DNMI

DET NORSKE METEOROLOGISKE INSTITUTT

klima

HANØYTANGEN , NOVEMBER 1994

Knut A. Iden

RAPPORT NR. 09/95 KLIMA

DNMI-REPORT

DET NORSKE METEOROLOGISKE INSTITUTT
P.O.BOX 43, BLINDERN 0313 OSLO

TEL. : (22) 96 30 00

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TITLE

HANØYTANGEN , NOVEMBER 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
PROJ. RESPONSIBLE

Bjørn Aune
HEAD OF DIVISION

CLIENT	:	DNMI
CONTRACT NO.	:	KCC/PAC004/001
PROJECT NO.	:	
DOCUMENT NAME	:	RAPPNOV.94
PROJ. MANAGER	:	Knut A. Iden
EXECUTED BY	:	Bjørn. H. Halvorsen and Knut A. Iden
APPROVED BY	:	Bjørn Aune Bjørn Aune 21.02.1995
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REV 1.	:	

HANØYTANGEN MET-DATA

MONTHLY REPORT
NOVEMBER 1994

DSU : Serial no. 6642
Received : FEBRUARY 6 1995

Comments regarding the data :

The DSU serial no.6642 contains data for the period 04/11/94 to 01/02/95.
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 NOVEMBER 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	99.7 %	m/s	5.8	3.7	19.7	268	28:0938	0.4	71	01:0859
Wind speed	18 m	100.0 %	m/s	5.6	3.6	18.5	N/A	28:0938	0.4	N/A	01:0839
Wind speed	10 m	100.0 %	m/s	5.4	3.5	18.2	280	28:0938	0.4	49	01:0849
Wind gust	30 m	99.7 %	m/s	7.8	4.8	36.5	284[2]	23:1620	0.4	5[2]	01:1229
Wind gust	18 m	100.0 %	m/s	7.6	4.8	37.1	N/A	23:1620	0.4	N/A	01:0859
Wind gust	10 m	100.0 %	m/s	7.5	4.7	34.7	275[2]	23:1620	0.4	63[2]	08:0650

OTHER METEOROLOGICAL DATA

Parameter	Height	Cover.	Unit	Mean	ST.D.	Max	D.:hour	Min	D.:hour
Air Temp.	2. m[3]	99.4 %	C	7.2	2.0	14.7	04:1048	1.5	18:2030
Rel. Hum.	2. m[3]	99.4 %	%	78	12.4	91	26:2358	31	04:1048
Air pr.	0. m[3]	99.4 %	hPa	1011.8	11.9	1031.4	29:2058	983.1	15:1240

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 occured 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).

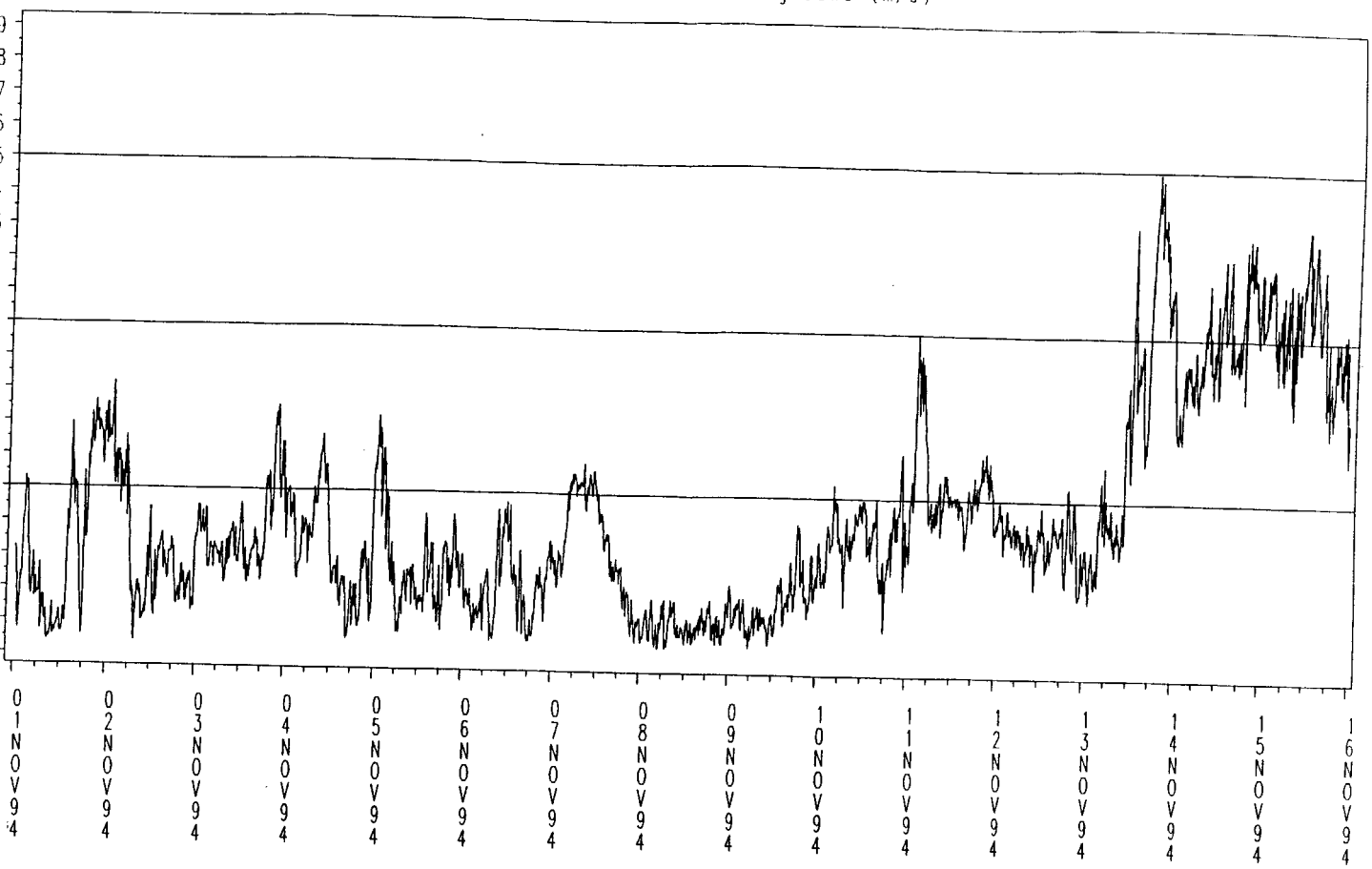
This month probable false heating has been traced in the temperature data on the 2, 3 and 11. Spikes has been removed on these days.

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)

