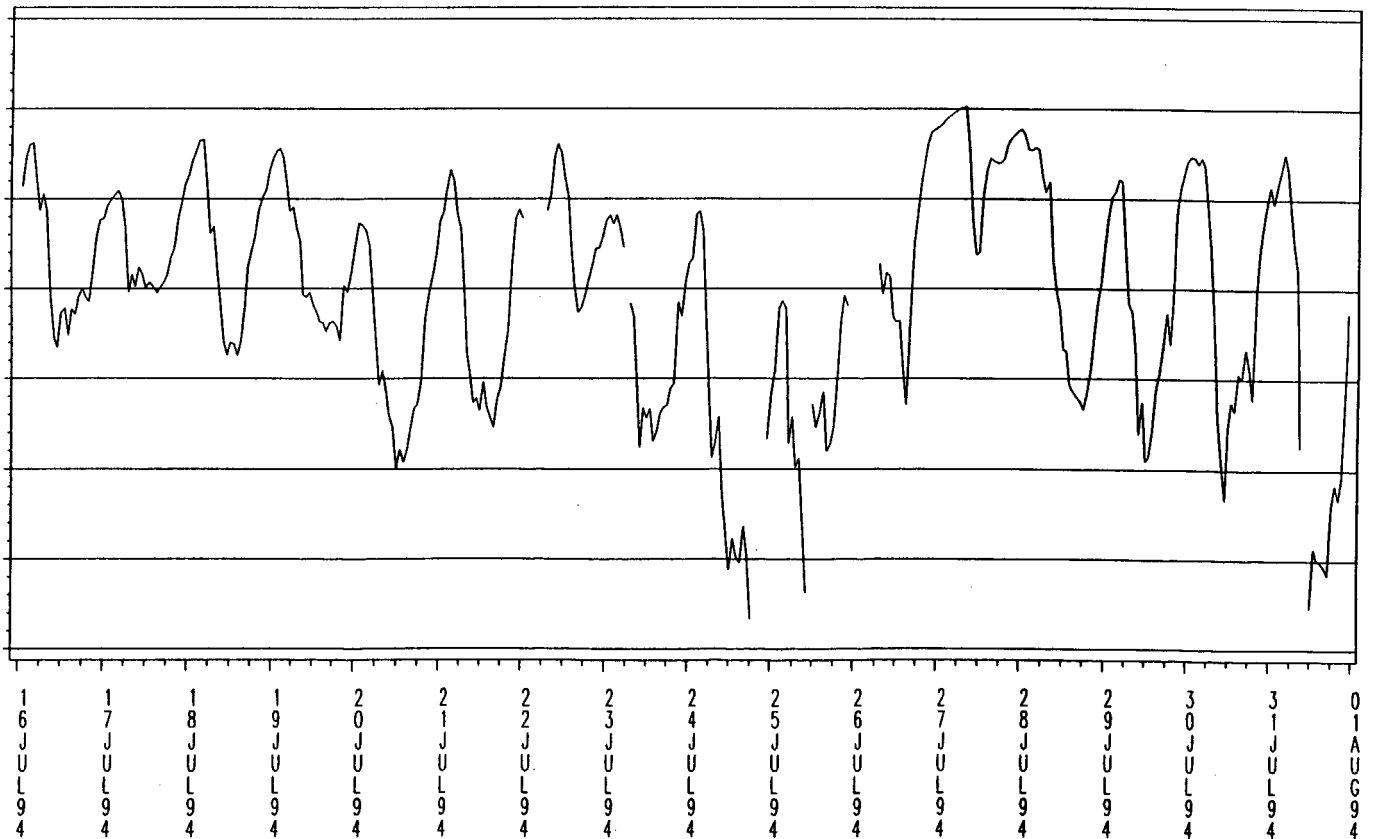


DAY

DNMI - KLIMADELINGEN

HANØYTANGEN 1994

Air Humidity in % (Hourly Means)

