DNMI

DET NORSKE METEOROLOGISKE INSTITUTT

klima

HANØYTANGEN , AUGUST 1994

Knut A. Iden

RAPPORT NR. 36/94 KLIMA

DNMI-REPORT

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HANØYTANGEN , AUGUST 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

for Bjørn Aune
HEAD OF DIVISION

MONTHLY REPORT AUGUST 1994

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
REPORT 10 : September 22 1994

CLIENT	:	DNMI
CONTRACT NO.	:	KCC/PAC004/001
PROJECT NO.	:	
DOCUMENT NAME	:	RAPPAUG.94
PROJ. MANAGER	:	Knut A. Iden
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APPROVED BY	:	Bjørn Aune
COMPLETION DATE	:	SEPT. 22 1994
REV 1.	:	

HANØYTANGEN MET-DATA **Monthly Report**
AUG 1994

DSU : serial no. 6602
Received : AUGUST 5 1994

Comments regarding the data :

The DSU serial no.6602 contains data for the period 03/8/94 to 07/9/94.
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 AUG 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	4.3	2.8	16.1	329	13:1321	0.4	198	03:2151
Wind speed	18 m	99.8 %	m/s	4.1	2.7	14.7	N/A	13:1221	0.4	N/A	02:0234
Wind speed	10 m	99.8 %	m/s	4.0	2.6	14.8	309	13:1321	0.4	301	03:2151
Wind gust	30 m	99.7 %	m/s	5.8	3.7	21.3	355[2]	13:1331	0.4	343[2]	20:0331
Wind gust	18 m	99.8 %	m/s	5.6	3.5	20.7	N/A	13:1441	0.4	N/A	15:2351
Wind gust	10 m	99.8 %	m/s	5.5	3.6	20.1	333[2]	13:1331	0.4	301[2]	03:2151

OTHER METEOROLOGICAL DATA

Parameter	Height	Cover.	Unit	Mean	ST.D.	Max	D.:hour	Min	D.:hour
Air Temp.	2. m[3]	99.8 %	C	14.6	3.1	29.0	01:1054	8.1	29:0531
Rel. Hum.	2. m[3]	99.8 %	%	73	10.6	89	10:0851	32	24:1401
Air pr.	0. m[3]	99.8 %	hPa	1012.5	7.1	1023.5	07:0821	996.9	28:2301

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).

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 01,11,21 ... giving some problems to the computing of the hourly means strictly after the definition given.

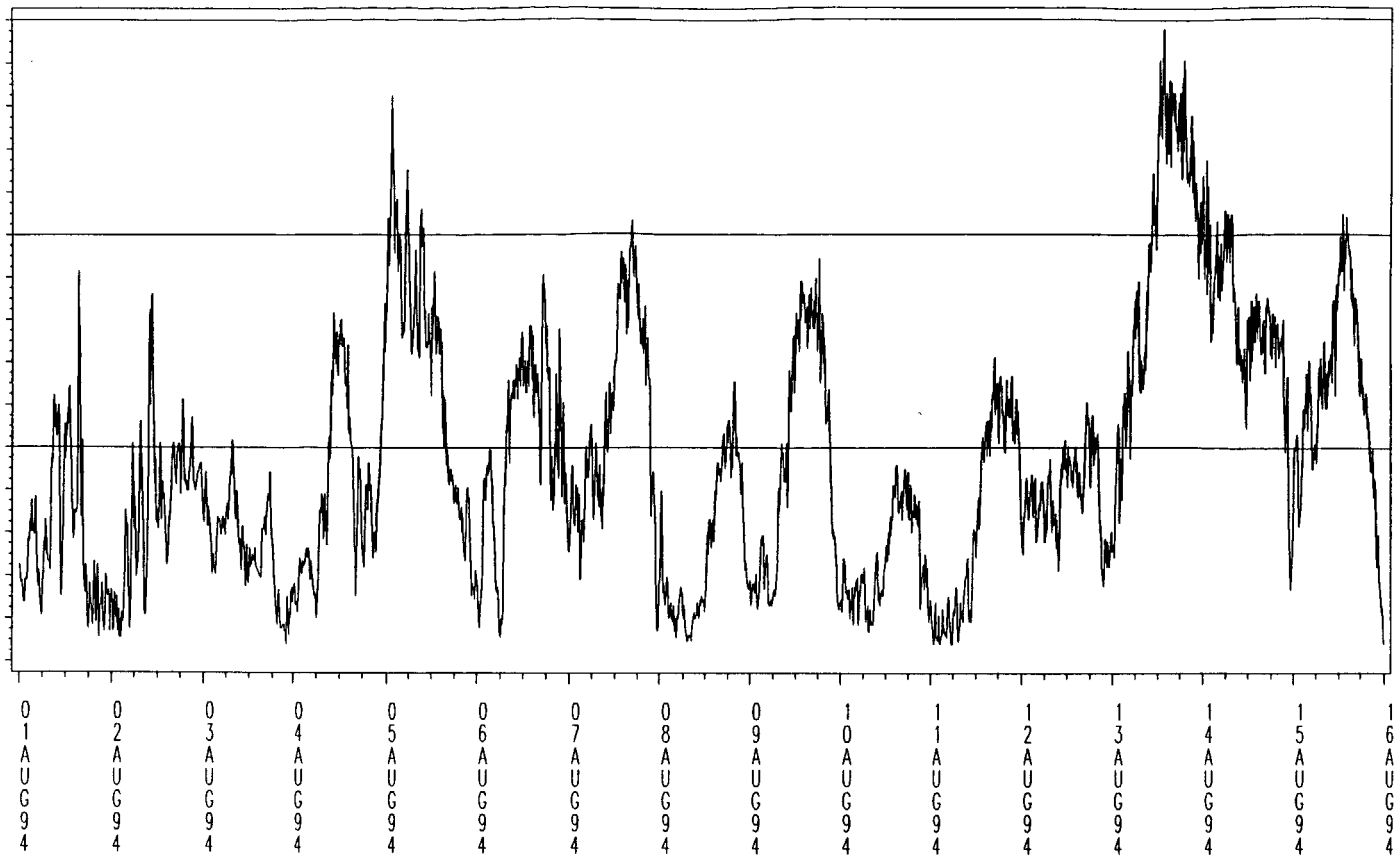
This month false heating has not been traced in the temperature data.