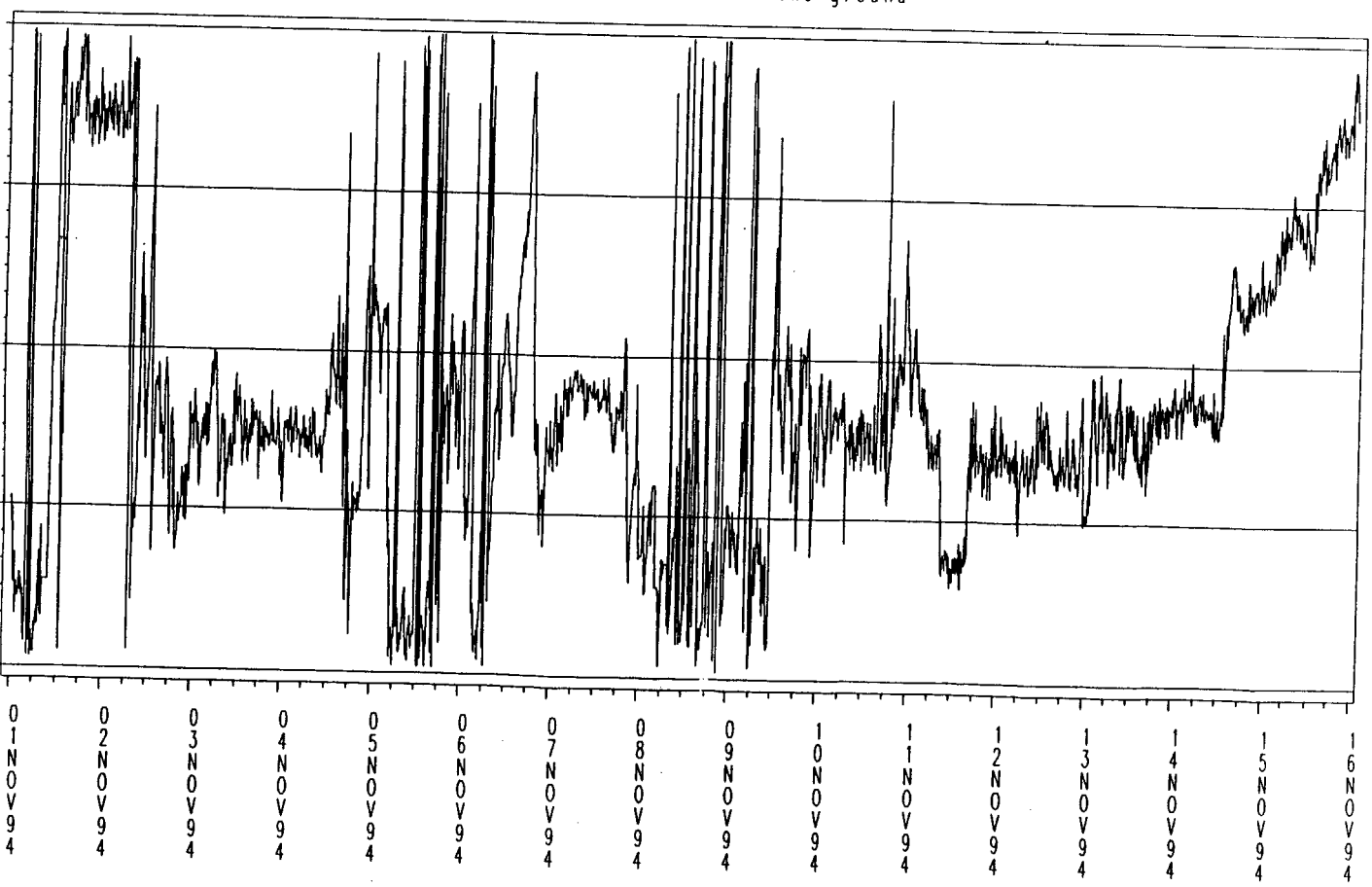


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 10 m above the ground

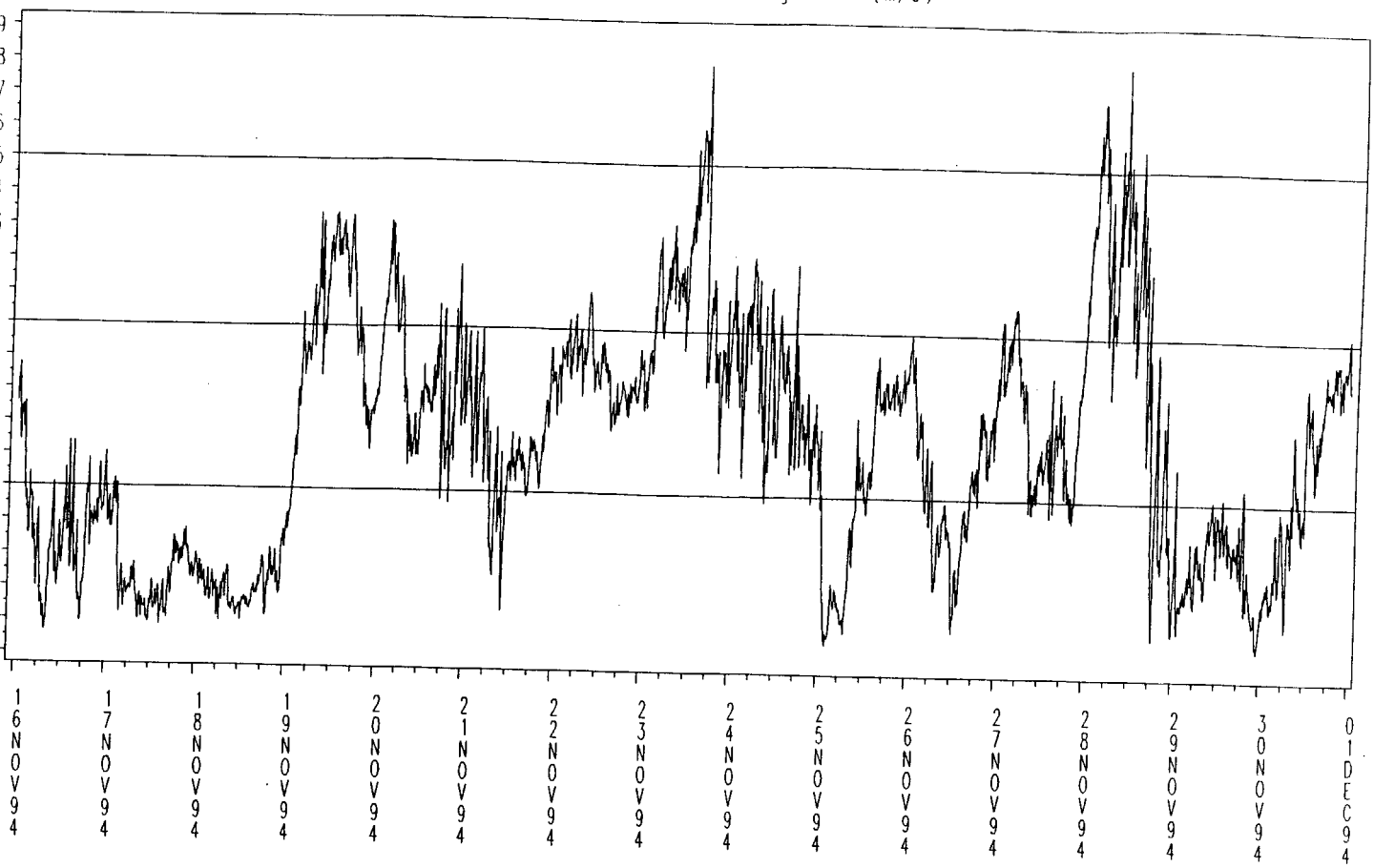


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

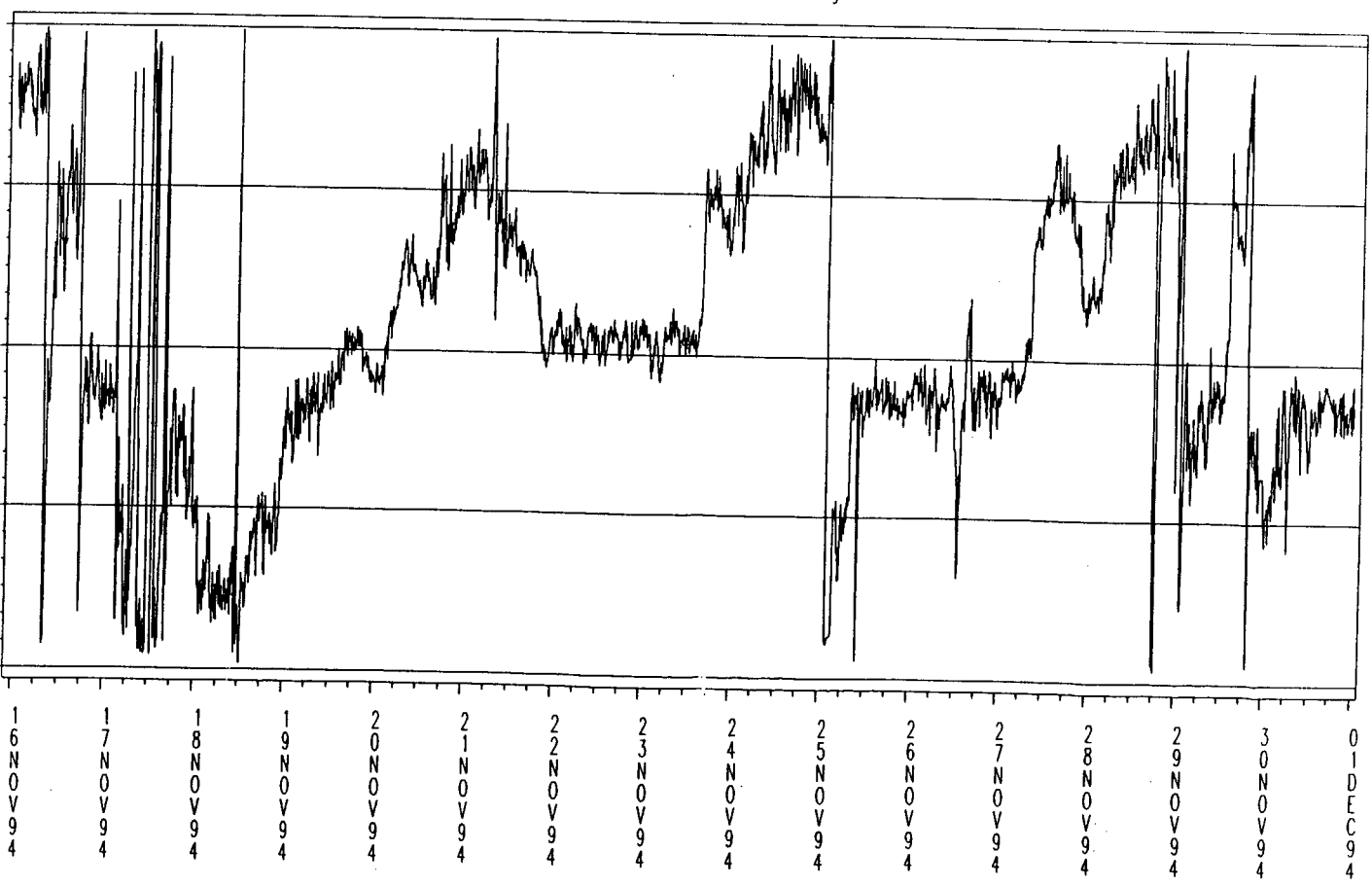


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 10 m above the ground

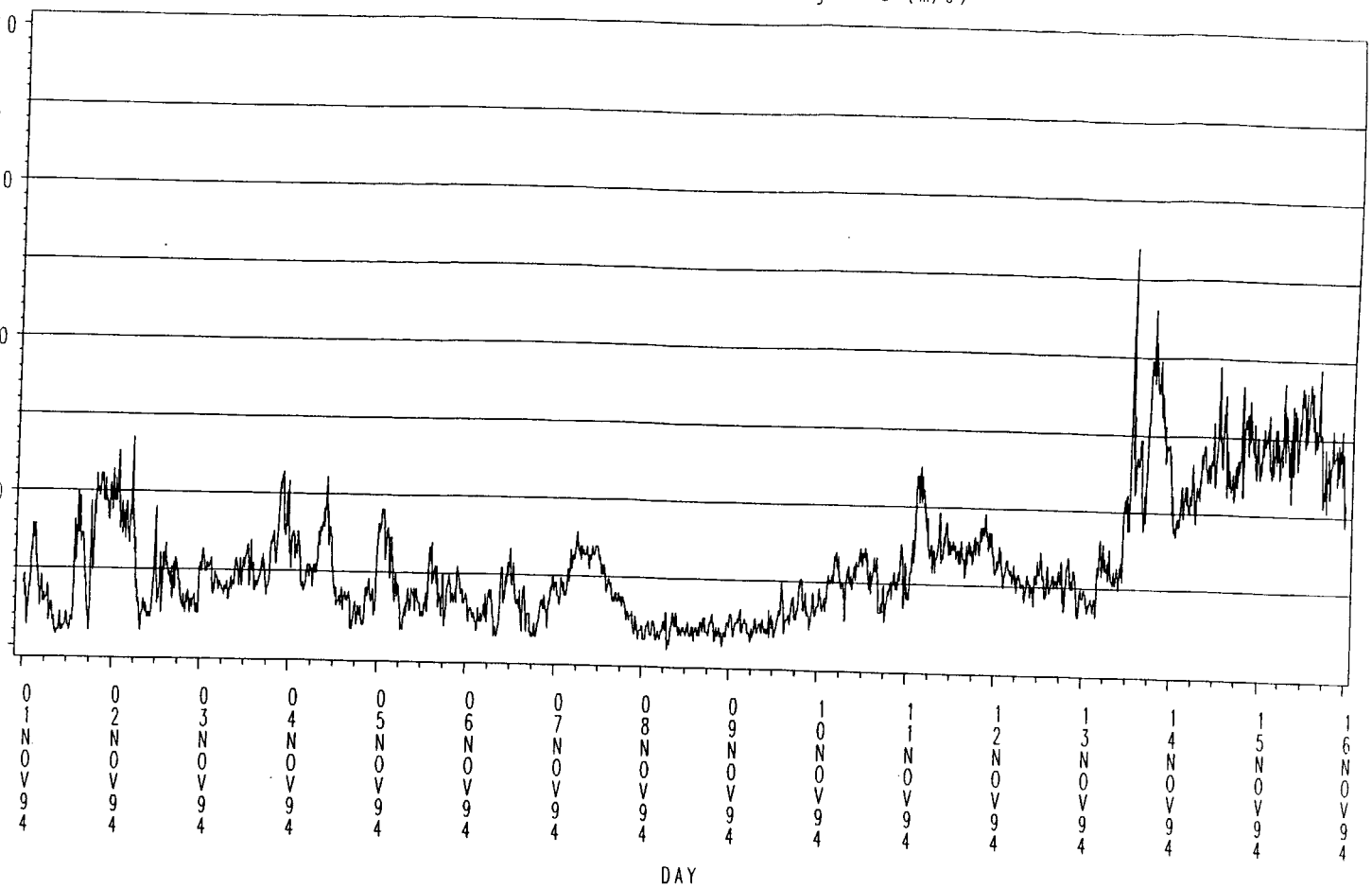


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

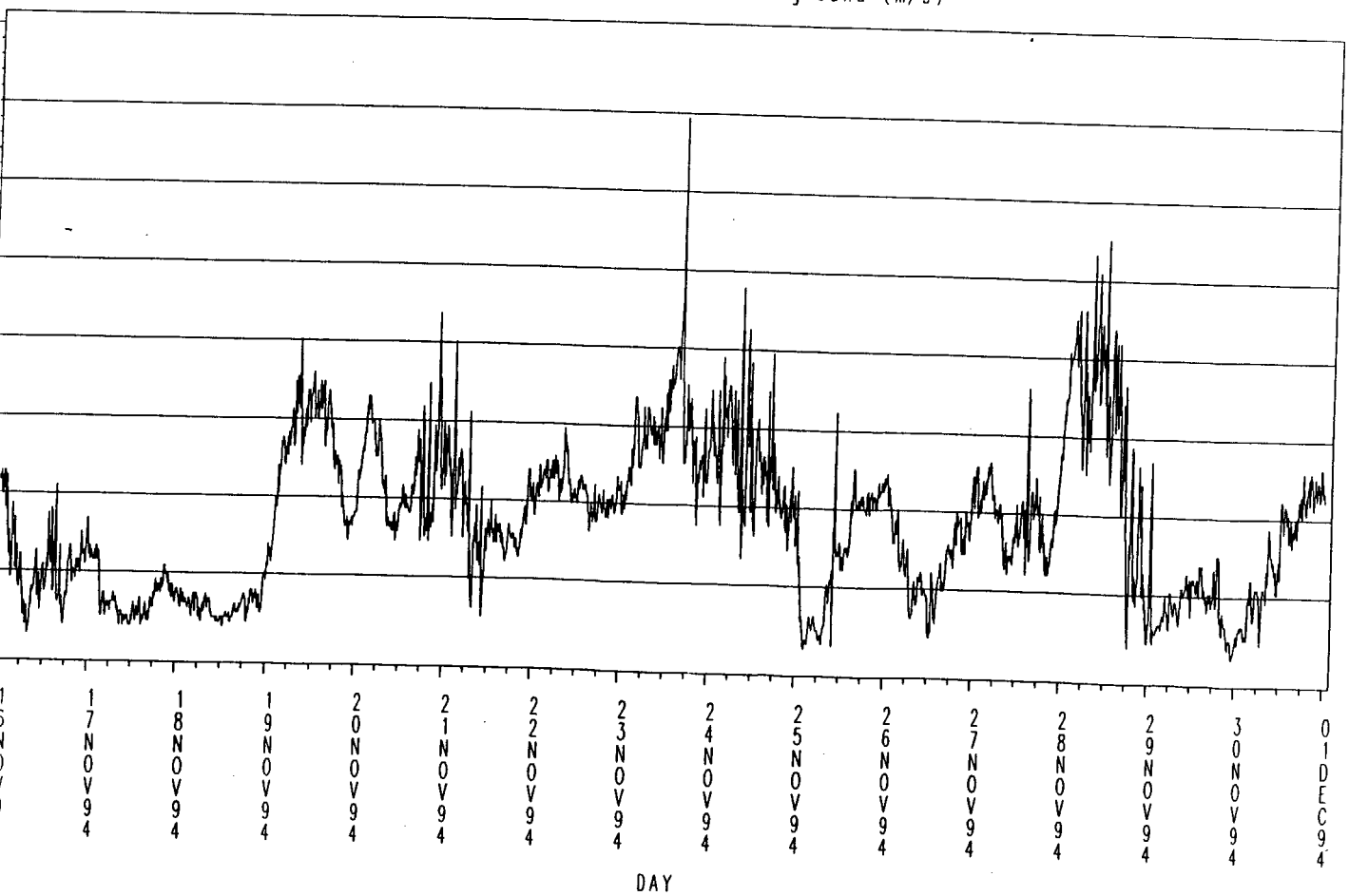
Gust wind speed 10 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

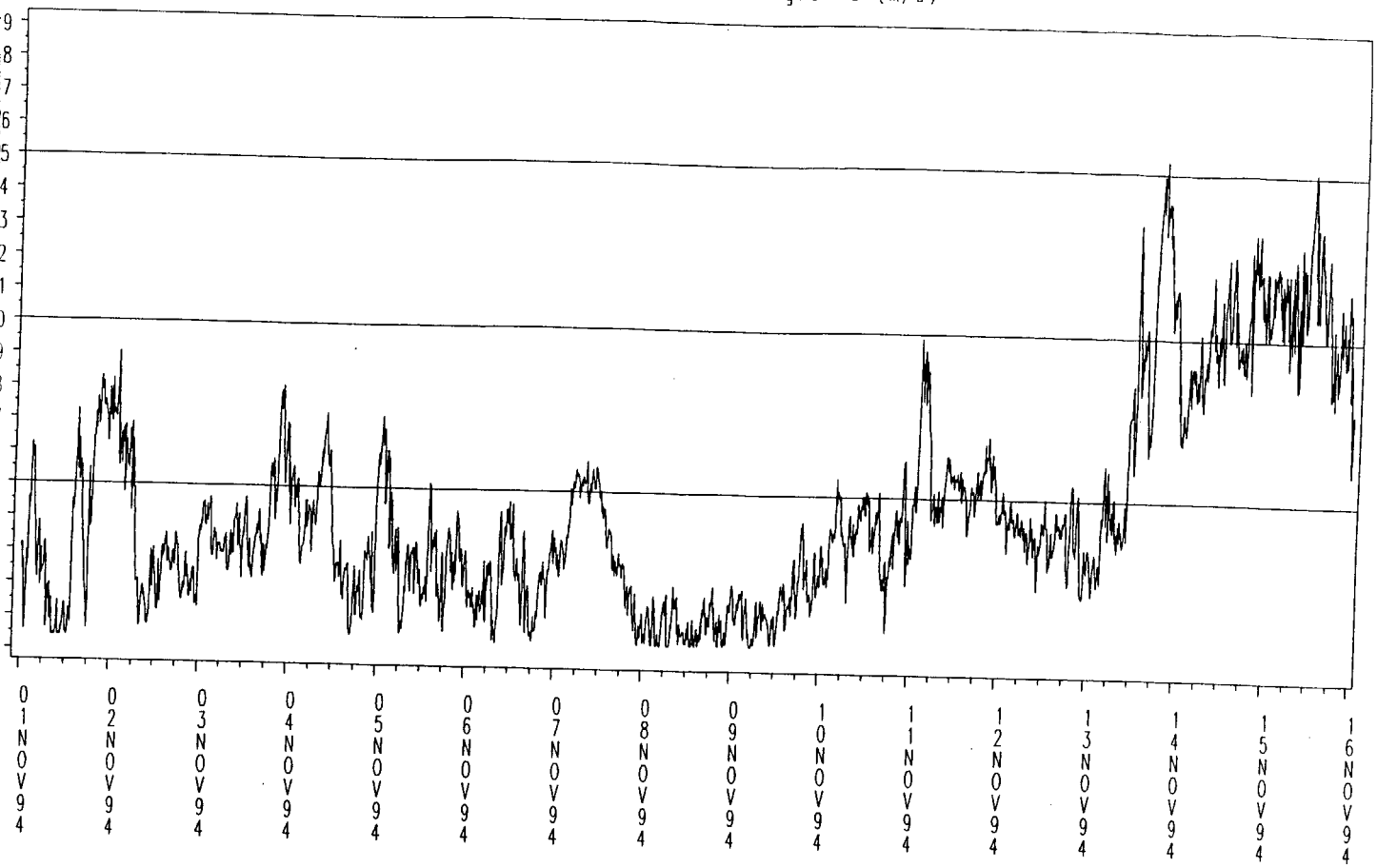
Gust wind speed 10 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