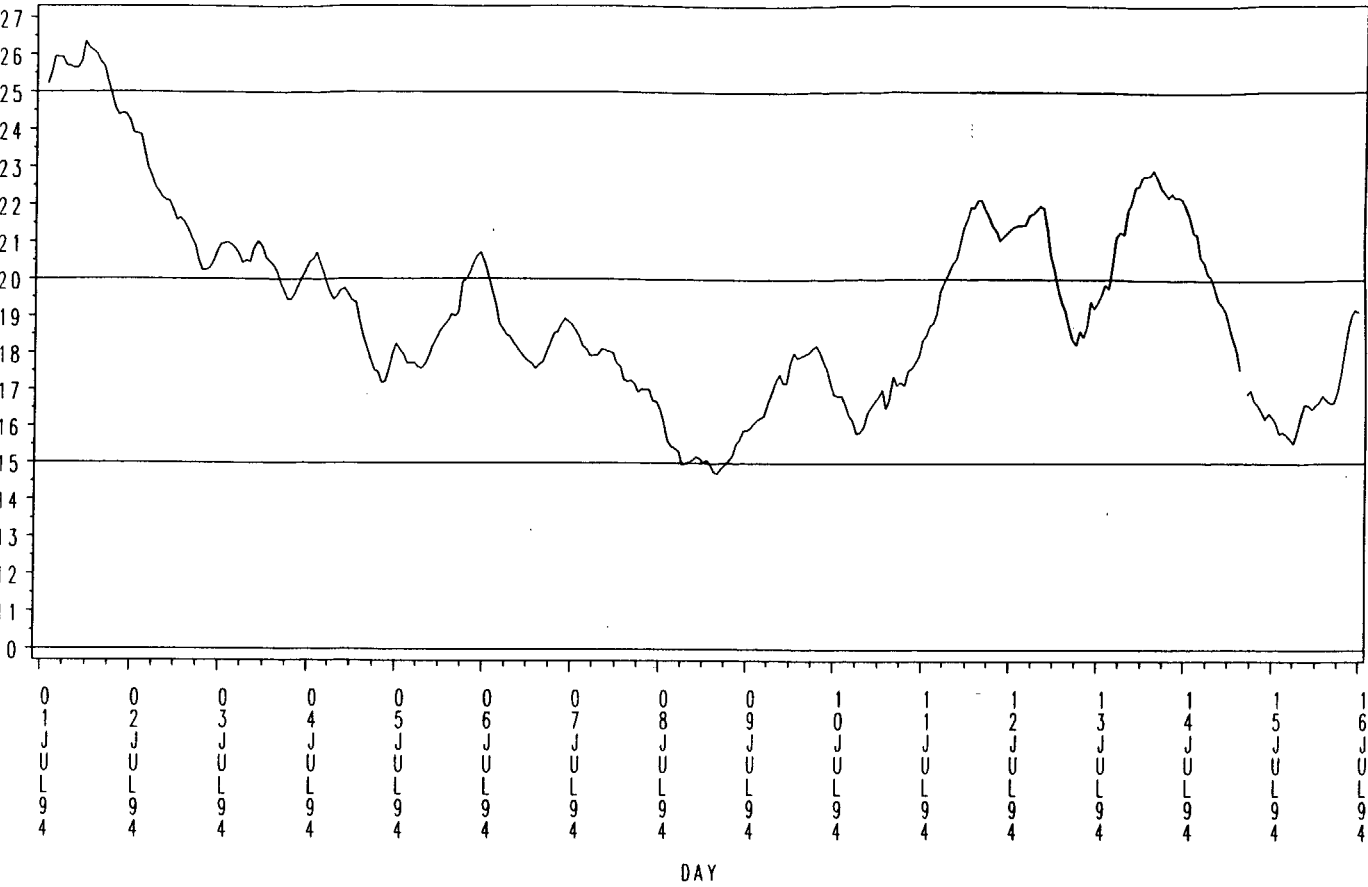


DAY

DNMI - KLIMADELINGEN

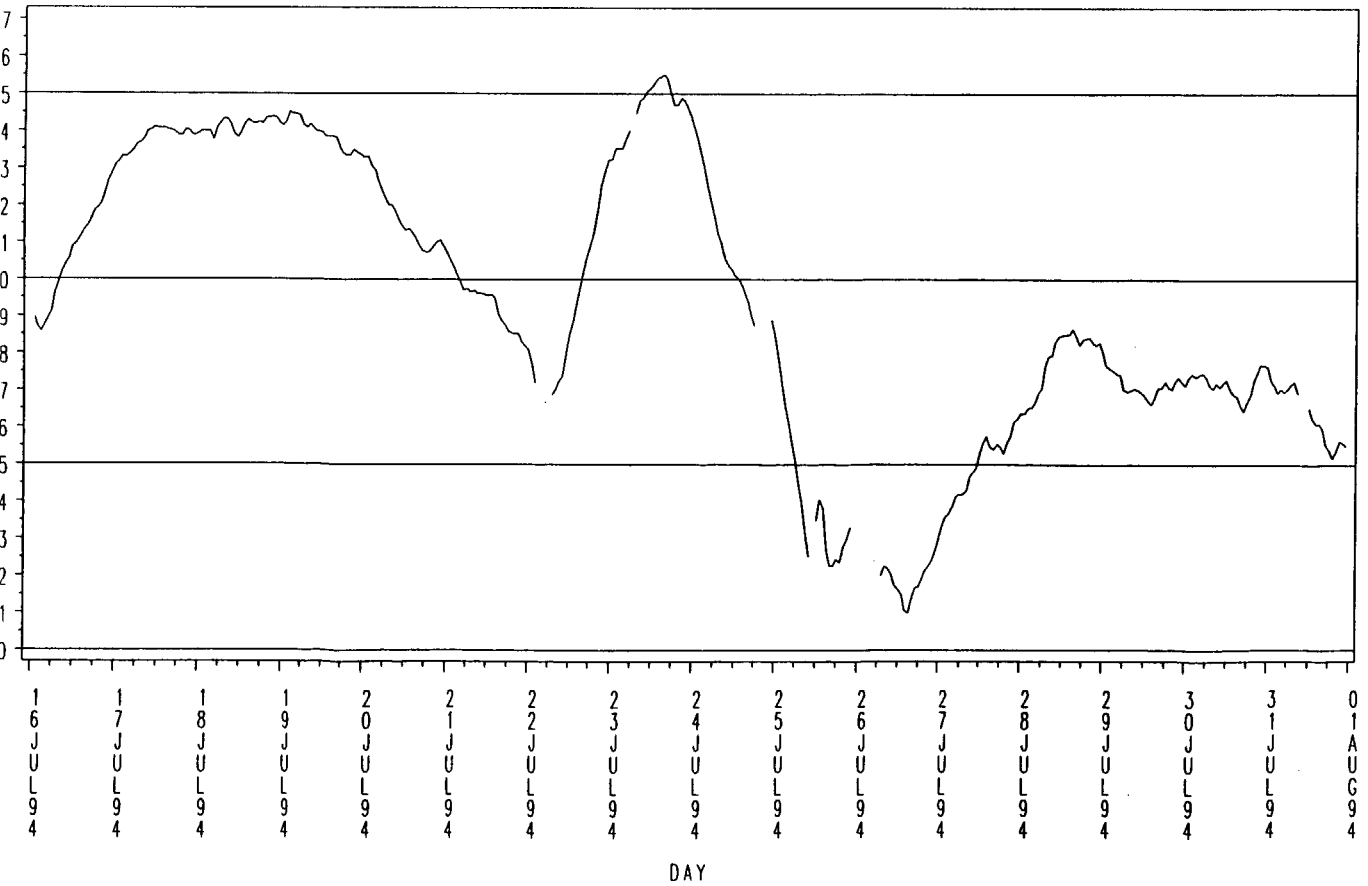
HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)



HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)



DISTRIBUTION TABLES / WIND ROSES

The distribution table gives details about the distribution of