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)



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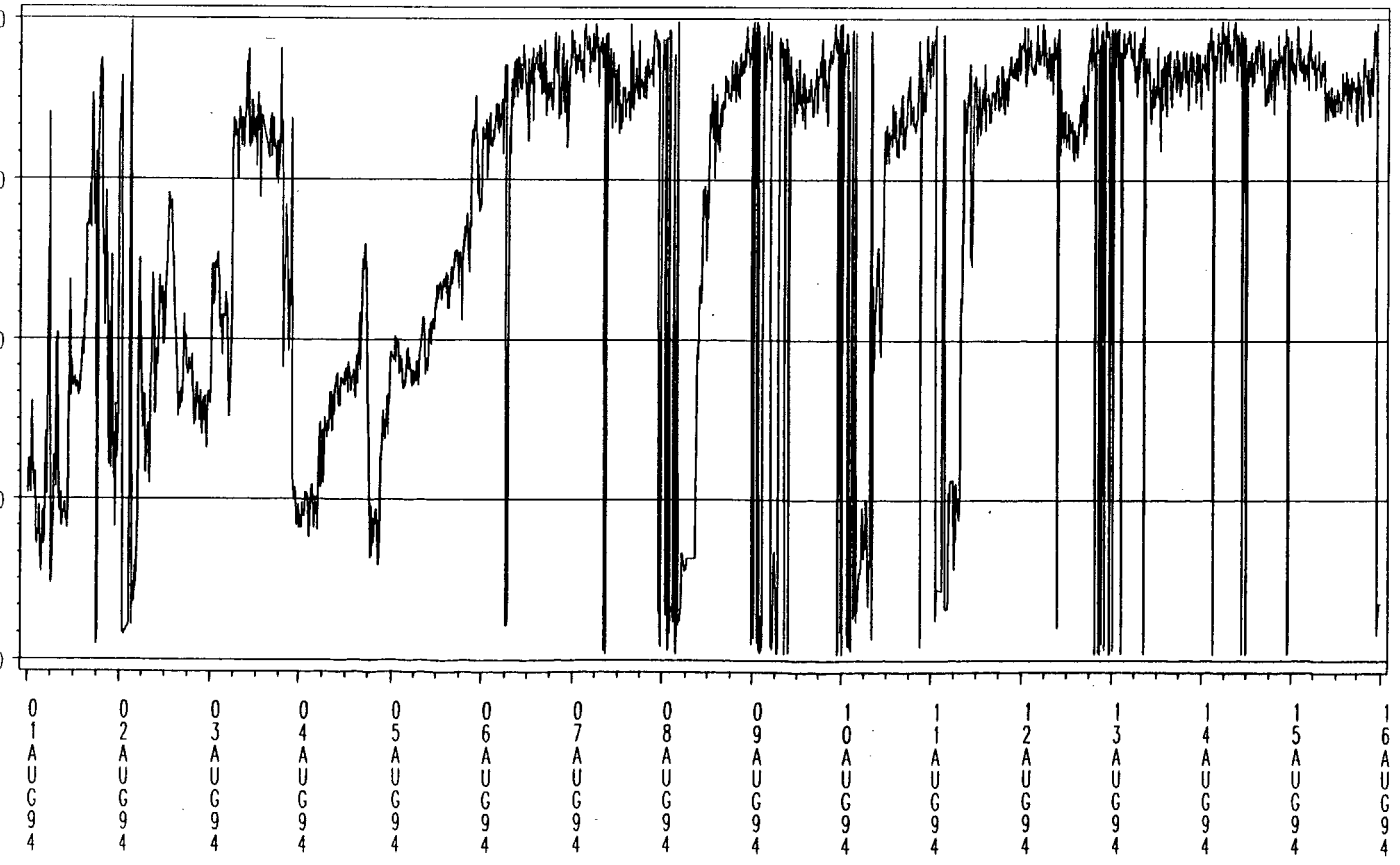
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 10 m above the ground



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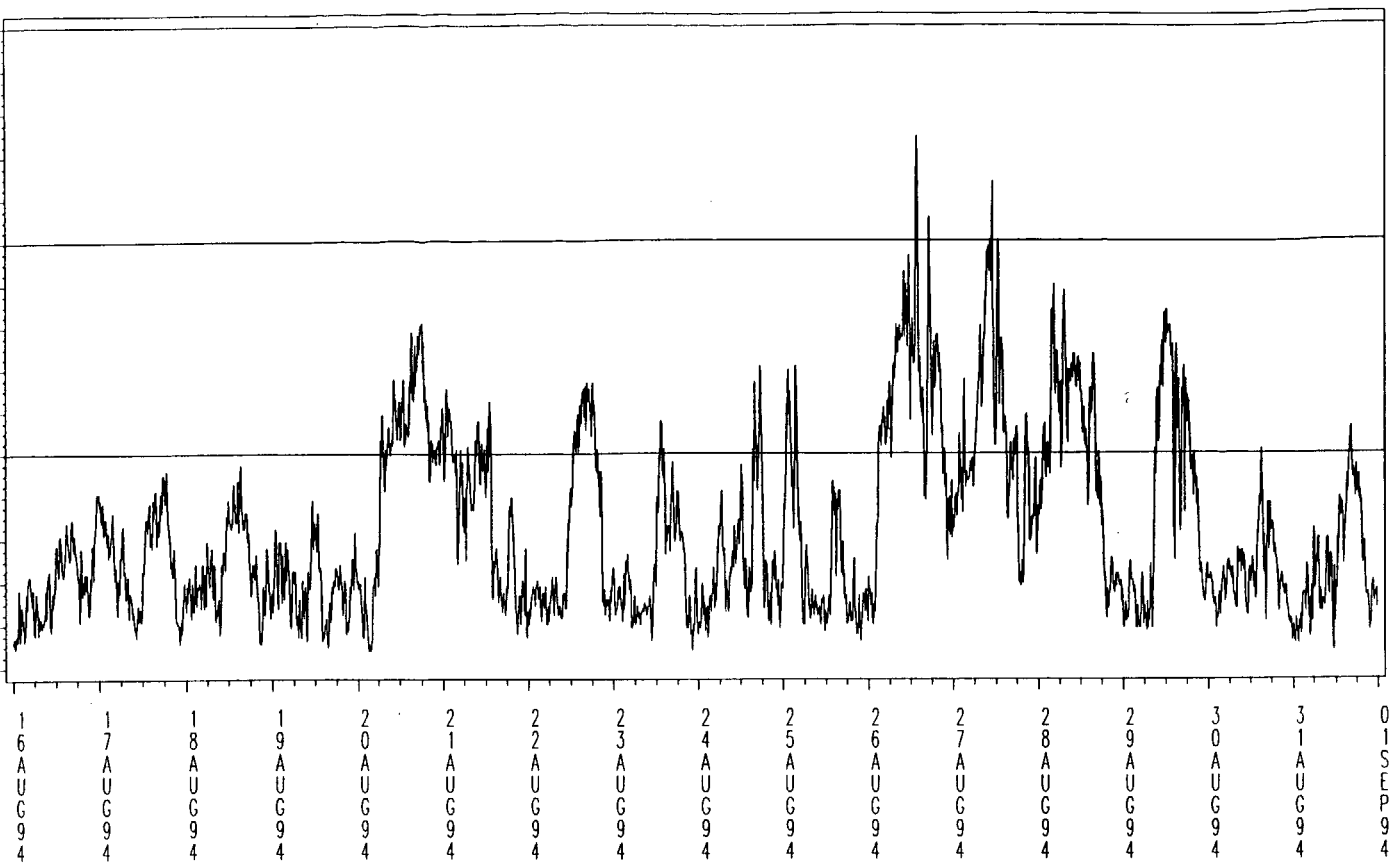
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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