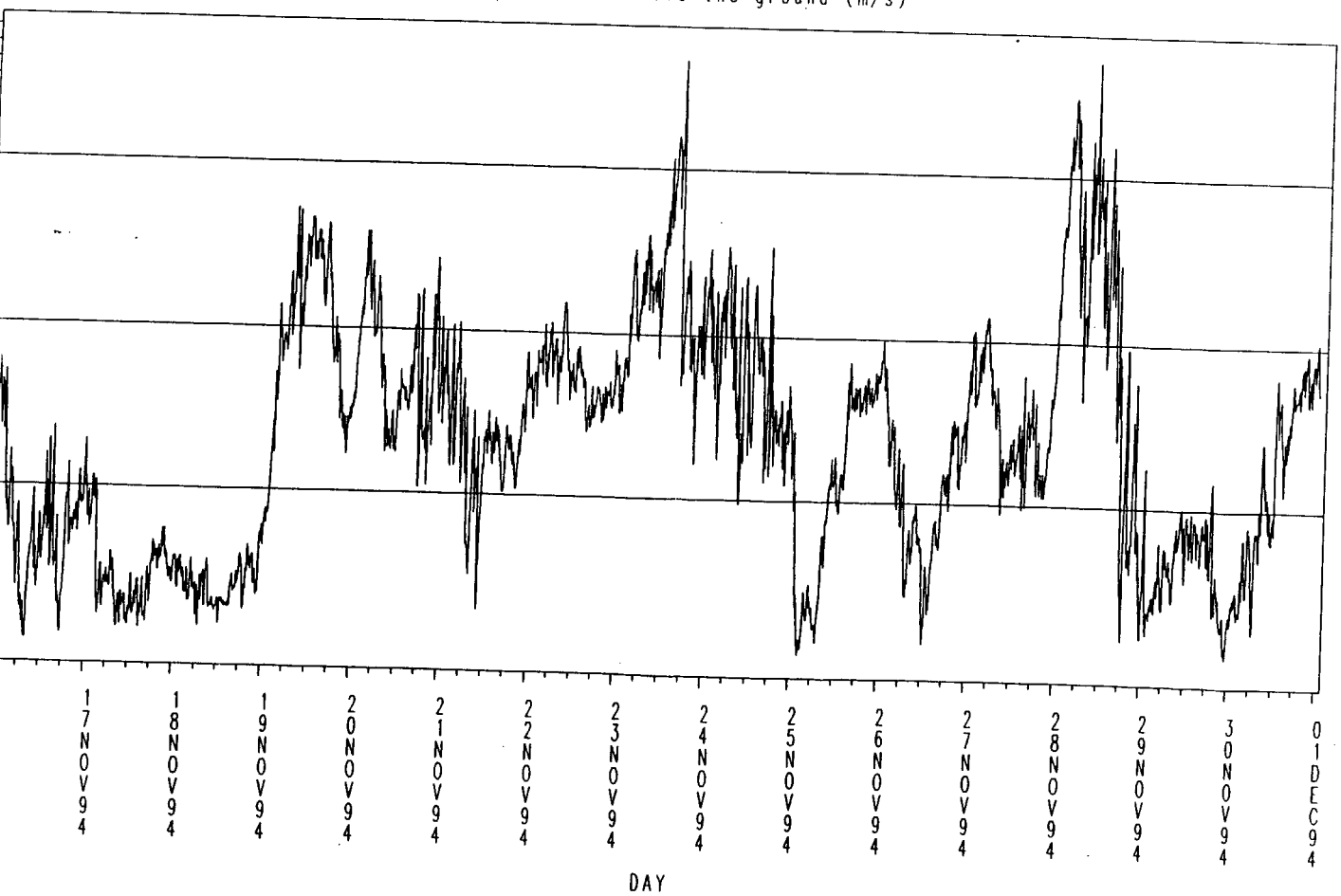
Wind speed 18 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

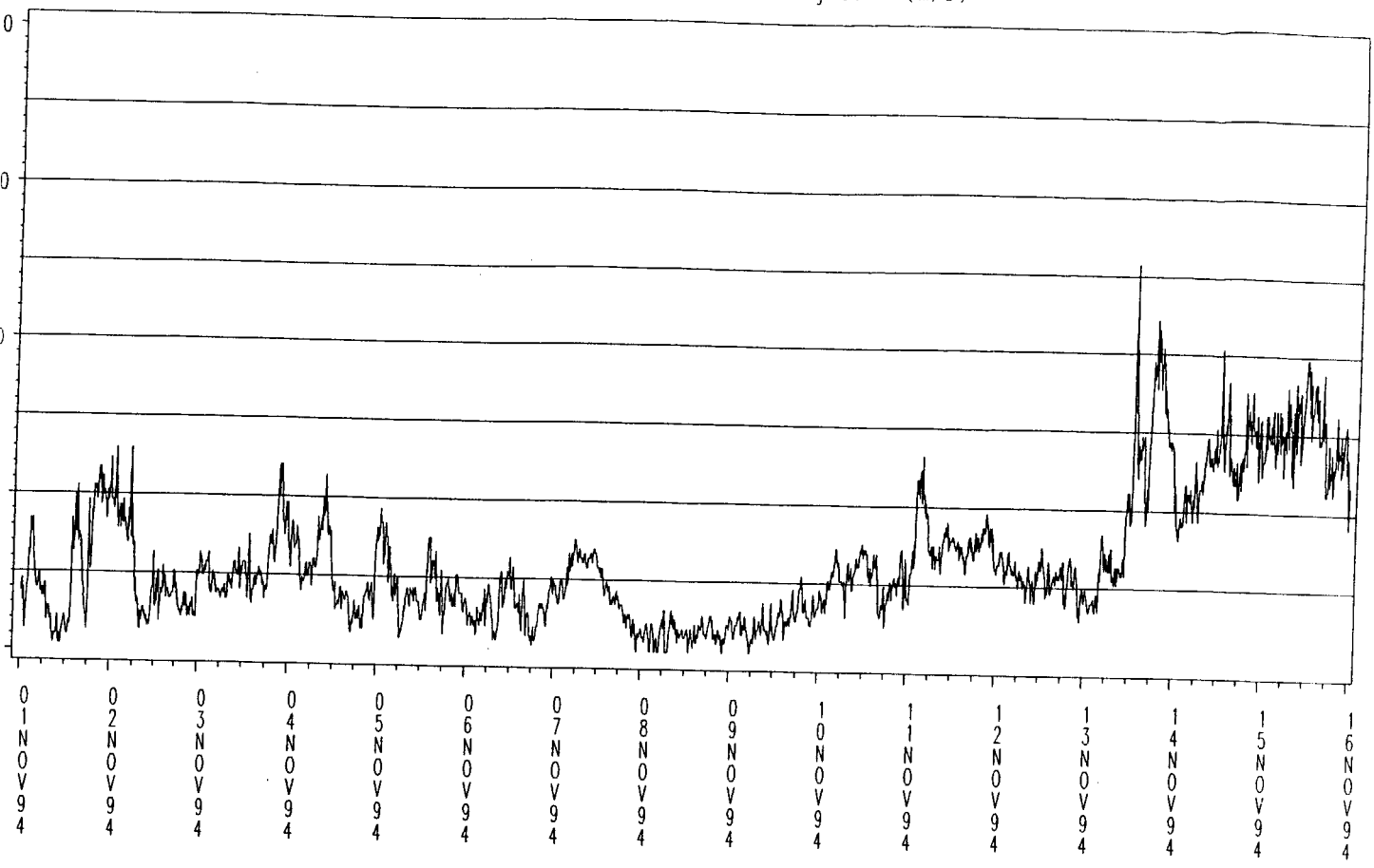
Wind speed 18 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