the wind speed for a certain wind direction or the distribution of the wind directions for a certain wind speed.

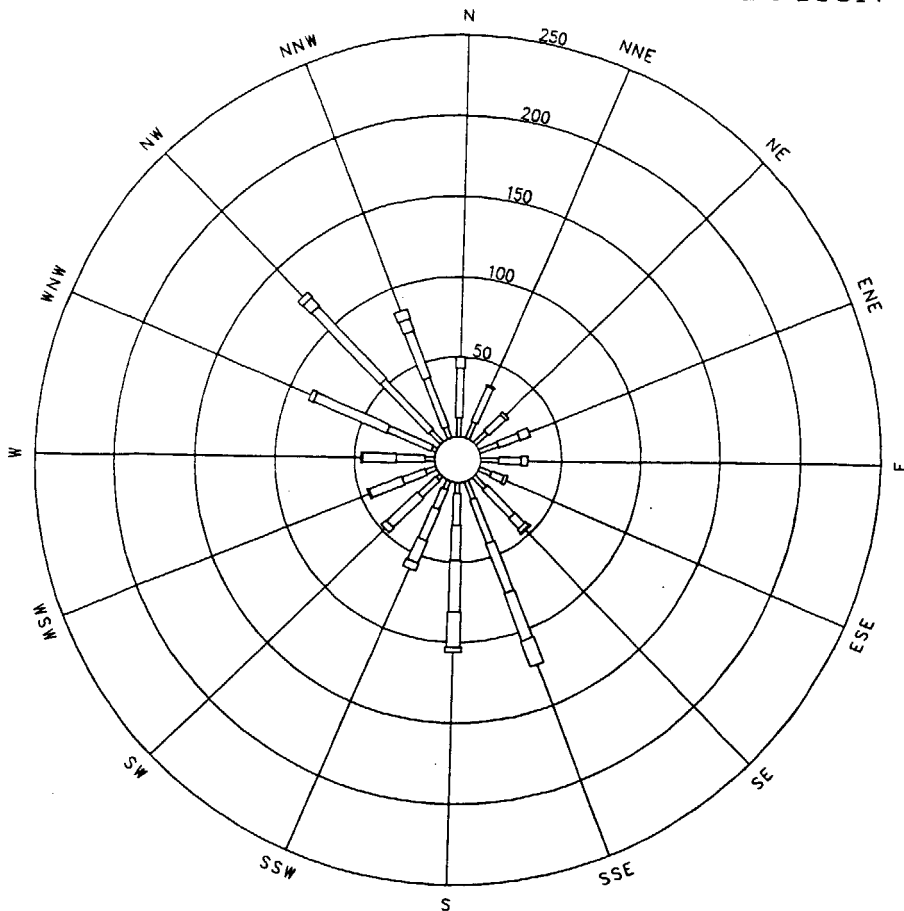
If for example, it is of interest to know the directions for which wind force 5 Beaufort have occurred this month, one has to look at the line for 5 Beaufort in the table.