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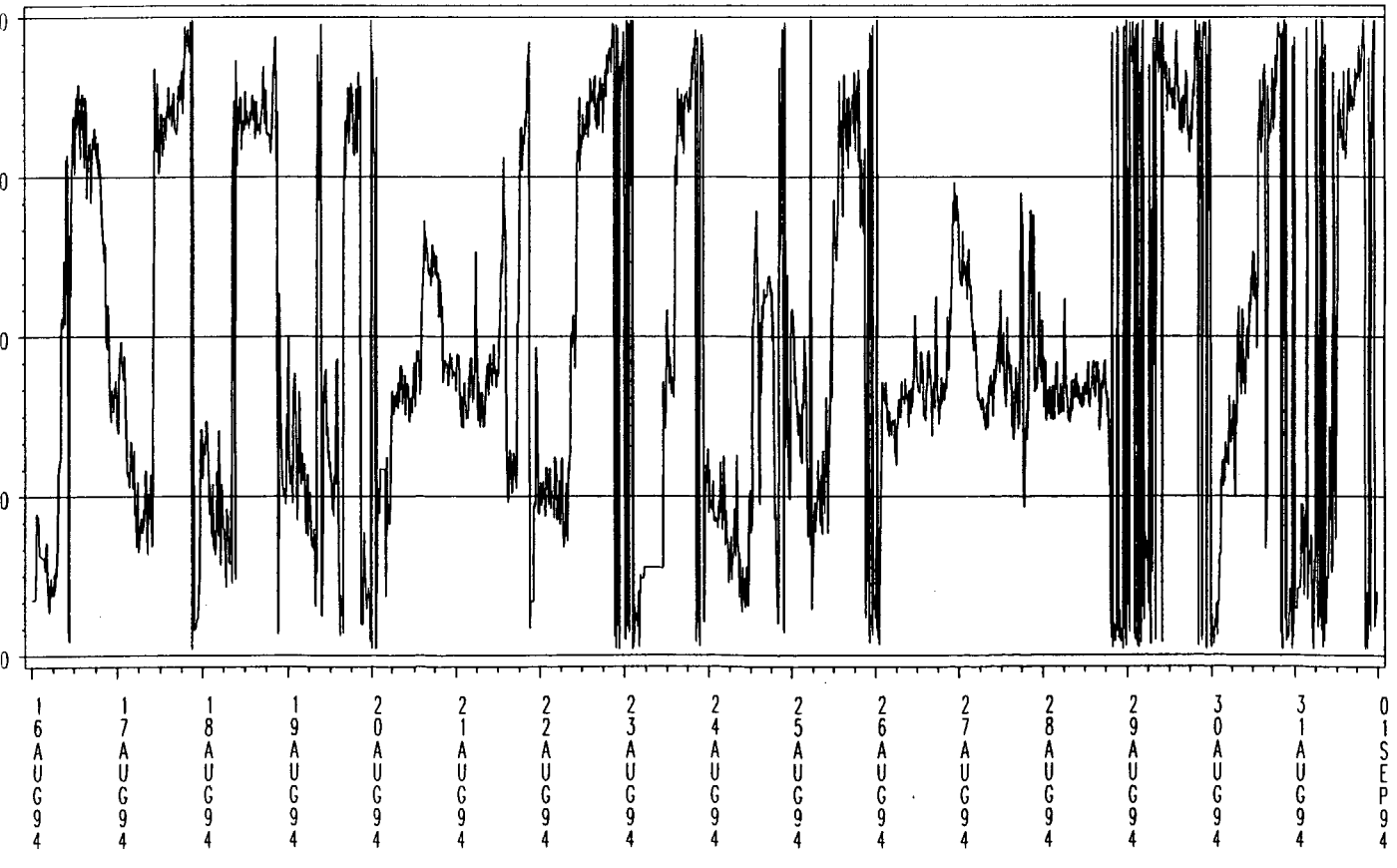
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 10 m above the ground