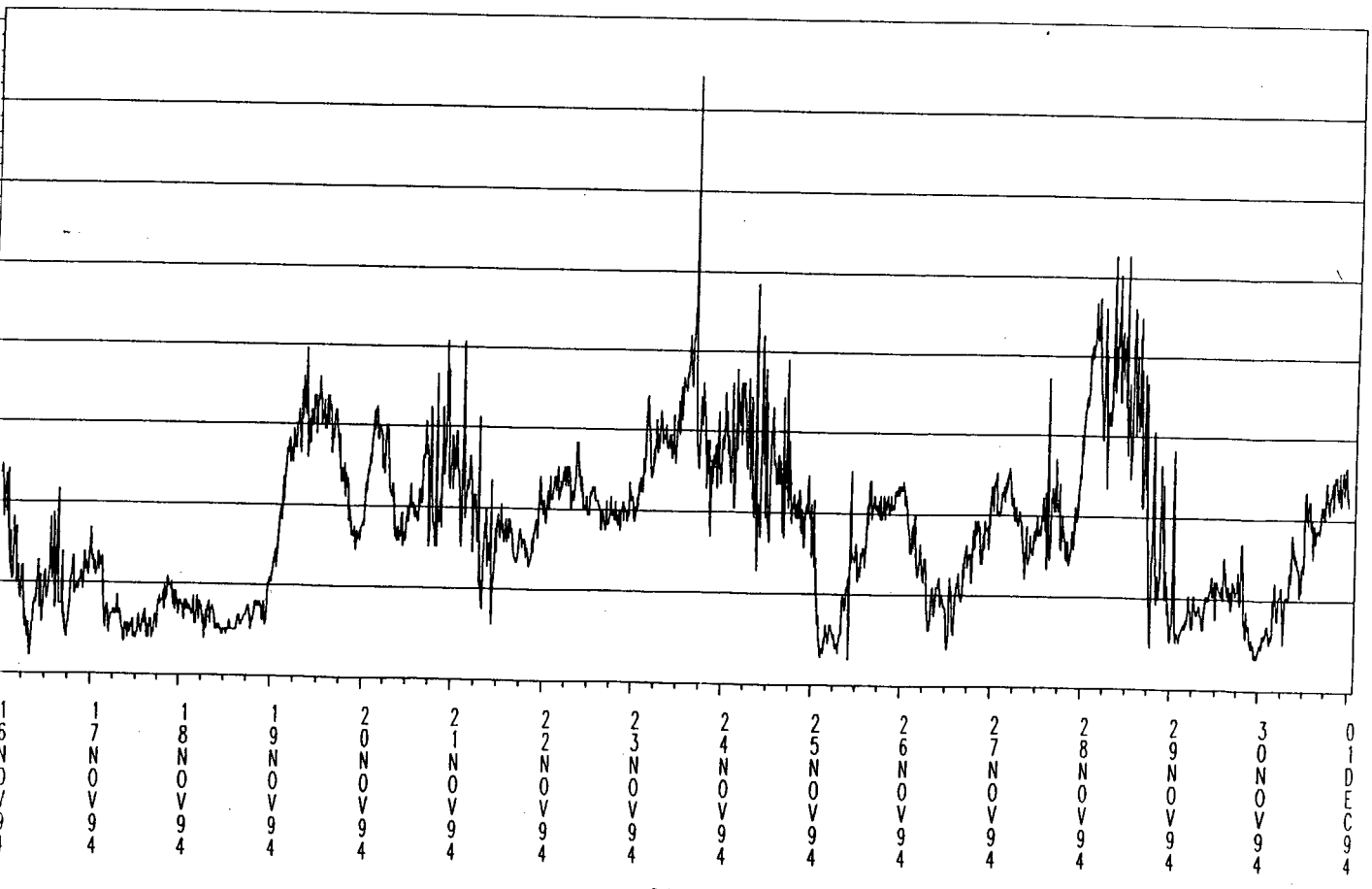


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

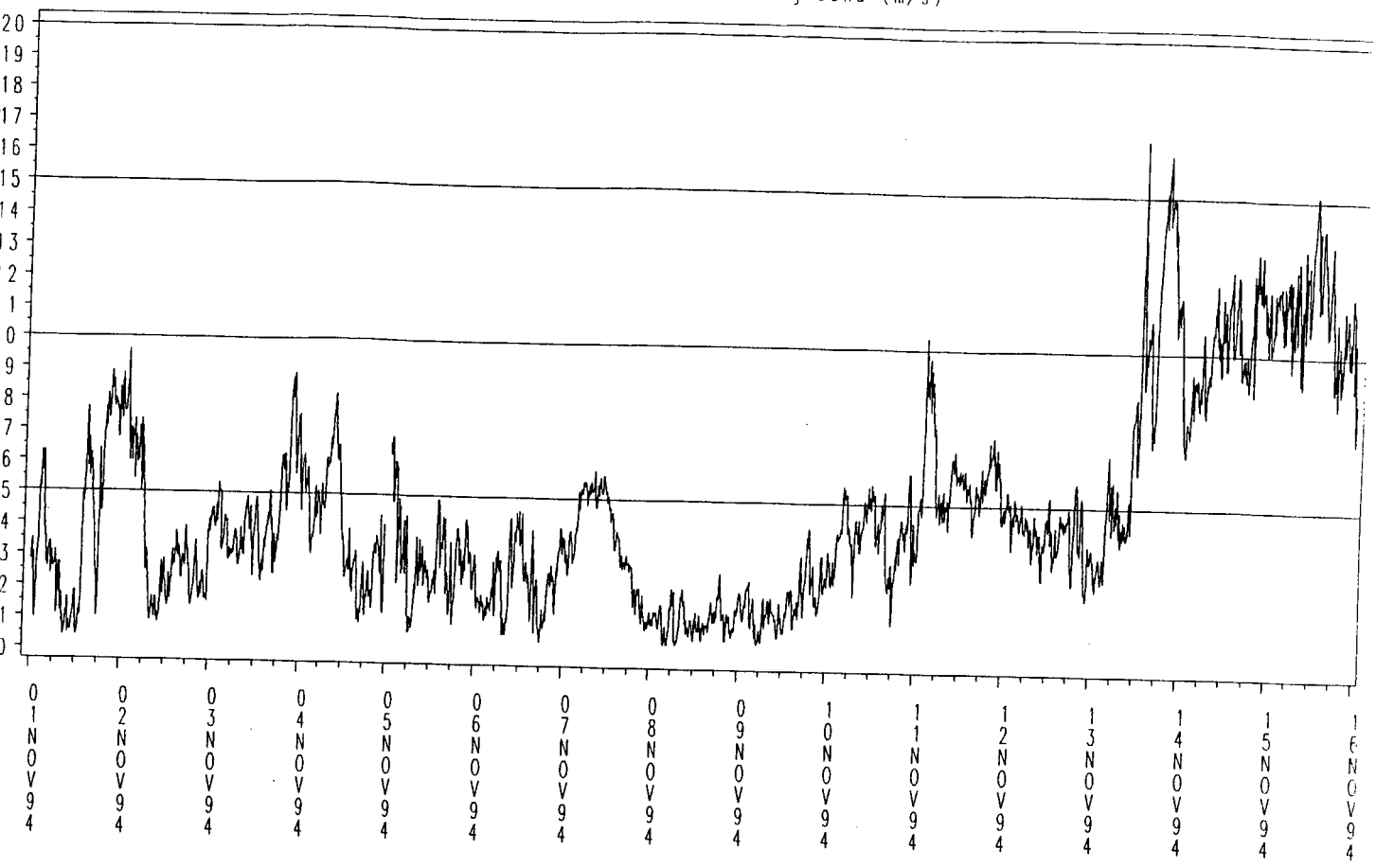


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

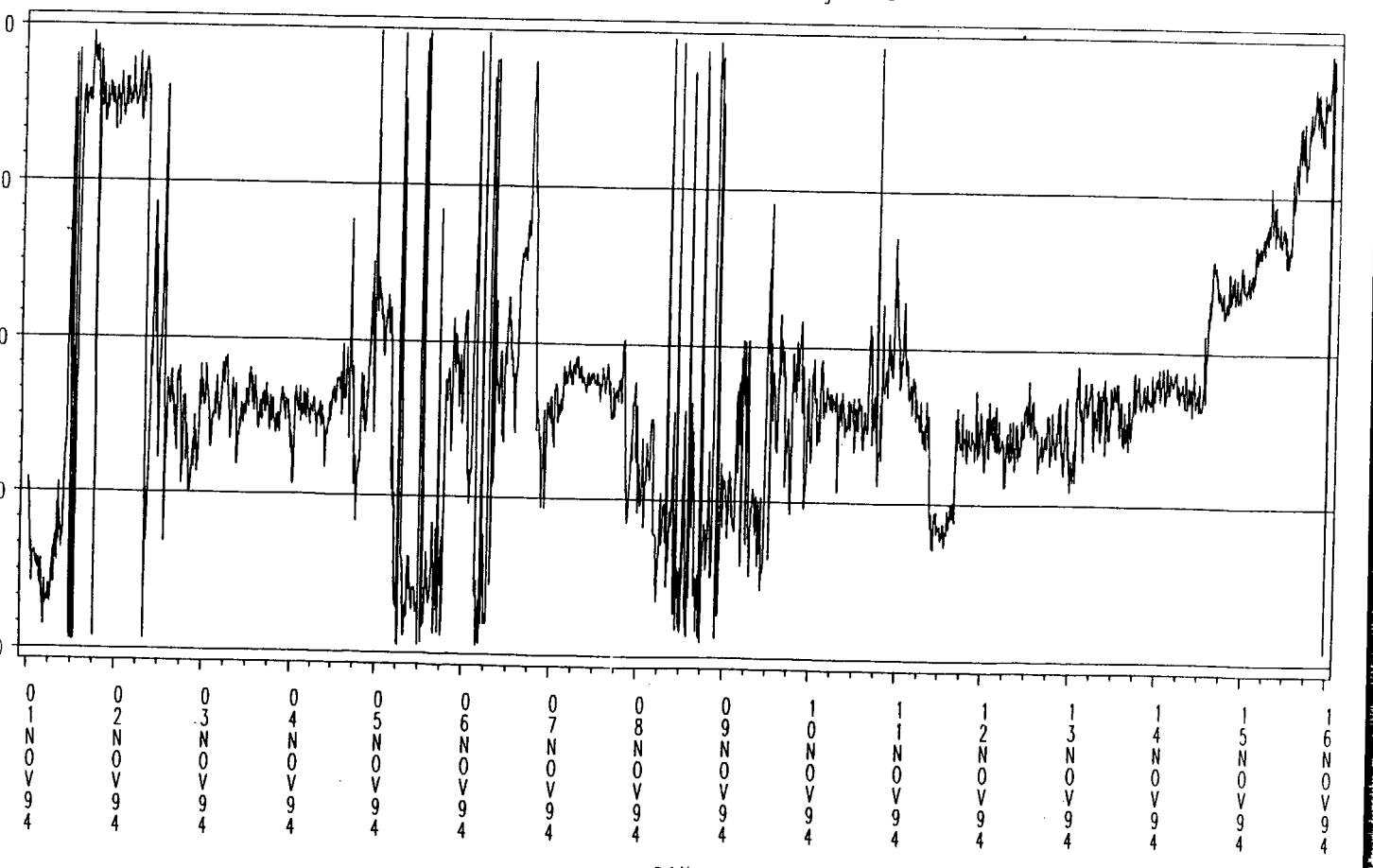


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 30 m above the ground

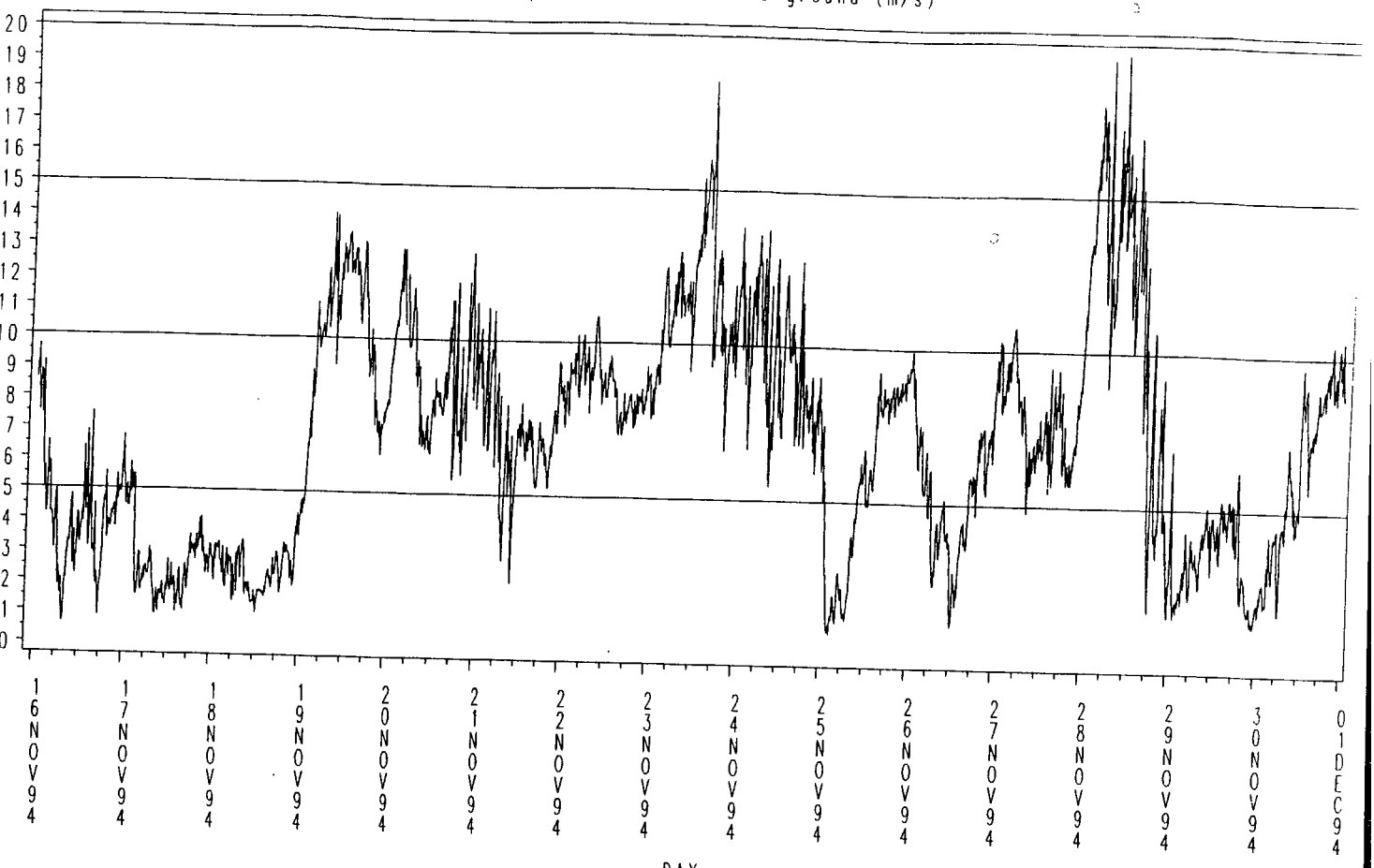


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

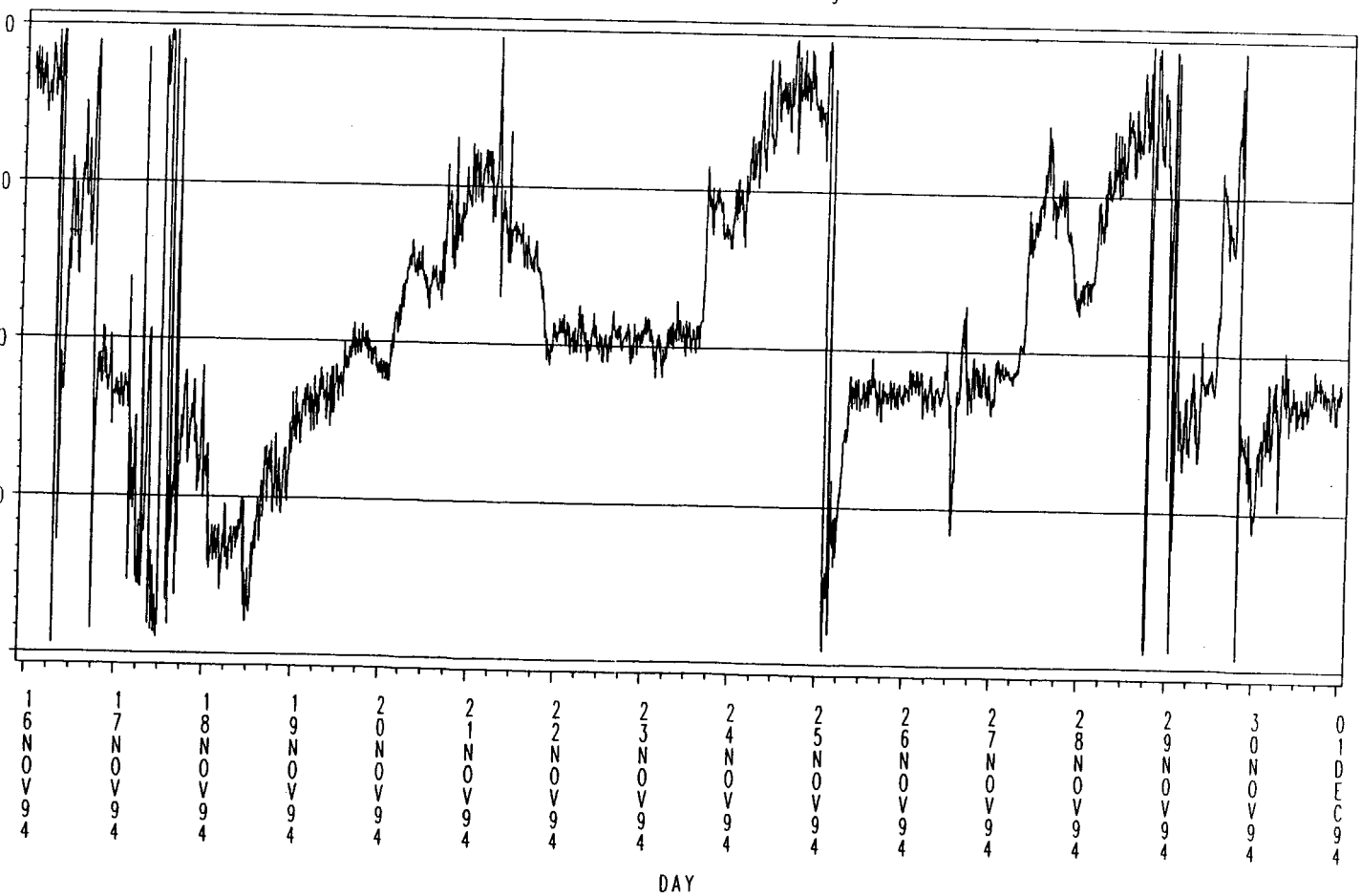


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 30 m above the ground

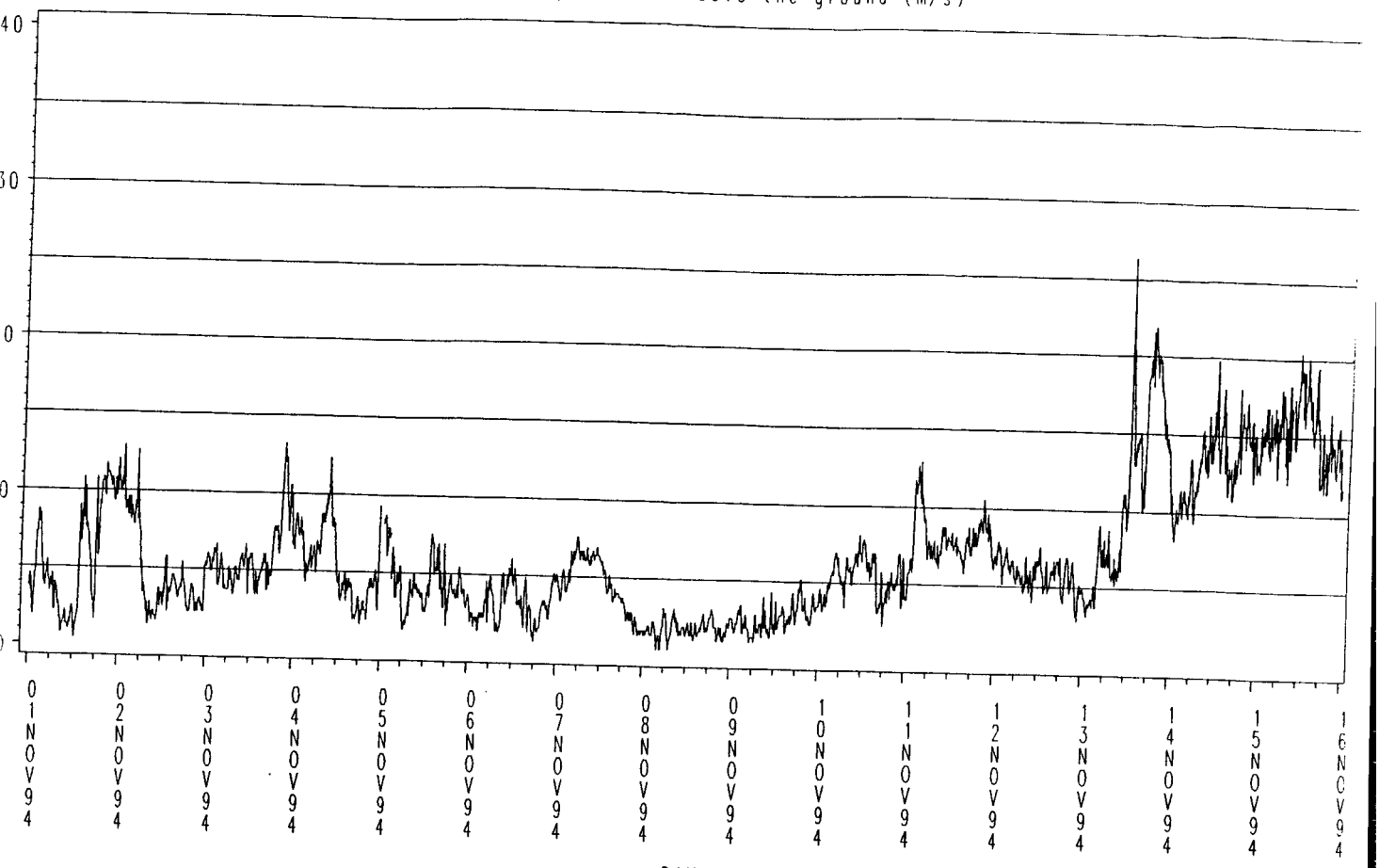