If the information of the wind forces that have occurred this month for a certain direction is of interest, one has to look at the column for that specific direction.

The frequencies in the table are given per thousand (Prm) of the data available this month.

The wind rose is a graphic representation of the information given in the distribution table. The same number of classes is applied. No Beaufort value is given to the centre of the wind rose. Thus, the first class outside the centre is 0 Beaufort (0-0.2 m/s). Due to the calibration of the wind sensors, this class will always be empty at Hanøytangen.

HANOYTANGEN JULY 1994 WIND DISTRIBUTION 30 M



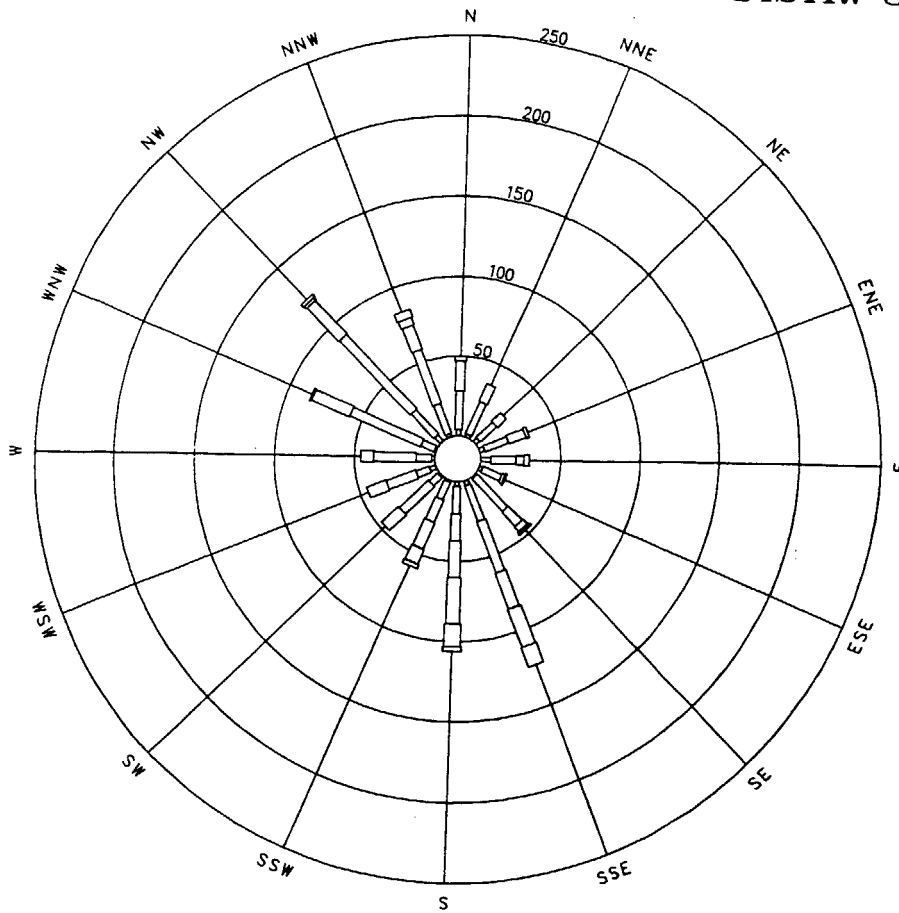
LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
 WIDTH = SPEED (M/S / BEAUFORT SCALE)



Wind direction (DD) / Wind speed (Beaufort and m/s) 30 m above the ground

Be- au- fo- rt	DD																ALL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	
0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.2	12	11	10	12	11	8	10	12	7	6	3	7	6	3	10	7	142
1.5	31	24	14	14	14	8	24	29	20	13	15	15	18	30	43	33	354
3.3	7	1	2	7	4	2	9	33	22	21	26	22	21	50	62	31	325
5.4	0	.	.	0	0	0	3	32	32	15	4	1	1	3	7	8	112
7.9	.	.	.	.	.	0	1	17	22	5	.	.	.	0	4	6	58
10.7	.	.	.	.	.	.	.	.	3	0	.	.	.	.	.	.	4
13.8	.	.	.	.	.	.	.	.	0	0	.	.	.	.	.	.	1
17.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
20.7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	51	37	26	34	31	20	50	125	110	63	49	47	48	87	127	86	1000