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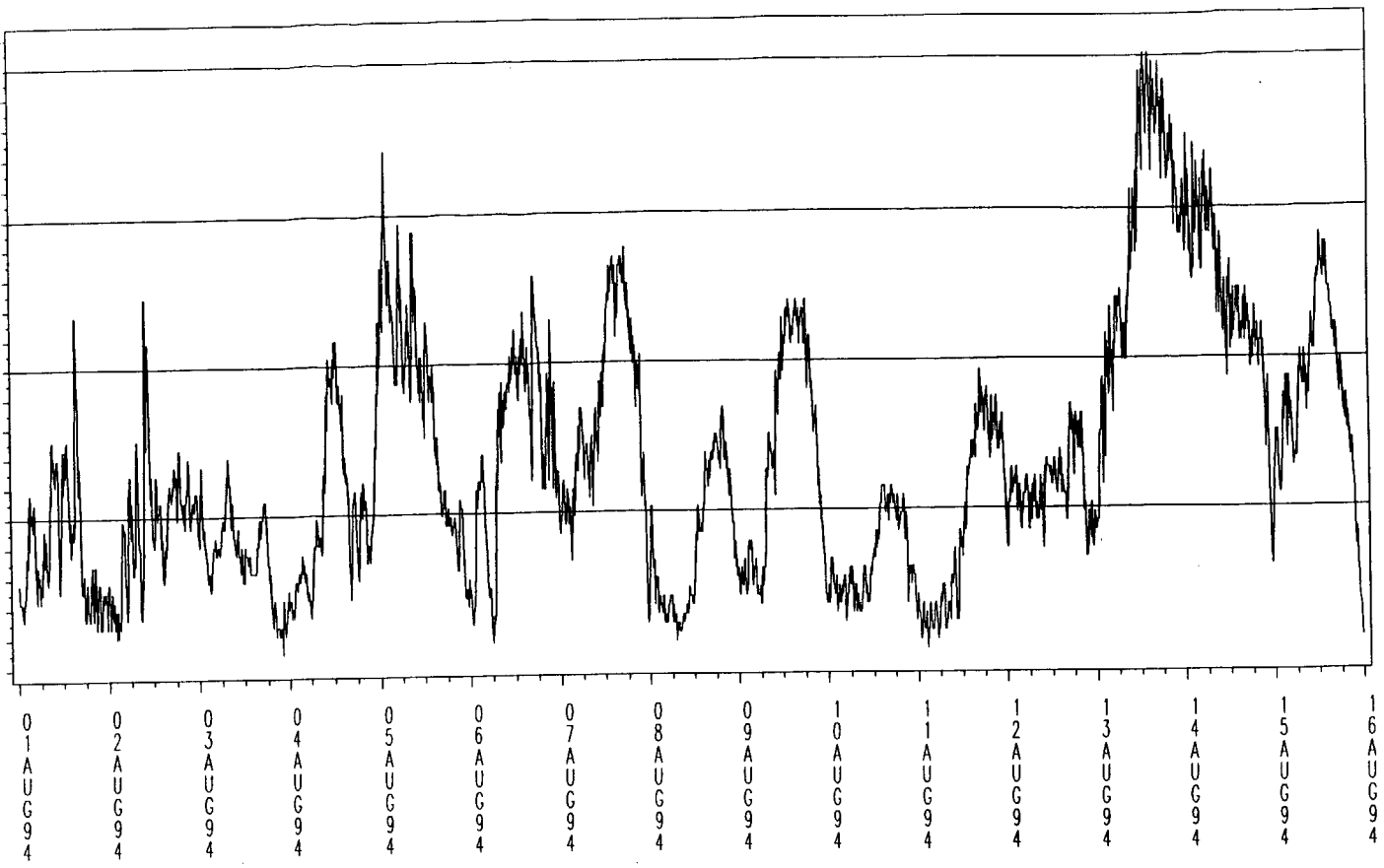
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