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

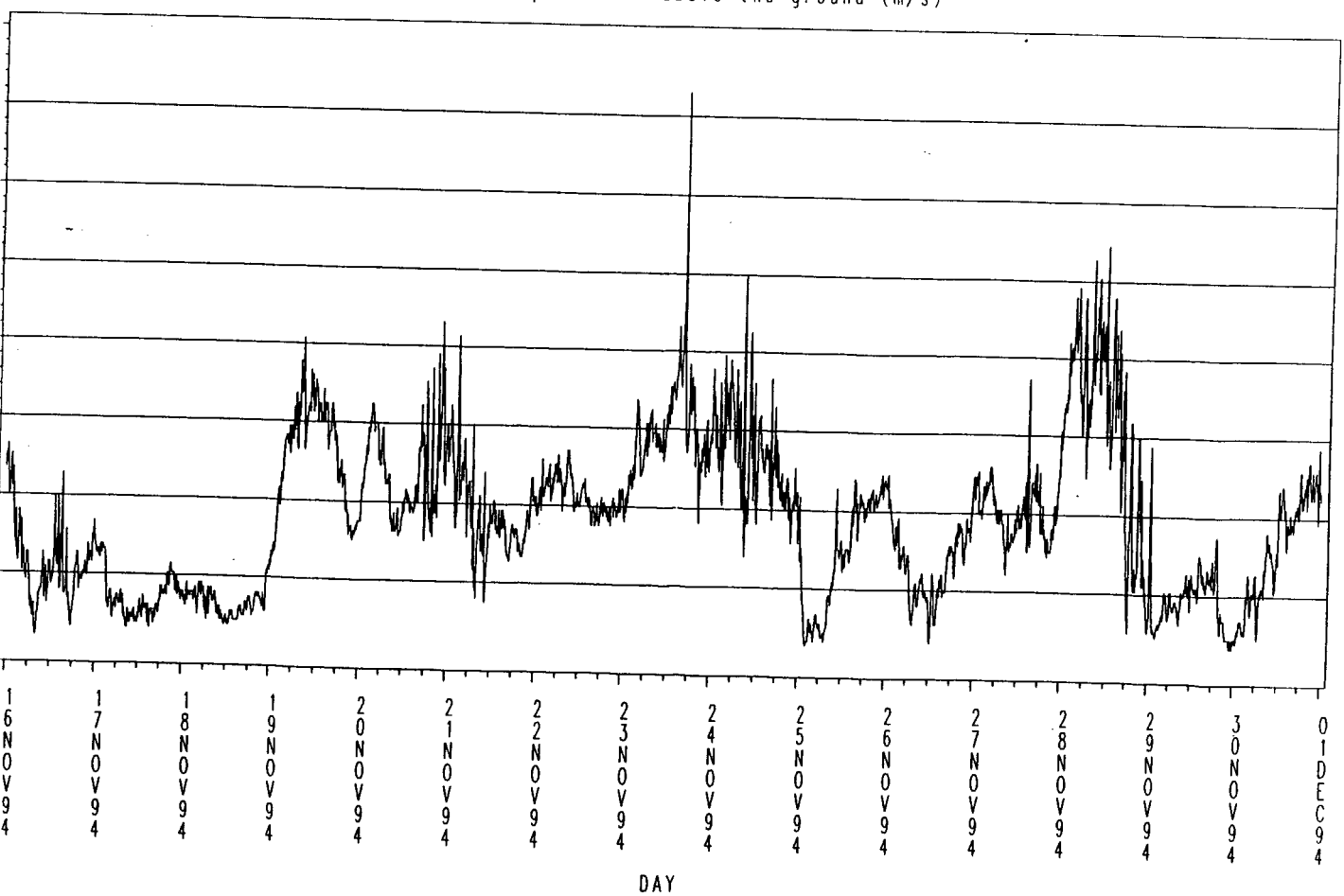


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

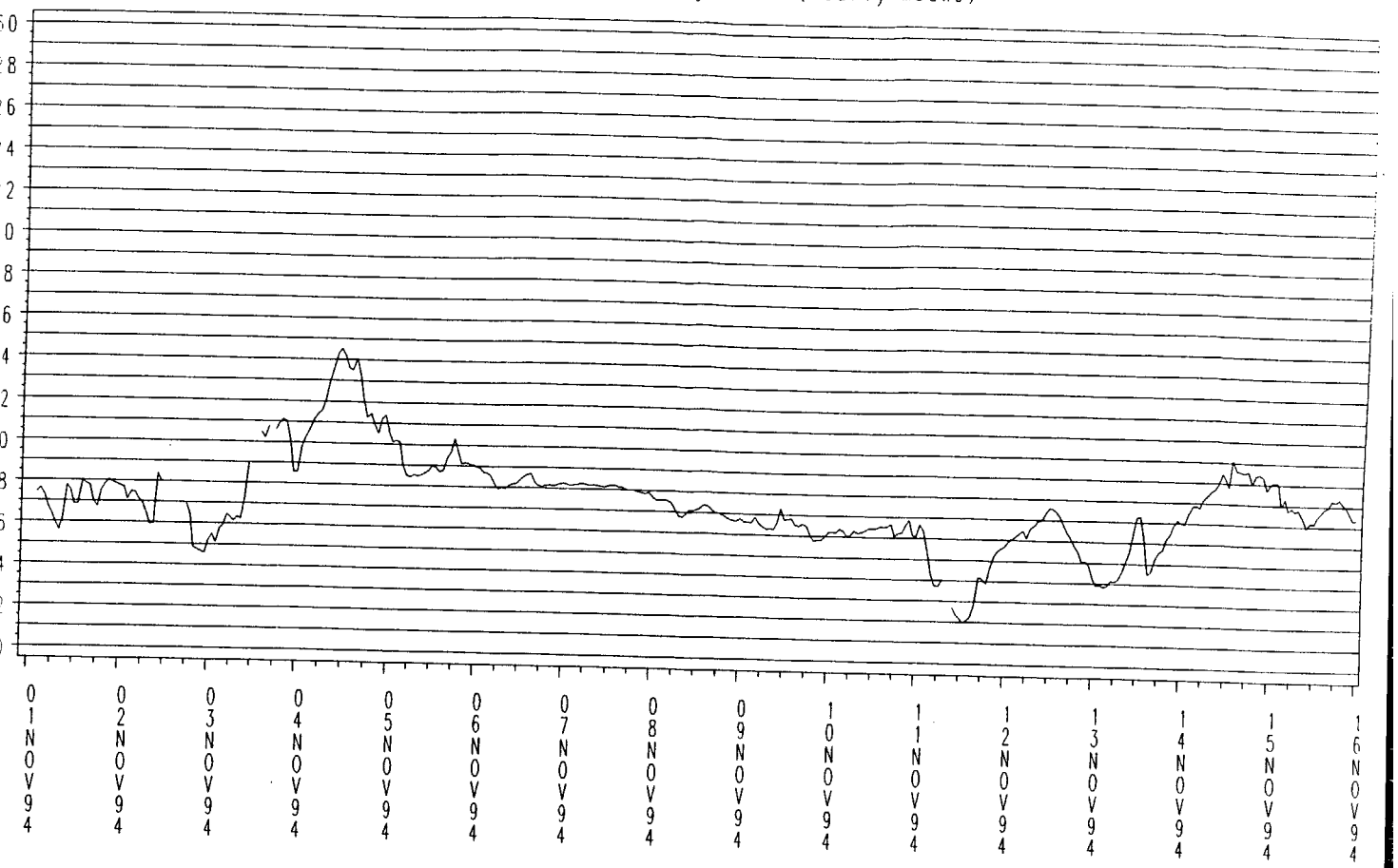


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Temperature in degrees C (Hourly Means)

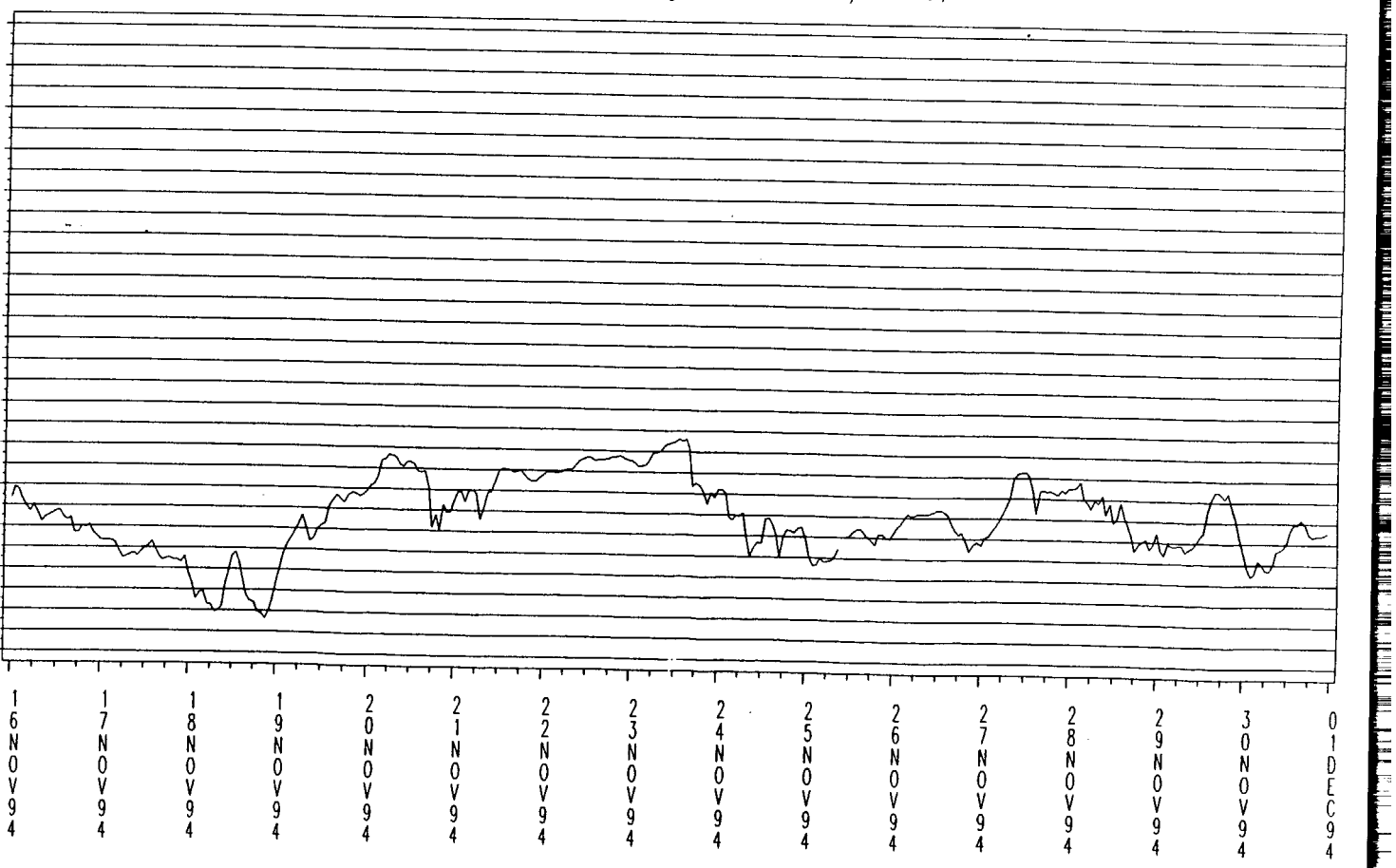


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Temperature in degrees C (Hourly Means)

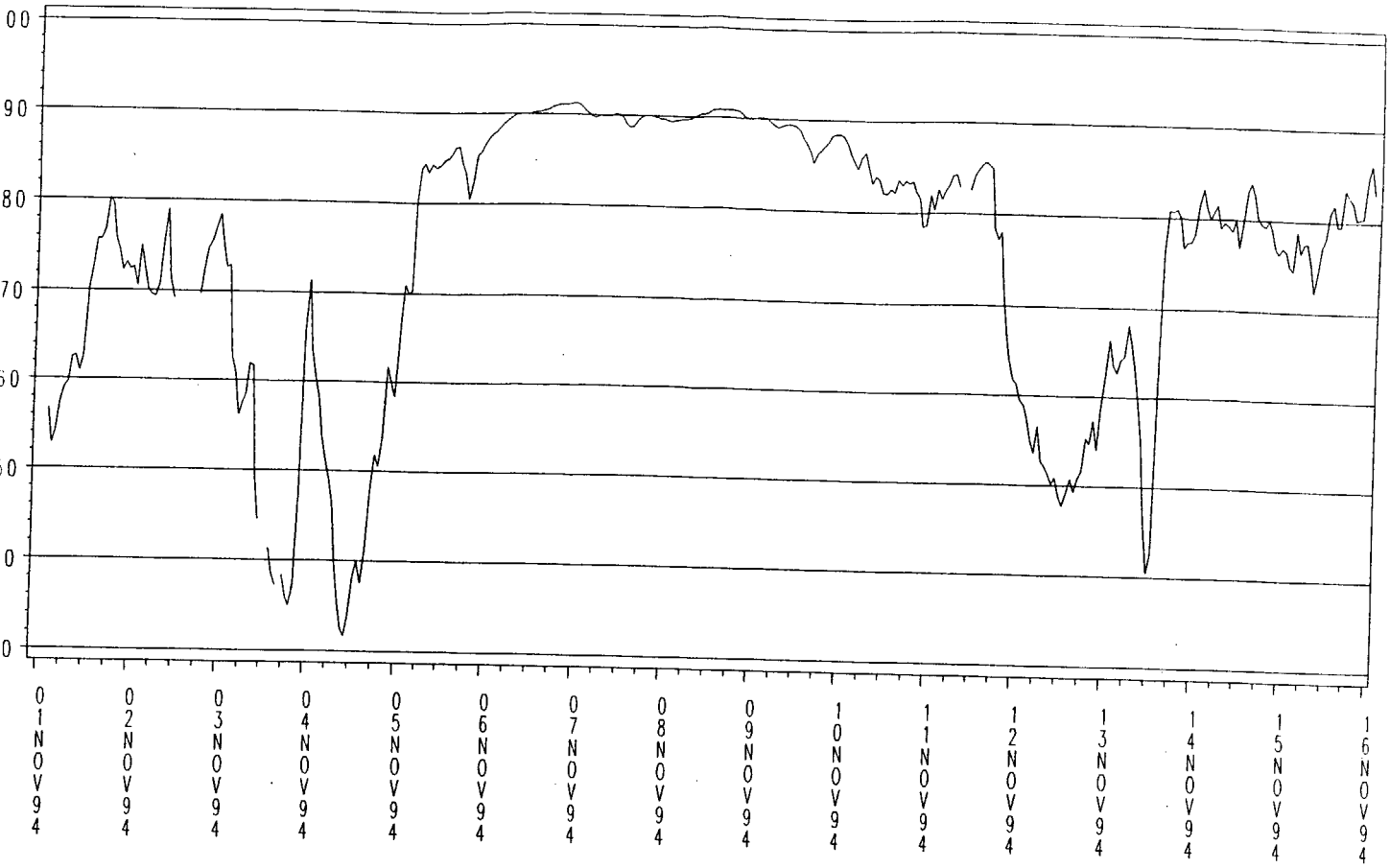


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Humidity in % (Hourly Means)