HANOYTANGEN JULY 1994 GUST WIND DISTR. 30 M

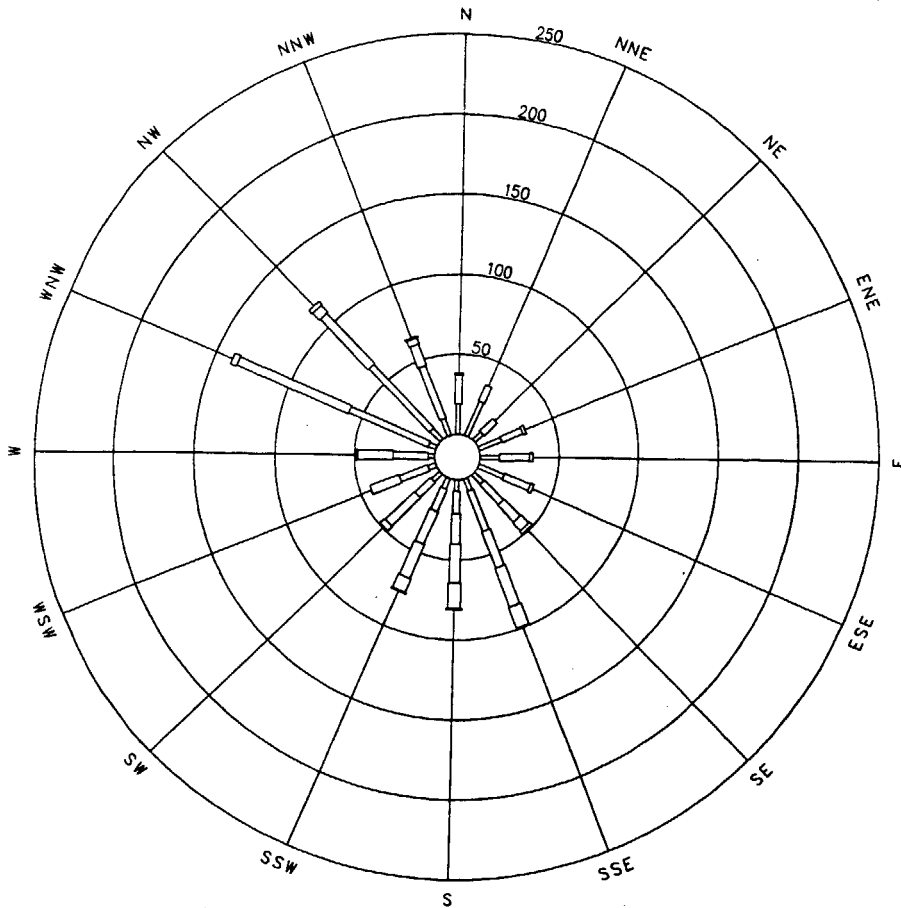


LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
 WIDTH = SPEED (M/S / BEAUFORT SCALE)

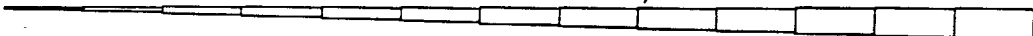
Wind direction (DD)/ Gust wind speed (m/s) 30 m above the ground.

m/s	DD																ALL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	
0-.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0.3-1.5	4	2	3	3	6	2	1	3	3	1	1	4	2	1	5	2	49
1.6-3.3	24	22	14	16	16	13	28	24	17	12	7	9	10	9	21	20	271
3.4-5.4	19	12	8	11	5	2	12	34	17	15	25	19	26	48	64	36	362
5.5-7.9	3	0	0	2	3	1	4	24	23	18	14	13	8	26	29	16	191
8.0-10.7	0	.	.	.	.	0	1	25	29	10	0	0	.	1	2	5	77
10.8-13.8	0	.	.	.	.	.	1	13	14	3	.	.	0	0	2	5	41
13.9-17.1	.	.	.	.	.	.	0	0	3	0	.	.	.	.	.	.	4
17.2-20.7	.	.	.	.	.	.	.	.	0	.	.	.	.	.	.	.	0
20.8-24.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.5-28.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.5-32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
> 32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	51	37	26	34	31	20	50	125	110	63	49	47	48	87	127	86	1000

HANOYTANGEN JULY 1994 WIND DISTRIBUTION 10 M



LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
 WIDTH = SPEED (M/S / BEAUFORT SCALE)



Wind direction (DD) / Wind speed (Beaufort and m/s) 10 m above the ground

Beaufort	DD																ALL
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm
0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.2	19	23	7	15	12	17	8	8	7	7	7	5	4	5	9	11	172
1.5	18	11	11	14	19	18	17	27	14	15	13	19	22	54	54	35	370
3.3	1	0	0	2	2	2	15	24	19	22	25	19	22	76	44	14	295
5.4	.	.	.	0	0	.	7	26	24	23	4	0	1	4	6	4	105
7.9	.	.	.	.	.	0	2	14	16	9	.	.	.	0	3	1	49
10.7	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	3
13.8	.	.	.	.	.	.	.	.	0	0	.	.	.	.	.	.	0
17.1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
20.7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	39	35	19	33	35	39	52	101	85	81	51	45	51	142	118	67	1000

COEFFICIENT TRANSFERT TABLES

The tables are actually histograms of the quotient given in the heading of the tables, plotted horizontally. They give details about the distribution of the quotients.