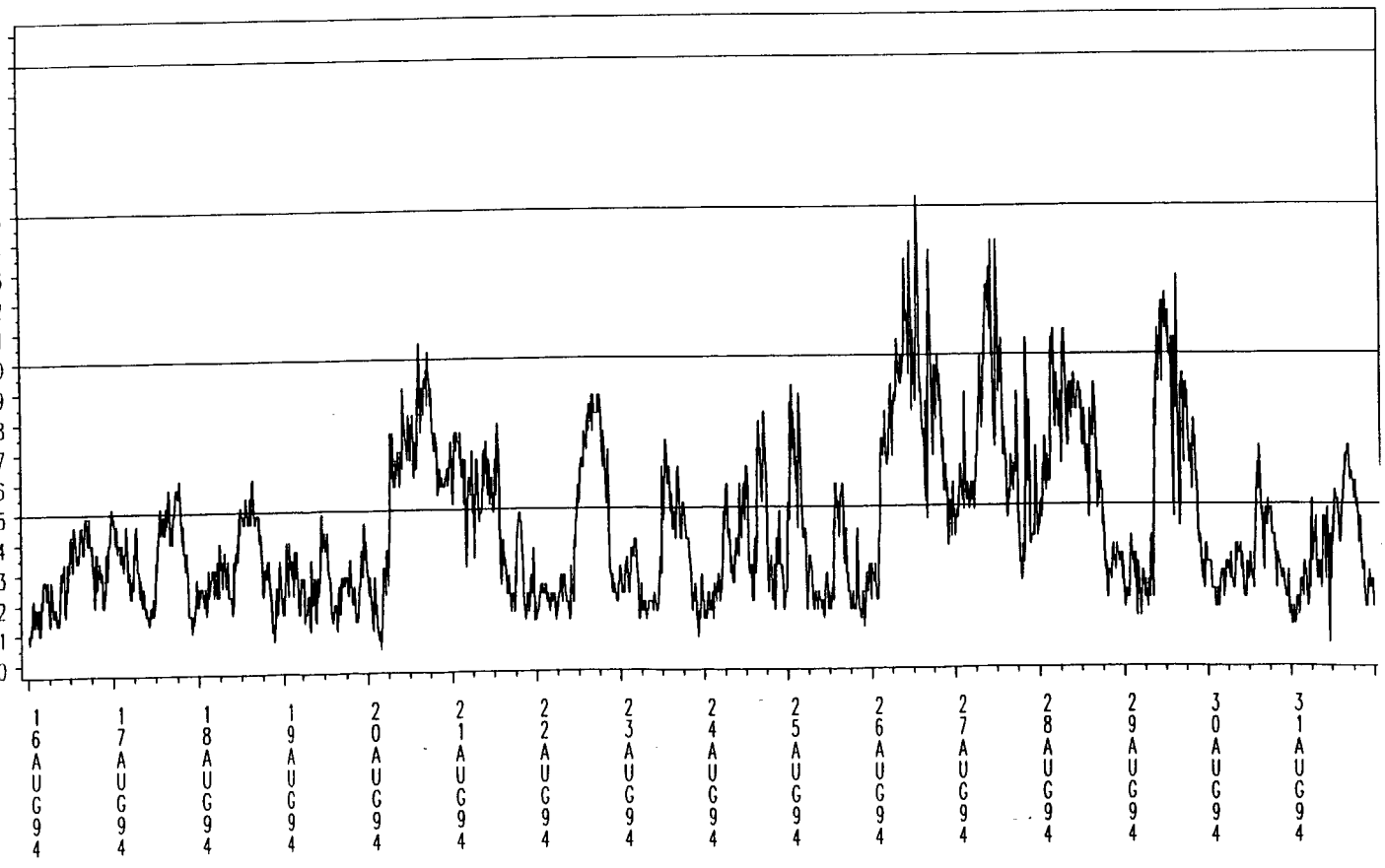


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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