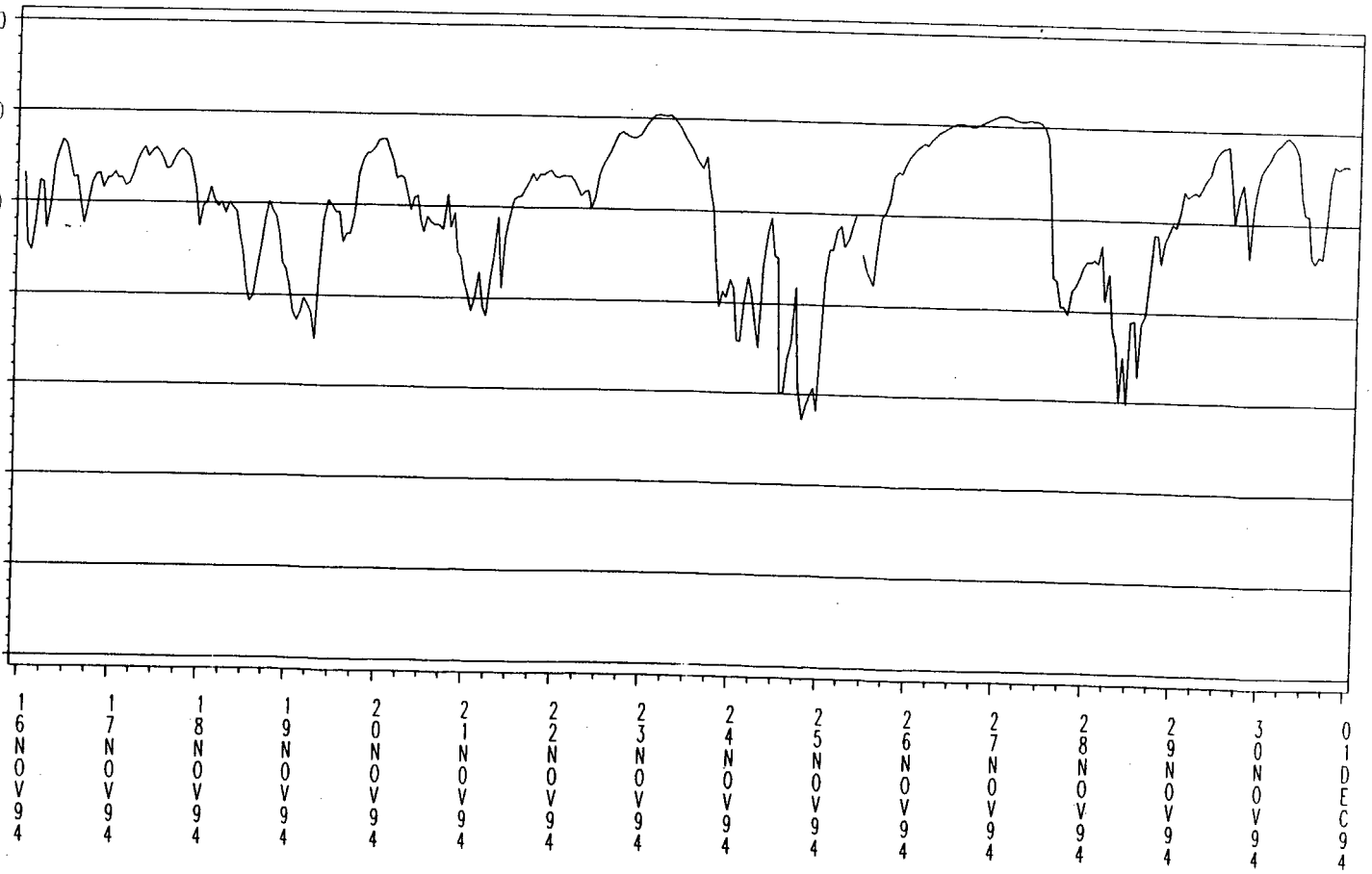


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Humidity in % (Hourly Means)

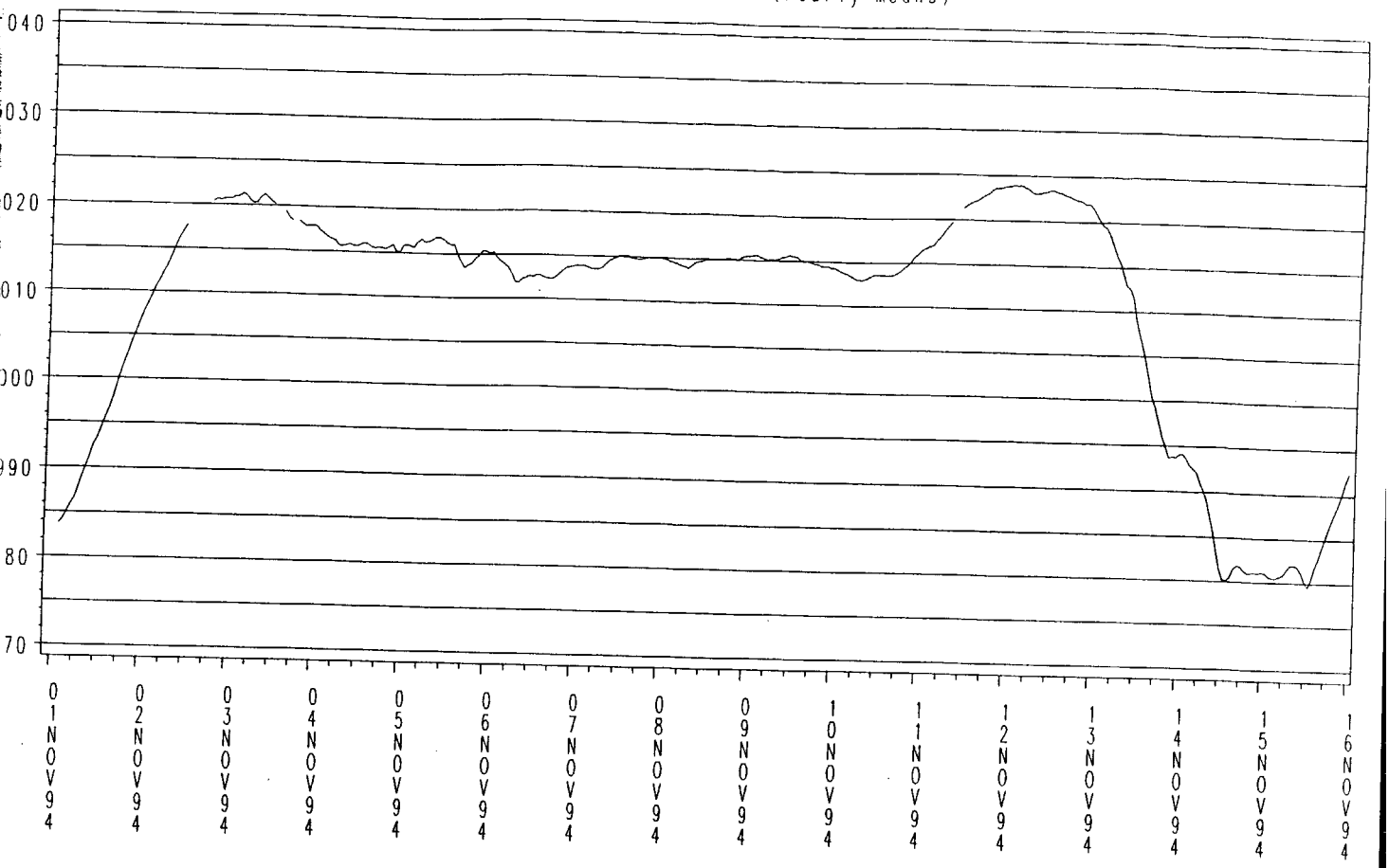


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)

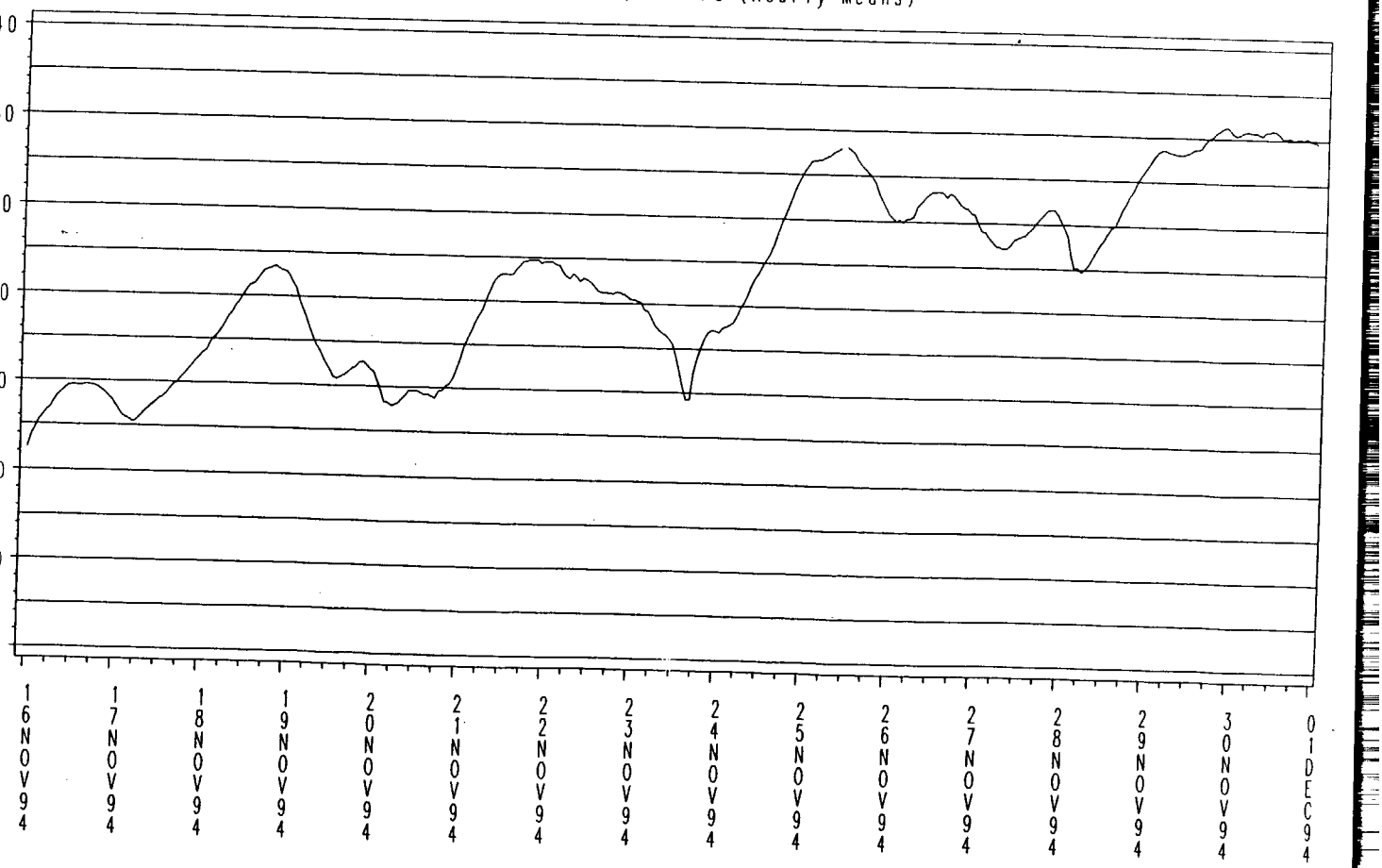


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)



DAY

DNMI - KLIMAAVDELINGEN

DISTRIBUTION TABLES / WIND ROSES

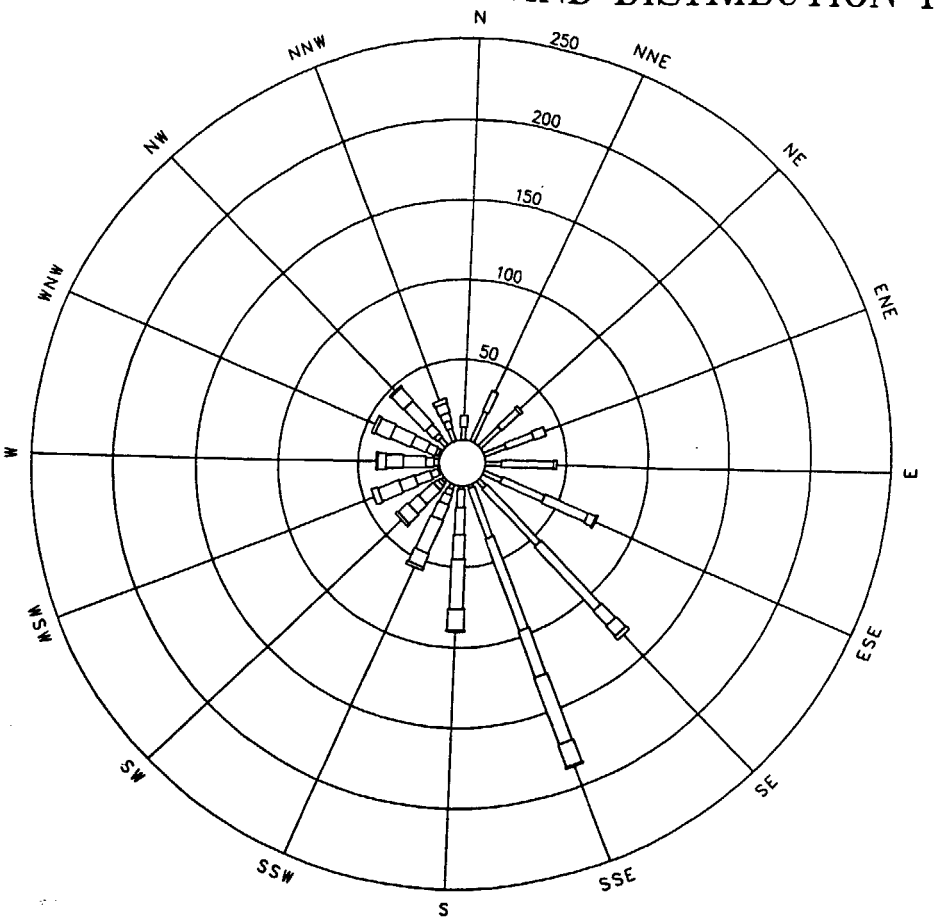
The distribution table gives details about the distribution of the wind speed for a certain wind direction or the distribution of the wind directions for a certain wind speed.

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.

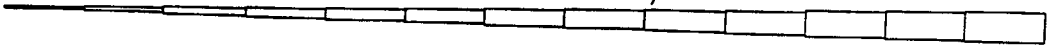
The frequencies in the table are given per thousand (Prm) of the data available this month.