The class interval is 0.5 and the frequencies for the actual class is plotted at the midpoint of the class. If the quotient is 1 the wind speed in the two heights considered have the same value.

The classes start at 0.75 (.725-.774) and end at 1.80 (1.775-1.825). Quotients below or above these limits are counted in these classes respectively.

The tables are giving the frequencies in the actual classes in percent and also as cumulative frequencies in percent.

F30 = Wind speed 30 m above the ground
F18 = Wind speed 18 m above the ground
F10 = Wind speed 10 m above the ground

HANØYTANGEN JULY 1994

QUOTIENT F30/F18

F30/F18 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	**	86	86	1.93	1.93
0.80	*	40	126	0.90	2.82
0.85	*	65	191	1.46	4.28
0.90	***	135	326	3.02	7.30
0.95	*****	453	779	10.14	17.44
1.00	*****	1921	2700	43.00	60.44
1.05	*****	858	3558	19.21	79.65
1.10	*****	301	3859	6.74	86.39
1.15	****	199	4058	4.45	90.84
1.20	***	151	4209	3.38	94.22
1.25	**	88	4297	1.97	96.19
1.30	*	62	4359	1.39	97.58
1.35	*	44	4403	0.99	98.57
1.40		24	4427	0.54	99.10
1.45		11	4438	0.25	99.35
1.50		9	4447	0.20	99.55
1.55		3	4450	0.07	99.62
1.60		3	4453	0.07	99.69
1.65		3	4456	0.07	99.75
1.70		1	4457	0.02	99.78
1.75		0	4457	0.00	99.78
1.80		10	4467	0.22	100.00

Frequency

HANØYTANGEN JULY 1994

QUOTIENT F30/F10

F30/F10 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	***	144	144	3.22	3.22
0.80	*	50	194	1.12	4.34
0.85	*	71	265	1.59	5.93
0.90	**	114	379	2.55	8.48
0.95	*****	429	808	9.60	18.09
1.00	*****	1077	1885	24.11	42.20
1.05	*****	918	2803	20.55	62.75
1.10	*****	553	3356	12.38	75.13
1.15	*****	325	3681	7.28	82.40
1.20	****	206	3887	4.61	87.02
1.25	**	116	4003	2.60	89.61
1.30	**	95	4098	2.13	91.74
1.35	*	71	4169	1.59	93.33
1.40	*	60	4229	1.34	94.67
1.45	*	52	4281	1.16	95.84
1.50	*	60	4341	1.34	97.18
1.55		24	4365	0.54	97.72
1.60	*	30	4395	0.67	98.39
1.65		17	4412	0.38	98.77
1.70		7	4419	0.16	98.93
1.75		11	4430	0.25	99.17
1.80	*	37	4467	0.83	100.00

HANØYTANGEN JULY 1994

QUOTIENT F18/F10

F18/F10 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	*	37	37	0.83	0.83
0.80	*	29	66	0.65	1.48
0.85	*	46	112	1.03	2.51
0.90	**	111	223	2.48	4.99
0.95	*****	373	596	8.35	13.34
1.00	*****	1693	2289	37.89	51.23
1.05	*****	1126	3415	25.20	76.43
1.10	*****	514	3929	11.50	87.94
1.15	*****	246	4175	5.51	93.44
1.20	**	110	4285	2.46	95.90
1.25	*	58	4343	1.30	97.20
1.30	*	40	4383	0.90	98.10
1.35	*	35	4418	0.78	98.88
1.40		22	4440	0.49	99.37
1.45		9	4449	0.20	99.57
1.50		9	4458	0.20	99.78
1.55		5	4463	0.11	99.89
1.60		4	4467	0.09	99.98
1.65		1	4468	0.02	100.00
1.70		0	4468	0.00	100.00
1.75		0	4468	0.00	100.00
1.80		0	4468	0.00	100.00

Frequency

OCCURRENCE TABLES

The content of the table is based on the hourly maxima (Fx) of the 10 min wind speed. First a period fulfilling the criterion $F_x < \text{Limit}$ is sought. The length of this period is divided by the length of the windows specified and may result in multiples of the actual window or zero if the length of the period is less than the length of the actual window. This procedure is repeated through the month and the number of the different windows are accumulated.