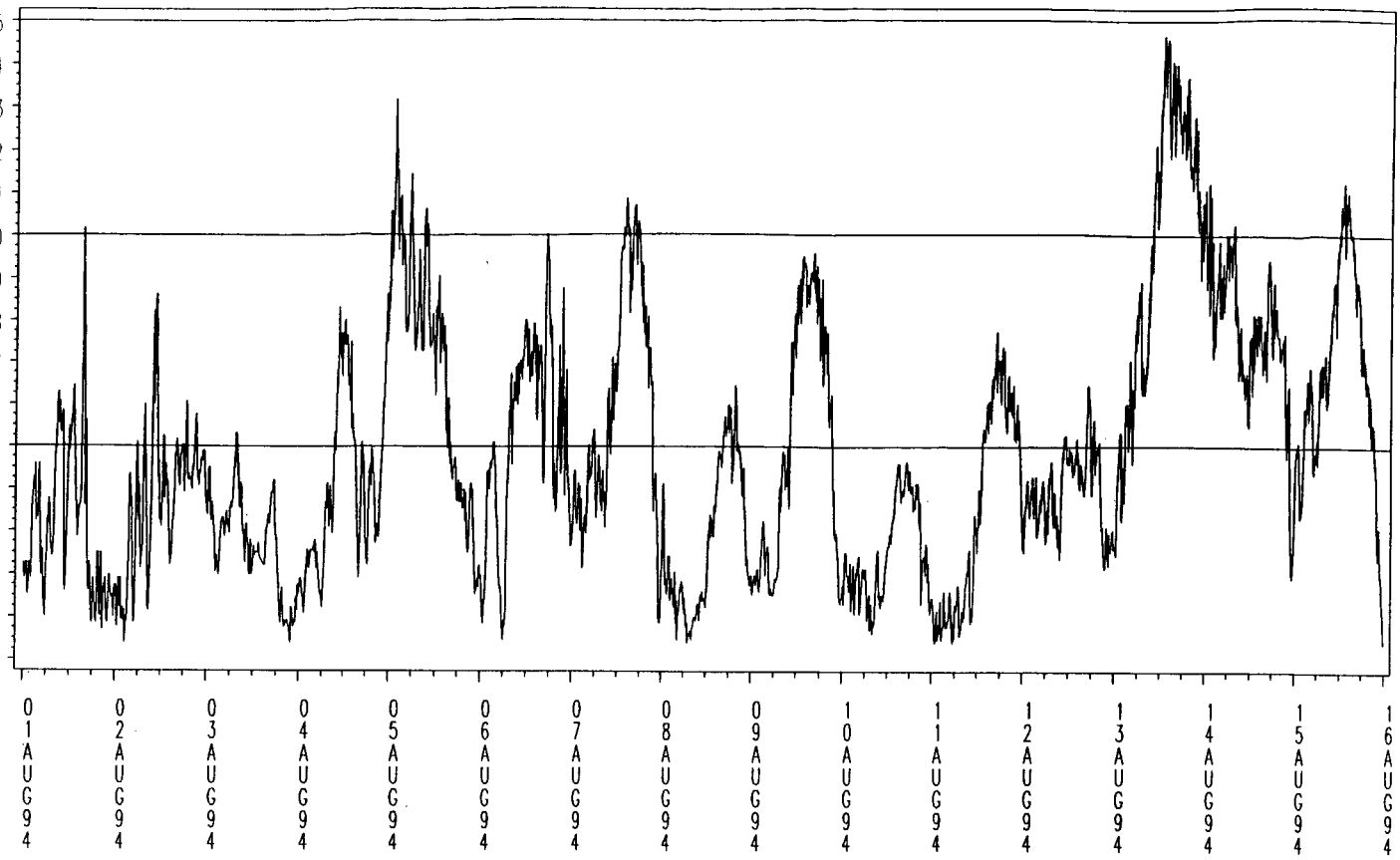


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

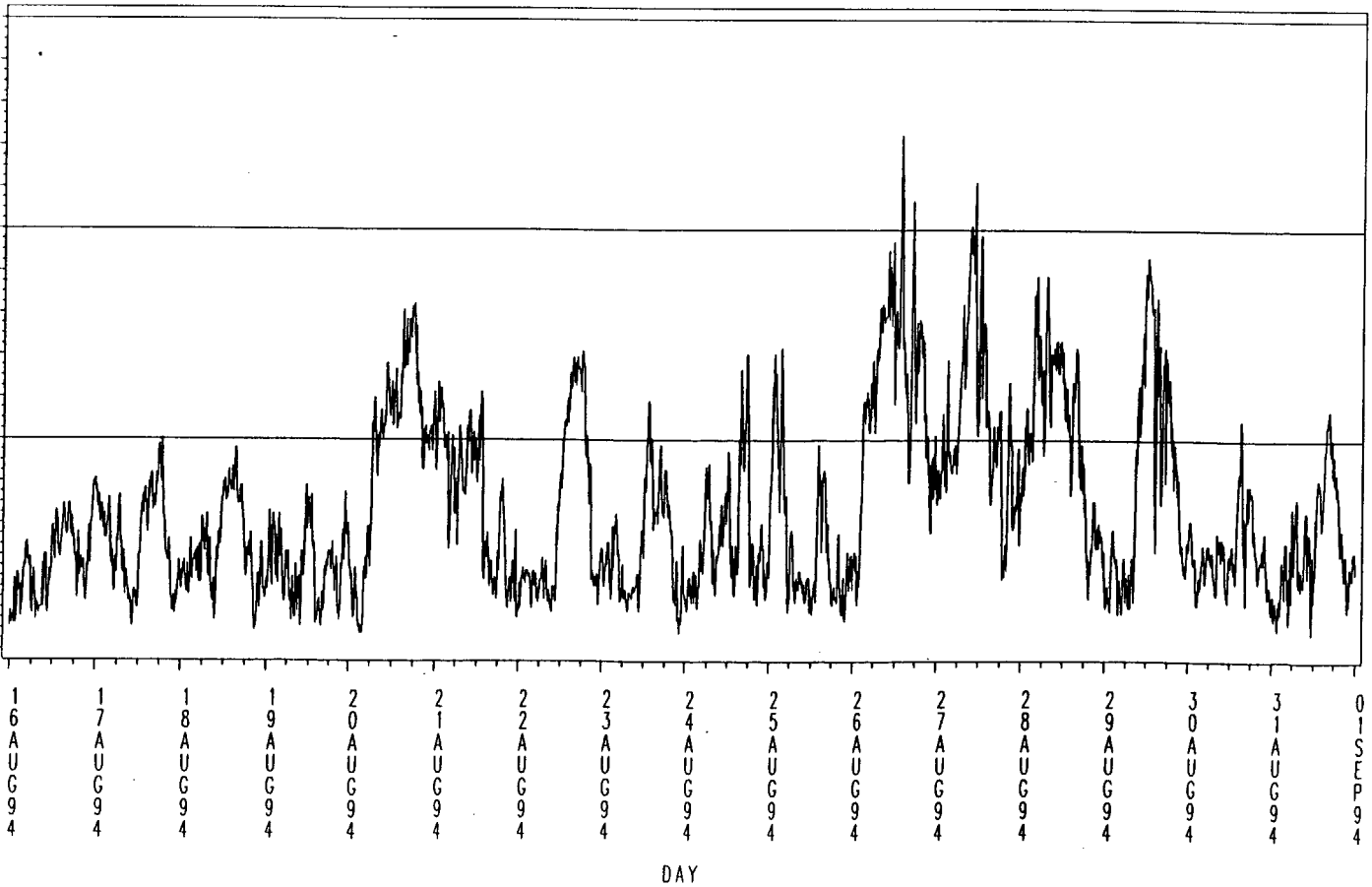
Wind speed 18 m above the ground (m/s)