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 NOV 1994 WIND DISTRIBUTION 10 M



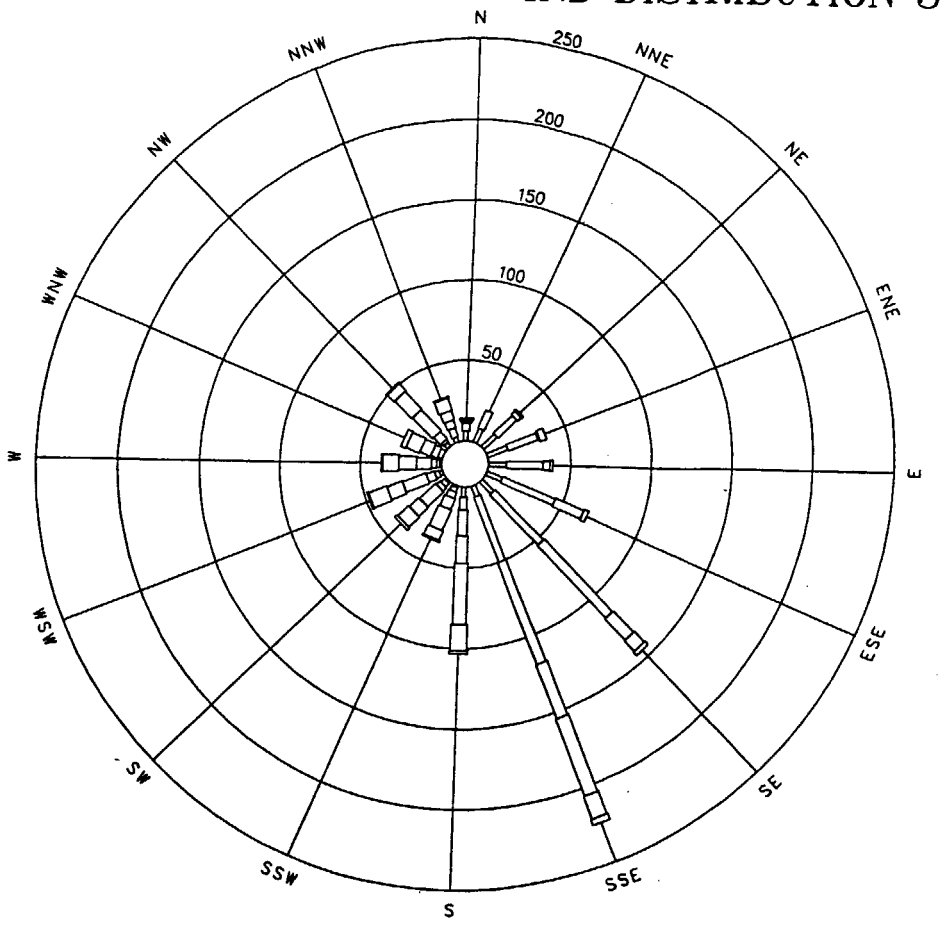
LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
WIDTH = SPEED (M/S / BEAUFORT SCALE)



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

	Beau-fort	DD																	
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
		Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm
.2	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1.5	1	8	20	17	14	10	12	6	2	2	3	2	1	0	1	6	8	120
3.3	2	7	14	15	18	32	29	49	33	11	4	2	5	3	2	3	5	241
5.4	3	0	0	2	8	2	29	54	61	17	6	3	10	5	6	7	5	222
7.9	4	0	.	.	0	0	5	12	31	15	10	12	10	14	10	19	6	152
10.7	5	0	.	.	.	.	1	8	44	31	22	8	14	11	14	11	3	174
13.8	6	.	.	.	.	.	.	3	15	13	9	8	4	5	10	1	0	73
17.1	7	.	.	.	.	.	.	0	1	1	2	2	0	1	2	0	.	12
20.7	8	.	.	.	.	.	.	.	.	.	.	.	0	0	.	.	.	0
24.5	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	ALL	17	36	36	42	45	78	135	190	93	60	41	48	43	48	50	29	1000

HANOYTANGEN NOV 1994 WIND DISTRIBUTION 30 M



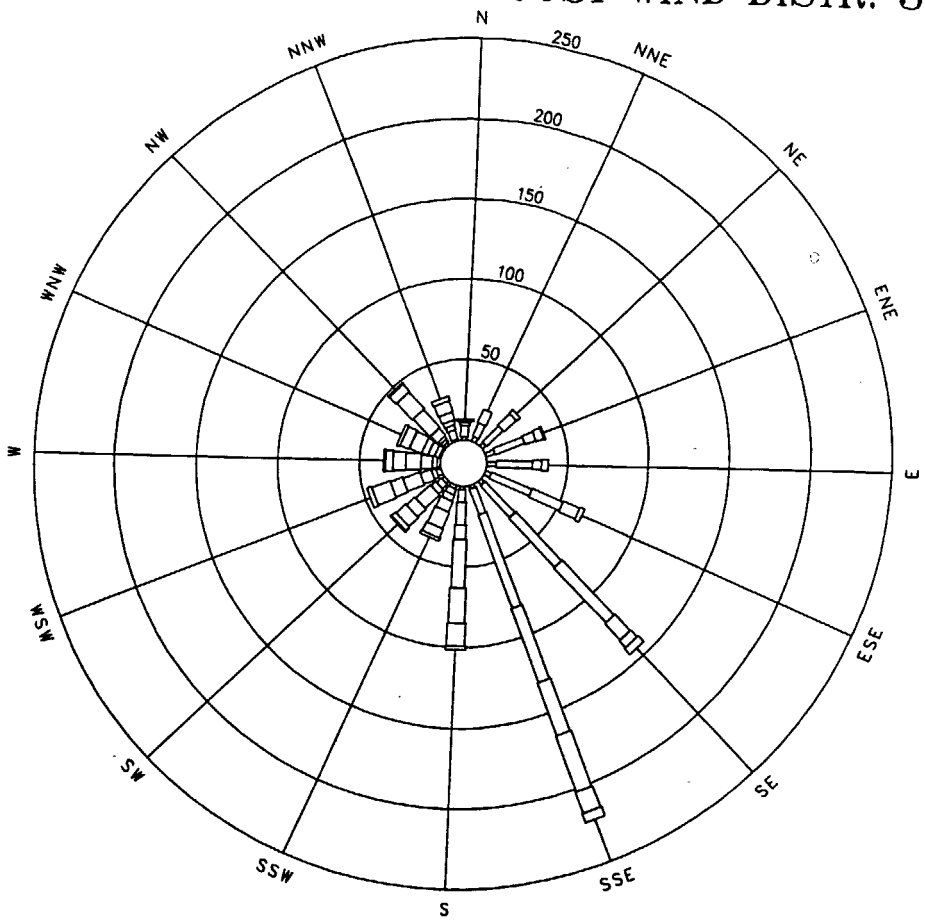
LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
WIDTH = SPEED (M/S / BEAUFORT SCALE)

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

Beaufort	DD																	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm
0 .2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1 1.5	6	9	11	13	11	10	10	7	6	1	1	2	1	0	3	3	101
2 3.3	5	12	16	19	22	35	43	43	8	3	3	3	2	0	2	6	228
3 5.4	1	0	3	1	4	19	62	68	16	4	3	5	3	3	6	5	213
4 7.9	1	.	1	4	2	3	18	36	17	7	13	15	9	4	18	6	162
5 10.7	1	.	.	.	.	0	9	51	38	14	8	10	11	7	15	8	176
6 13.8	.	.	.	.	.	.	3	15	16	6	9	12	10	9	6	1	93
7 17.1	.	.	.	.	.	.	0	4	2	1	2	1	1	3	1	.	20
8 20.7	.	.	.	.	.	.	.	.	.	.	0	0	0	.	0	.	1
9 24.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
10 28.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
11 32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
12 .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	16	22	32	40	40	68	148	227	106	40	44	52	41	30	52	32	1000

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
REPORT 13 : February 17 1995

HANOYTANGEN NOV. 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																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm
0-.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0.3-1.5	2	3	3	6	6	4	3	2	2	0	0	0	0	0	2	1	43
1.6-3.3	7	9	14	19	22	27	27	17	8	2	2	3	0	0	2	6	172
3.4-5.4	2	9	10	7	6	21	42	62	14	4	4	3	2	1	2	3	198
5.5-7.9	1	.	3	5	4	11	47	49	9	4	4	7	3	3	6	3	167
8.0-10.7	0	.	0	1	0	3	14	35	30	7	12	11	7	4	15	5	151
10.8-13.8	1	.	.	.	.	0	6	37	22	11	7	8	9	4	14	7	132
13.9-17.1	0	.	.	.	.	.	5	14	14	6	8	12	8	8	6	3	89
17.2-20.7	0	.	.	.	.	.	0	6	2	2	3	3	5	6	1	0	32
20.8-24.5	.	.	.	.	.	.	0	0	0	.	1	0	1	2	0	.	7
24.5-28.4	.	.	.	.	.	.	.	0	.	.	.	.	0	.	0	.	1
28.5-32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
> 32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	0	.	.	0
ALL	16	22	32	40	40	68	148	227	106	40	44	52	41	30	52	32	1000

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
REPORT 13 : February 17 1995

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.

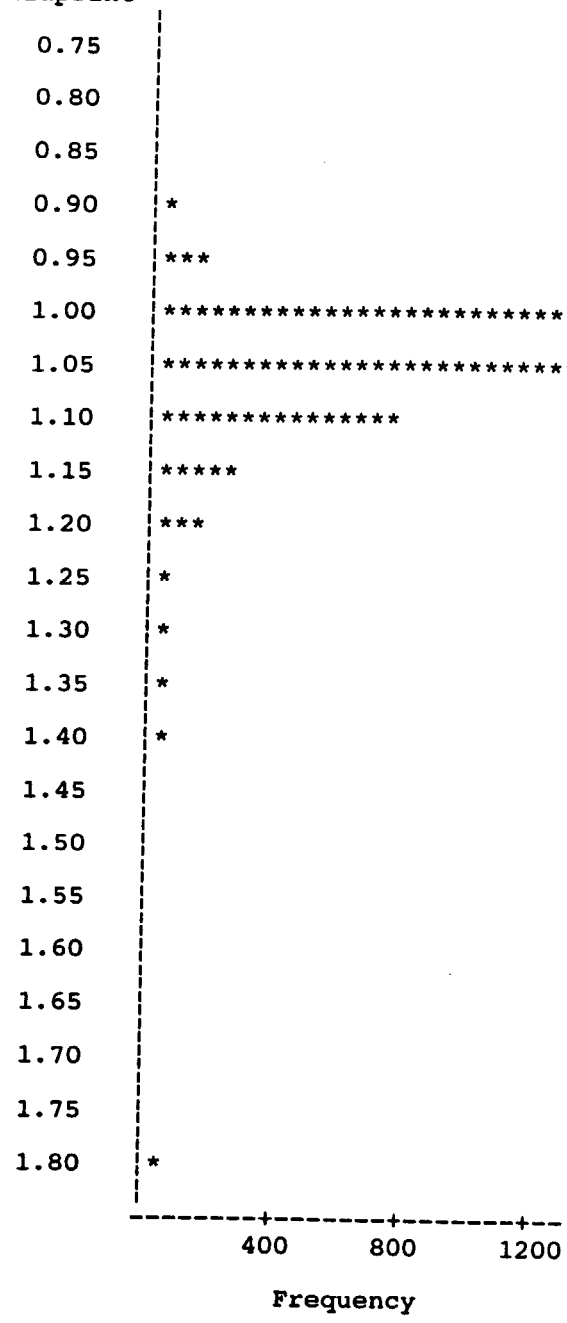
The classes start at 0.75 (.725-.774) and end at 1.80 (1.775-1.825). Quotients below or above these limits are counted in these classes respectively.

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 NOV. 1994

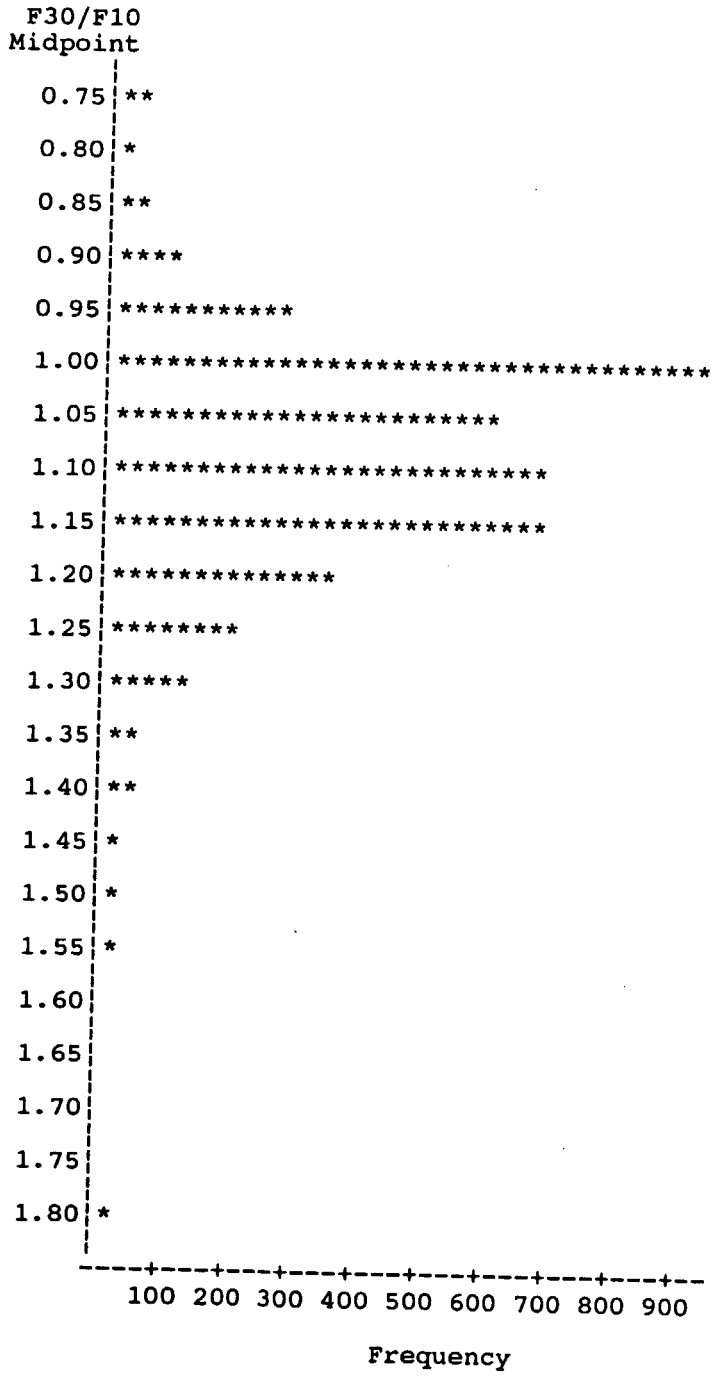
QUOTIENT F30/F18



F30/F18 Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
0.75	16	16	0.37	0.37
0.80	16	32	0.37	0.74
0.85	19	51	0.44	1.18
0.90	52	103	1.21	2.39
0.95	162	265	3.76	6.15
1.00	1248	1513	28.97	35.12
1.05	1318	2831	30.59	65.71
1.10	755	3586	17.53	83.24
1.15	265	3851	6.15	89.39
1.20	144	3995	3.34	92.73
1.25	64	4059	1.49	94.22
1.30	54	4113	1.25	95.47
1.35	46	4159	1.07	96.54
1.40	37	4196	0.86	97.40
1.45	12	4208	0.28	97.68
1.50	16	4224	0.37	98.05
1.55	10	4234	0.23	98.28
1.60	14	4248	0.32	98.61
1.65	12	4260	0.28	98.89
1.70	3	4263	0.07	98.96
1.75	4	4267	0.09	99.05
1.80	41	4308	0.95	100.00