Observation Period :									Location :
From :01/07/94			JULY 1994						Level : 10 m a.gr.
To :31/07/94									Coordinates:
Coverage : 100.0%		HANØYTANGEN							X = 71908
Number of data: 4464									Y = 47414
OCCURRENCE TABLE									
NUMBER OF WINDOWS FROM 6 TO 72 HOURS									
Wind Speed <= Beaufort	1	2	3	4	5	6	7	8	
Duration									
6 H	0	28	83	107	120	123	124	124	
12 H	0	8	34	51	59	61	62	62	
18 H	0	1	20	33	39	41	41	41	
24 H	0	0	10	22	29	30	31	31	
48 H	0	0	1	10	13	14	15	15	
72 H	0	0	0	5	9	9	10	10	
Remarks : Based on maximum 10mn wind speed within the interval period, in any direction, at 10 metres level									

CLIMATOLOGICAL SUMMARY

Observation Period :												Location:
From : 01/07/94												Level: 2 m a.gr.
To : 31/07/94												HANØYTANGEN 1994
Coverage : 98.6 %												
Number of data : 4403												
CLIMATOLOGICAL SUMMARY												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Air Temperature												
Mean Day min.	0.2	-2.1	0.8	3.7	6.1	8.4	12.6					
Abs min.	-4	-6.3	-5.1	0.3	1.1	4	8.7					
Mean Day max.	3.8	3.3	5.3	8.4	13.2	12.3	19.4					
Abs max.	6.7	6.4	10.5	14.9	22.7	18.4	26.4					
Mean	2.1	0.1	3	5.9	9.5	10.2	15.8					
Relative Humidity												
Mean Day min.	61	44	59	57	44	64	56					
Abs min.	44	27	29	30	19	40	25					
Mean Day max.	81	73	84	84	80	86	85					
Abs max.	89	90	89	91	89	93	91					
Mean	70	60	73	72	63	78	72					
Air pressure												
Mean Day min.	991.6	1016.7	993.4	1004.4	1013.7	1008.3	1017.7					
Abs min.	966.2	989.7	969.4	970.9	1004.7	991.9	1010.8					
Mean Day max.	1003.5	1023.6	1004.7	1011.8	1018	1015.8	1020.9					
Abs max.	1019.6	1045.2	1024.3	1028.8	1027.8	1028.1	1026.4					
Mean	998	1020	999.1	1008.2	1016	1012.2	1019.3					
Coefficient Transfert												
from level 10 to 18	1.051	1.046	1.024	1.022	1.049	1.035	1.04					
from level 10 to 30	1.117	1.088	1.055	1.053	1.119	1.067	1.077					
from level 18 to 30	1.059	1.036	1.029	1.032	1.063	1.03	1.032					
Remarks:												
The summary is based on air temperature, humidity and pressure measured each 10 minute.												

ESTIMATES OF WIND SPEED WITH 10/100 YEAR RETURN PERIODS

The method for the estimation is described in the report 43/92 KLIMA, Climatological statistics for Hanøytangen near Bergen. The long data series from Hellisøy is the basis for the computations of 10/100 year values.

At Hellisøy the automatic weather station was out of operation regarding all parameters by the end of 1993. The wind speed measurements were functioning again from 3.2.1994. It must be emphasized that when May 1994 was specified as the first month of which 10/100 years should be presented for Hanøytangen, the starting of the parallel series was assumed to be September 1993.

At the end of July 1994 the parallel series between Hellisøy and Hanøytangen, which is the basis for establishing 10/100 year values valid for Hanøytangen, is still very short. It covers the period 3.2-31.7.1994 with some gaps due to missing data at Hanøytangen. The values given below must therefore still be regarded as approximations.

Detailed discussion of the results must be postponed to a longer parallel series is available. However, the transfer coefficient for the direction where the extreme most probably will occur, is of the same magnitude as that used for the 10 min mean in the report 43/92 KLIMA. This preliminary result gives no reason to change the 10/100 years estimates given in this report.

The transfer coefficients for the gust wind is lower than the estimates used in the report 43/92 KLIMA. Thus the estimates for the gust wind in this report may seem to high.

Estimates of transfer coefficients based on data from Hellisøy (He) and Hanøytangen (Ha) for the period 3.2-31.7.1994.

V(Han., 10 min)/V(He., 10 min)						
V(Han., 3 sec.)/V(He., 10 min)						
030-129°	130-159°	160-199°	200-229°	230-299°	300-339°	340-029°
0.60	0.72	0.71	0.81	0.65	0.67	0.58
0.93	0.98	1.00	1.12	1.00	1.00	0.86

The estimates for the wind speed at Hellisøy given below and these new transfer coefficients are applied to compute the wind speed estimates for Hanøytangen.

Estimates of extreme values for the 10 min mean of the wind speed (V_{10}) with return periods 10 and 100 years valid for Hellisøy Fyr.