DNMI - KLIMAAVDELINGEN

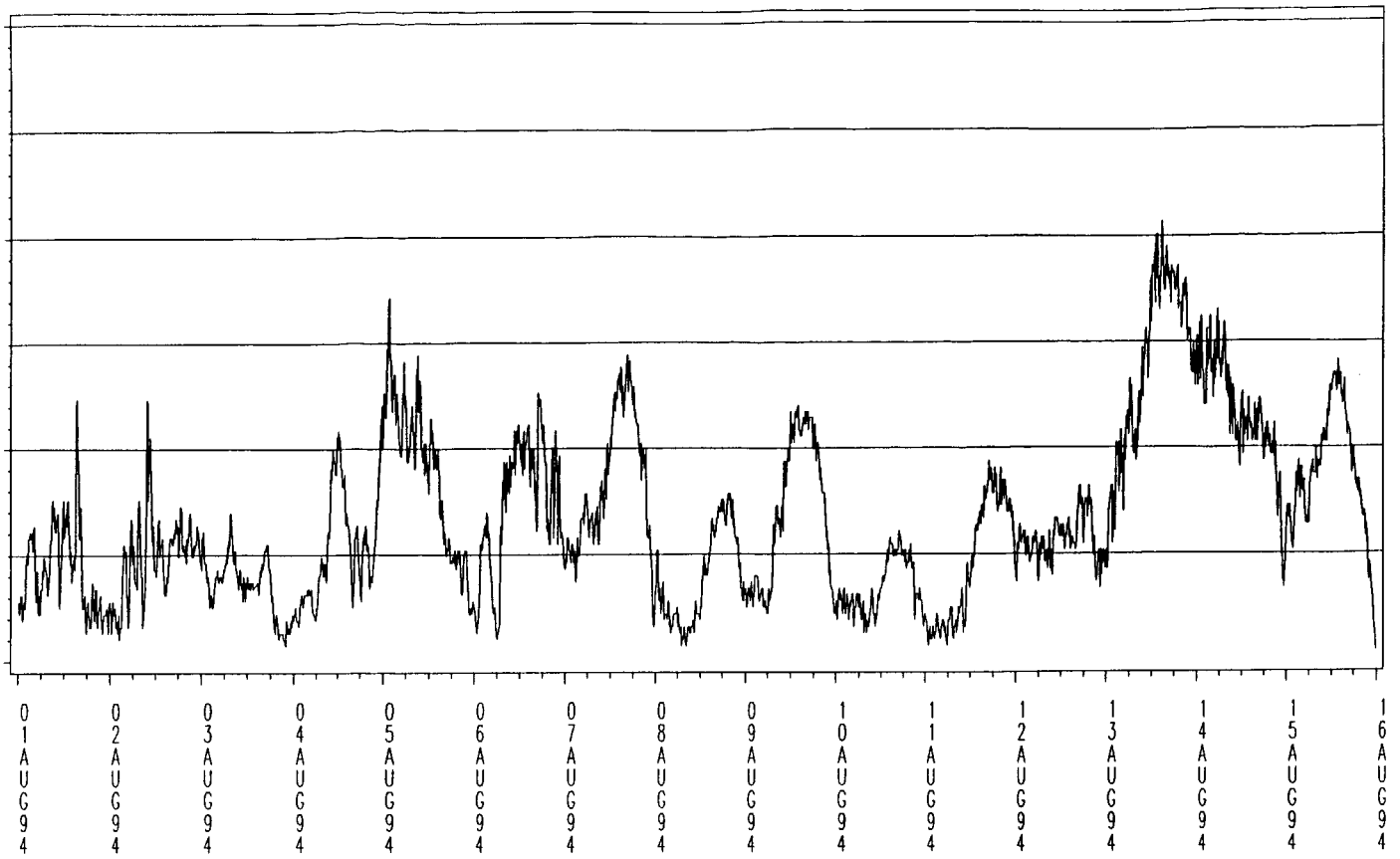
HANØYTANGEN 1994

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



HANØYTANGEN 1994

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



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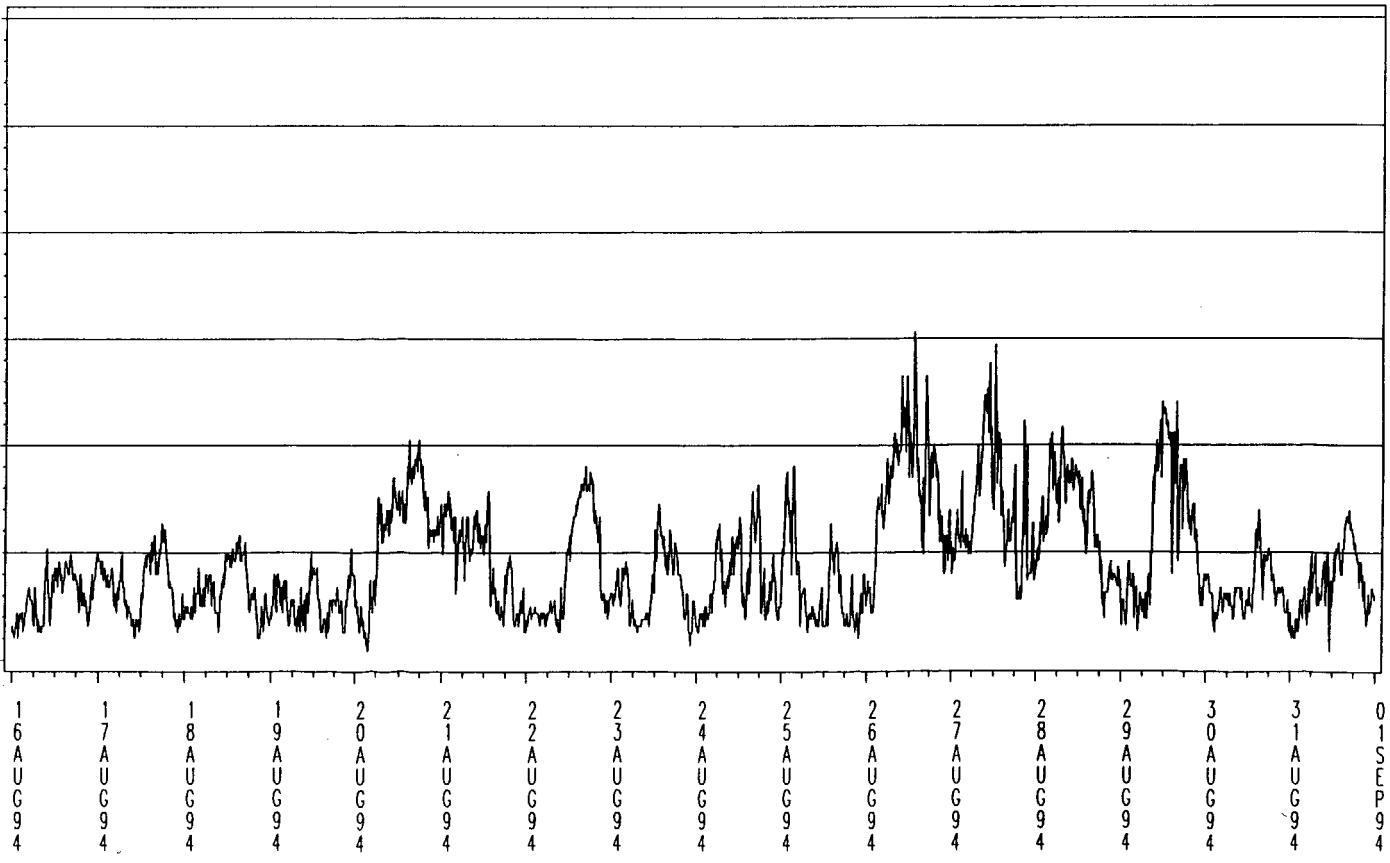
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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