HANØYTANGEN NOV. 1994

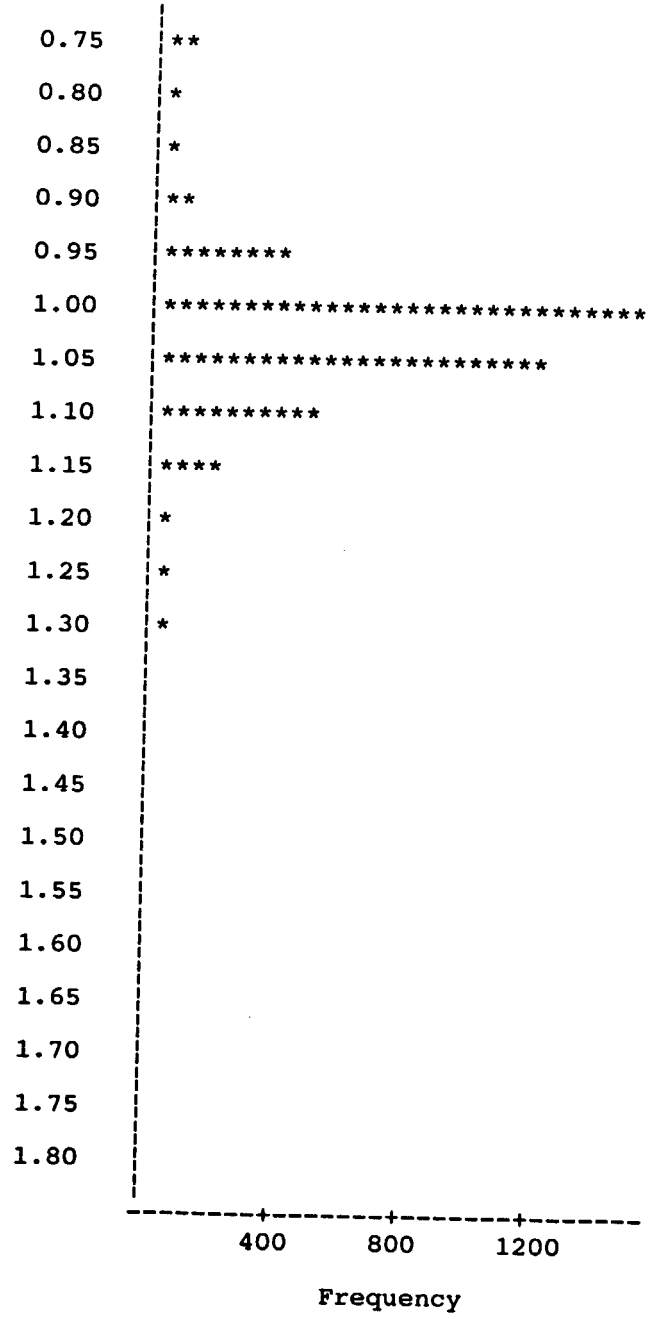
QUOTIENT F30/F10



Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
0.75	54	54	1.25	1.25
0.80	26	80	0.60	1.86
0.85	51	131	1.18	3.04
0.90	90	221	2.09	5.13
0.95	284	505	6.59	11.72
1.00	946	1451	21.96	33.68
1.05	597	2048	13.86	47.54
1.10	672	2720	15.60	63.14
1.15	679	3399	15.76	78.90
1.20	356	3755	8.26	87.16
1.25	203	3958	4.71	91.88
1.30	118	4076	2.74	94.61
1.35	59	4135	1.37	95.98
1.40	47	4182	1.09	97.08
1.45	37	4219	0.86	97.93
1.50	26	4245	0.60	98.54
1.55	25	4270	0.58	99.12
1.60	6	4276	0.14	99.26
1.65	7	4283	0.16	99.42
1.70	3	4286	0.07	99.49
1.75	3	4289	0.07	99.56
1.80	19	4308	0.44	100.00

HANØYTANGEN NOV. 1994

QUOTIENT F18/F10



F18/F10 Midpoint	Freq	Cum. Freq	Percent	Cum. Percent
0.75	98	98	2.27	2.27
0.80	44	142	1.02	3.29
0.85	71	213	1.64	4.93
0.90	105	318	2.43	7.36
0.95	382	700	8.85	16.21
1.00	1549	2249	35.87	52.08
1.05	1195	3444	27.67	79.76
1.10	517	3961	11.97	91.73
1.15	214	4175	4.96	96.69
1.20	71	4246	1.64	98.33
1.25	31	4277	0.72	99.05
1.30	28	4305	0.65	99.70
1.35	7	4312	0.16	99.86
1.40	3	4315	0.07	99.93
1.45	1	4316	0.02	99.95
1.50	0	4316	0.00	99.95
1.55	0	4316	0.00	99.95
1.60	1	4317	0.02	99.98
1.65	0	4317	0.00	99.98
1.70	0	4317	0.00	99.98
1.75	1	4318	0.02	100.00
1.80	0	4318	0.00	100.00

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 Fx < Limit is sought. The lenght 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 :01/11/94	NOVEMBER 1994								Level : 10 m a.gr.
To : 30/11/94									Coordinates:
Coverage : 100.0 %	HANØYTANGEN								X = 71908
Number of data: 4318									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	1	21	52	75	97	115	118	119	
12 H	0	7	23	36	45	56	59	59	
18 H	0	3	11	23	28	37	39	39	
24 H	0	3	9	16	20	27	28	29	
48 H	0	1	3	6	9	13	14	14	
72 H	0	0	1	4	5	8	8	9	
Remarks : Based on maximum 10mn wind speed within the interval period, in any direction, at 10 metres level									

CLIMATOLOGICAL SUMMARY

Observation Period :											Location:	
From : 01/11/94												
To : 30/11/94						HANØYTANGEN 1994					Level:	2 m a.gr.
Coverage : 99.4-100.0 %												
Number of data :4294-4318												
						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	12.1	9.2	5.5	5.4	
Abs min	-4	-6.3	-5.1	0.3	1.1	4	8.7	8.1	3.2	0.2	1.5	
Mean Day max.	3.8	3.3	5.3	8.4	13.2	12.3	19.4	17.7	14.7	9.8	8.7	
Abs max.	6.7	6.4	10.5	14.9	22.7	18.4	26.4	29	22.1	14.8	14.7	
Mean	2.1	0.1	3	5.9	9.5	10.2	15.8	14.6	11.8	7.5	7.2	
Relative Humidity												
Mean Day min.	61	44	59	57	44	64	56	57	52	60	66	
Abs min.	44	27	29	30	19	40	25	32	23	35	31	
Mean Day max.	81	73	84	84	80	86	85	84	82	84	85	
Abs max.	89	90	89	91	89	93	91	89	91	90	91	
Mean	70	60	73	72	63	78	72	73	69	74	78	
Air pressure												
Mean Day min.	991.6	1016.7	993.4	1004.4	1013.7	1008.3	1017.7	1010.1	1006.6	1007.4	1007.6	
Abs min.	966.2	989.7	969.4	970.9	1004.7	991.9	1010.8	996.9	985.6	983	979.2	
Mean Day max.	1003.5	1023.6	1004.7	1011.8	1018	1015.8	1020.9	1015.1	1012.1	1014.2	1016	
Abs max.	1019.6	1045.2	1024.3	1028.8	1027.8	1028.1	1026.4	1023.5	1023.7	1030.9	1031.4	
Mean	998	1020	999.1	1008.2	1016	1012.2	1019.3	1012.5	1010.3	1011	1011.8	
Coeficient Transfert												
from level 10 to 18	1.051	1.046	1.024	1.022	1.049	1.035	1.04	1.048	1.044	1.037	1.022	
from level 10 to 30	1.117	1.088	1.055	1.053	1.119	1.067	1.077	1.117	1.115	1.12	1.097	
from level 18 to 30	1.059	1.036	1.029	1.032	1.063	1.03	1.032	1.063	1.065	1.068	1.078	
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.

At the end of December 1994 the parallel series between Hellisøy and Hanøytangen, which is the basis for establishing 10/100 year values valid for Hanøytangen, is still short. It covers the period 3.2-31.12.1994 with some gaps due to missing data at Hanøytangen and in September also at Hellisøy. The values given below must therefore still be regarded as approximations. The variations in the transfer coefficients when compared to those computed in the earlier reports are indications of this.

There is a minor reduction in the transfer coefficient for the sector 200°-229° when the November and December data are added to the parallel series leading to reduced 10/100 years estimates for this sector where the extreme most probably will occur.

The coefficients for the gust wind have increased with the new data but is still lower than the estimates used in the report 43/92 KLIMA. Thus the estimates for the gust wind in this report seem to be to high.

The estimates are referred to the level 10 m above the ground.

Estimates of transfer coefficients based on data from Hellisøy (He) and Hanøytangen (Ha) for the period 3.2-31.12.1994.

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°
0.73 1.11	0.75 1.08	0.78 1.07	0.78 1.08	0.78 1.17	0.80 1.11	0.69 0.96

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.

	SUMMER		WINTER	
	May - August		September - April	
DIRECTION	$V_{10}10$	$V_{10}100$	$V_{10}10$	$V_{10}100$
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 3.2-31.12.1994.

	SUMMER		WINTER	
	May - August		September - April	
DIRECTION	$V_{10}10$	$V_{10}100$	$V_{10}10$	$V_{10}100$
030-060°	9.0	10.7	14.0	15.8
070-100°	9.5	11.3	12.1	13.7
110-120°	13.2	15.8	17.8	20.1
130-150°	15.5	18.5	20.7	23.4
160-190°	18.6	22.2	23.8	26.8
200-220°	18.6	22.2	23.8	26.8
230-290°	16.8	19.9	21.5	24.3
300-330°	16.9	20.2	22.9	25.8
340-020°	14.9	17.8	19.5	22.3

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 3.2-31.12.1994.

	SUMMER		WINTER	
	May - August		September - April	
DIRECTION	V_g10	V_g100	V_g10	V_g100
030-060°	13.7	16.3	21.3	24.1
070-100°	14.4	17.2	18.4	20.9
110-120°	20.1	24.0	27.1	30.6
130-150°	22.2	26.6	30.6	34.6
160-190°	25.5	30.4	32.6	36.8
200-220°	25.7	30.7	32.9	37.2
230-290°	25.3	30.2	32.3	36.5
300-330°	23.4	28.0	31.7	35.9
340-020°	20.7	24.8	27.2	31.0

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 criterions set in the automatic filter.

HAN YTANGEN 1994

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	11	4	10	18	83	8.46	24.64	27.33	8.16	5.47	7.56	27.70	235.33	-16.26	56.52	941104.00
2	1994	11	4	23	48	645	36.28	9.35	196.94	5.47	7.26	5.32	6.96	200.08	10.77	63.72	1013.84
3	1994	11	4	23	58	645	29.20	29.20	211.95	5.77	7.26	5.70	7.26	214.04	10.77	63.31	1014.01
4	1994	11	5	0	0	645	59.78	58.81	216.83	6.07	8.16	5.70	8.16	217.88	10.50	66.15	1014.01
5	1994	11	5	0	10	645	29.12	67.32	209.50	6.07	7.56	5.85	7.56	213.69	10.40	68.98	1014.01
6	1994	11	5	0	20	645	67.32	67.32	210.55	5.70	7.26	5.62	7.56	206.36	10.31	70.20	1014.01
7	1994	11	5	0	30	645	29.12	67.32	203.57	6.29	8.16	6.22	7.86	203.22	10.22	70.20	1014.01
8	1994	11	5	0	40	645	0.55	0.55	207.06	6.52	7.56	6.44	7.86	208.11	10.13	70.61	1014.01
9	1994	11	5	0	50	645	0.47	0.40	198.34	7.19	9.35	7.26	9.05	200.08	10.22	70.61	1014.01
10	1994	11	5	3	0	645	2.19	0.70	191.36	4.35	6.37	4.50	6.07	194.85	10.13	70.20	1014.52
11	1994	11	11	8	50	645	5.17	6.67	114.23	5.10	6.67	5.55	9.65	108.64	36.24	30.59	1018.91
12	1994	11	15	9	50	645	0.40	0.40	241.61	11.59	16.51	10.47	15.02	248.59	6.90	77.49	980.02
13	1994	11	20	4	20	645	0.40	0.40	192.40	11.66	15.02	11.74	15.02	186.47	9.48	82.56	996.42
14	1994	11	25	10	10	645	5.40	6.37	163.44	5.40	0.92	7.41	1.22	10.22	-43.01	0.81	941125.00
15	1994	12	8	2	48	7	7.41	1.30	4.29	0.92	7.41	1.30	1.00	5.69	-39.01	941208.00	258.00
16	1994	12	8	3	8	645	16.29	43.67	141.10	15.32	28.45	14.50	34.12	133.07	9.57	49.94	976.64
17	1994	12	9	0	9	645	16.14	16.51	172.51	16.51	21.88	16.74	22.48	170.76	6.72	77.90	980.87
18	1994	12	9	12	44	645	19.50	0.40	207.06	0.40	0.40	0.40	0.40	210.20	7.91	68.38	998.45
19	1994	12	9	12	54	645	7.49	8.46	201.48	8.01	17.41	8.16	23.08	207.06	7.82	68.58	998.45
20	1994	12	9	13	9	645	48.14	0.40	178.09	0.40	0.40	0.40	0.40	183.68	7.82	70.61	998.45
21	1994	12	9	13	19	645	7.04	10.55	200.43	7.11	18.30	7.19	9.95	188.56	7.82	71.82	998.62
22	1994	12	10	17	19	645	3.76	0.40	37.10	4.28	6.07	3.61	5.77	29.07	2.79	86.41	988.47
23	1994	12	17	14	40	645	0.40	0.40	167.27	17.11	20.99	16.81	21.88	171.46	5.99	67.36	1004.20
24	1994	12	19	13	0	645	38.97	0.70	205.66	14.05	18.60	14.05	18.60	213.69	4.61	80.94	990.84
25	1994	12	19	13	10	645	0.85	29.34	188.56	13.75	16.81	13.83	18.30	203.92	5.16	75.47	991.01
26	1994	12	19	13	20	645	57.92	57.92	181.58	12.93	16.51	13.08	16.51	195.19	4.98	76.68	990.50
27	1994	12	19	13	30	645	10.10	38.74	198.34	11.59	16.22	11.81	15.92	186.82	5.16	76.28	990.84
28	1994	12	19	13	40	645	19.65	48.29	182.63	10.77	13.53	10.99	14.13	180.89	5.16	77.09	990.84
29	1994	12	19	13	50	645	57.92	48.37	178.79	10.32	13.83	10.55	14.13	184.72	4.89	76.28	990.84
30	1994	12	19	14	0	645	57.84	48.29	169.72	10.25	12.04	10.47	12.34	179.49	5.44	75.06	990.67
31	1994	12	19	14	10	645	29.27	19.72	171.46	10.92	13.53	11.07	13.83	174.95	5.34	74.66	990.33
32	1994	12	19	14	20	645	10.17	58.29	170.76	11.37	13.83	11.52	14.13	172.86	5.34	76.08	990.50
33	1994	12	19	14	50	645	20.77	19.65	193.80	10.77	13.83	10.92	13.83	195.54	5.07	75.87	991.35
34	1994	12	19	15	0	645	2.64	39.12	200.08	9.05	12.34	9.20	12.04	196.59	5.44	76.68	991.86
35	1994	12	19	15	10	645	43.52	0.55	196.94	8.61	12.93	8.68	12.34	204.97	4.70	77.49	991.86
36	1994	12	19	15	20	645	3.23	19.65	164.83	6.82	8.76	6.96	10.25	177.05	4.43	77.90	991.69
37	1994	12	19	15	30	645	38.67	29.20	179.14	5.55	8.46	5.55	8.46	183.68	5.16	78.71	991.52
38	1994	12	19	15	40	645	8.46	1.00	187.87	8.01	13.83	8.01	14.42	200.78	4.98	78.61	991.86
39	1994	12	24	18	10	645	3.01	9.65	192.40	8.01	9.65	8.16	9.95	195.89	7.55	84.69	1013.50
40	1994	12	26	2	30	645	0.40	0.40	223.46	10.17	13.23	9.80	13.23	222.77	5.34	70.20	991.01