DIRECTION	SUMMER		WINTER	
	May - August		September - April	
	$V_{10}10$	$V_{10}100$	$V_{10}10$	$V_{10}100$
030-060°	12.3	14.7	19.2	21.7
070-100°	13.0	15.5	16.6	18.8
110-120°	18.1	21.6	24.4	27.6
130-150°	20.6	24.6	28.3	32.0
160-190°	23.8	28.4	30.5	34.4
200-220°	23.8	28.4	30.5	34.4
230-290°	21.6	25.8	27.6	31.2
300-330°	21.1	25.2	28.6	32.3
340-020°	21.6	25.8	28.3	32.3

Estimates of values for the 10 min mean wind speed (V_{10}) with return periods 10 and 100 years valid for Hanøytangen. The estimates are based on computations made for Hellisøy Fyr and the parallel series between Hellisøy Fyr and Hanøytangen for the period 3.2-31.7.1994.

DIRECTION	SUMMER		WINTER	
	May - August		September - April	
	$V_{10,10}$	$V_{10,100}$	$V_{10,10}$	$V_{10,100}$
030-060°	7.4	8.8	11.5	13.0
070-100°	7.8	9.3	10.0	11.3
110-120°	10.9	13.0	14.6	16.6
130-150°	14.8	17.7	20.4	23.0
160-190°	16.9	20.2	21.7	24.4
200-220°	19.3	23.0	24.7	27.9
230-290°	14.0	16.8	17.9	20.3
300-330°	14.1	16.9	19.2	21.6
340-020°	12.5	15.0	16.4	18.7

Estimates of values for the 3 sec. gust wind speed (V_g) with return periods 10 and 100 years valid for Hanøytangen. The estimates are based on computations made for Hellisøy Fyr and the parallel series between Hellisøy Fyr and Hanøytangen for the period 3.2-31.7.1994.

DIRECTION	SUMMER		WINTER	
	May - August		September - April	
	$V_{g,10}$	$V_{g,100}$	$V_{g,10}$	$V_{g,100}$
030-060°	11.4	13.7	17.9	20.2
070-100°	12.1	14.4	15.4	17.5
110-120°	16.8	20.1	22.7	25.7
130-150°	20.2	24.1	27.7	31.4
160-190°	23.8	28.4	30.5	34.4
200-220°	26.7	31.8	34.2	38.5
230-290°	21.6	25.8	27.6	31.2
300-330°	21.1	25.2	28.6	32.3
340-020°	18.6	22.1	24.3	27.8

Appendix 1

BEAUFORT SCALE OF WIND

BEAUFORT NUMBER	DESCRIPTIVE TERM	MEAN VELOCITY IN KNOTS	MEAN VELOCITY IN m/s
0	Calm	< 1	0 - 0.2
1	Light air	1 - 3	0.3 - 1.5
2	Light breeze	4 - 6	1.6 - 3.3
3	Gentle breeze	7 - 10	3.4 - 5.4
4	Moder. breeze	11 - 16	5.5 - 7.9
5	Fresh breeze	17 - 21	8.0 - 10.7
6	Strong breeze	22 - 27	10.8 - 13.8
7	Near gale	28 - 33	13.9 - 17.1
8	Gale	34 - 40	17.2 - 20.7
9	Strong gale	41 - 47	20.8 - 24.4
10	Storm	48 - 55	24.5 - 28.4
11	Violent storm	56 - 63	28.5 - 32.6
12	Hurricane	64 and over	32.7 and over

Appendix 2

Records where at least one of the parameters is outside the criteria set in the automatic filter.

RECORDS WITH PARAMETERS OUTSIDE THE CRITERIONS

OBS	AAR	MND	DAG	TIME	MIN	REF	F30	G30	DD30	F18	G18	F10	G10	DD10	T	UU	P
1	1994	7	8	10	58	853	50.90	56.42	201.83	940708.00	1108.00	645.00	3.01	4.58	289.77	3.01	4.58
2	1994	7	9	7	59	645	19.50	0.40	279.65	0.40	0.40	0.40	0.40	294.66	13.09	68.98	1015.53
3	1994	7	9	8	9	645	2.56	4.58	286.63	2.49	17.71	2.41	6.67	278.26	13.19	69.39	1015.53
4	1994	7	14	15	49	645	4.06	5.17	204.27	3.76	5.47	3.76	6.07	198.34	31.68	44.37	1015.36
5	1994	7	14	15	59	645	4.13	5.47	195.19	4.06	5.17	3.98	4.88	195.19	30.33	43.15	1015.36
6	1994	7	24	19	14	645	4.80	6.07	184.03	4.58	6.07	4.58	6.96	181.58	35.07	22.99	1016.88
7	1994	7	24	21	54	645	4.20	5.47	171.81	3.46	4.88	3.61	6.07	159.60	30.71	26.74	1016.88
8	1994	7	24	22	4	645	4.20	4.88	167.27	3.76	4.58	3.38	4.58	171.11	30.81	25.73	1016.88
9	1994	7	26	0	24	645	6.82	8.16	172.86	6.52	7.86	6.14	7.26	167.62	30.81	36.67	1011.30