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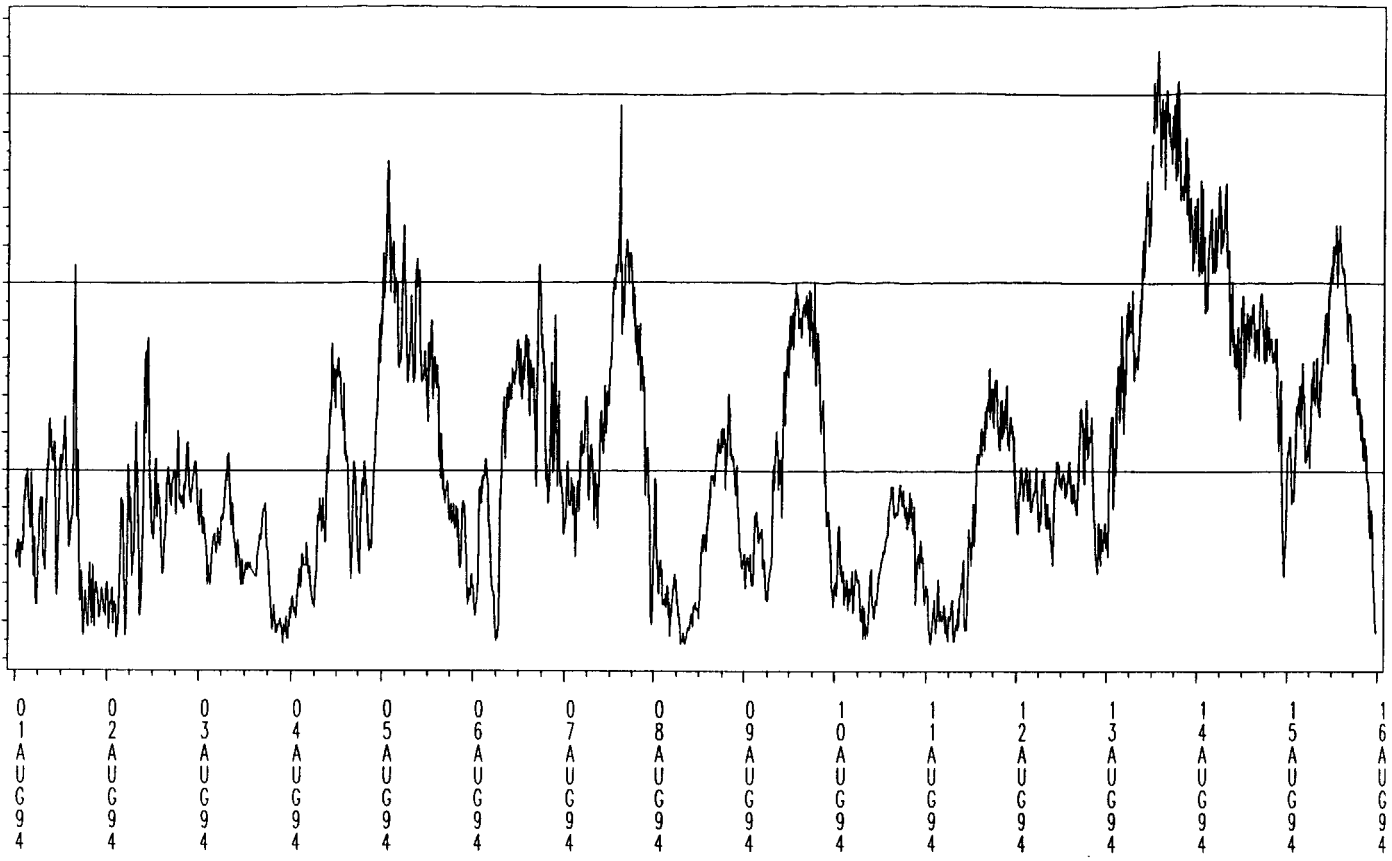
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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



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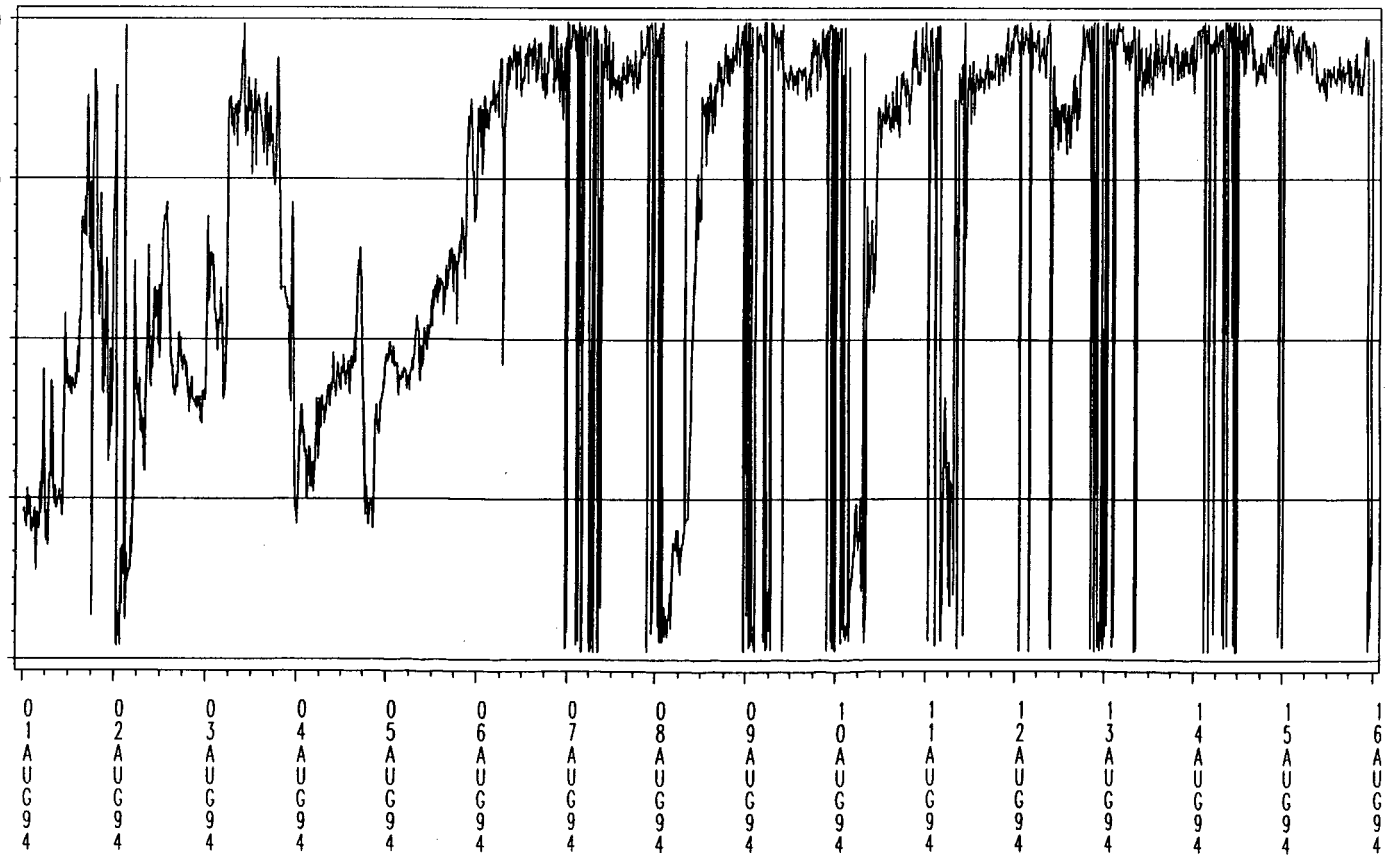
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 30 m above the ground



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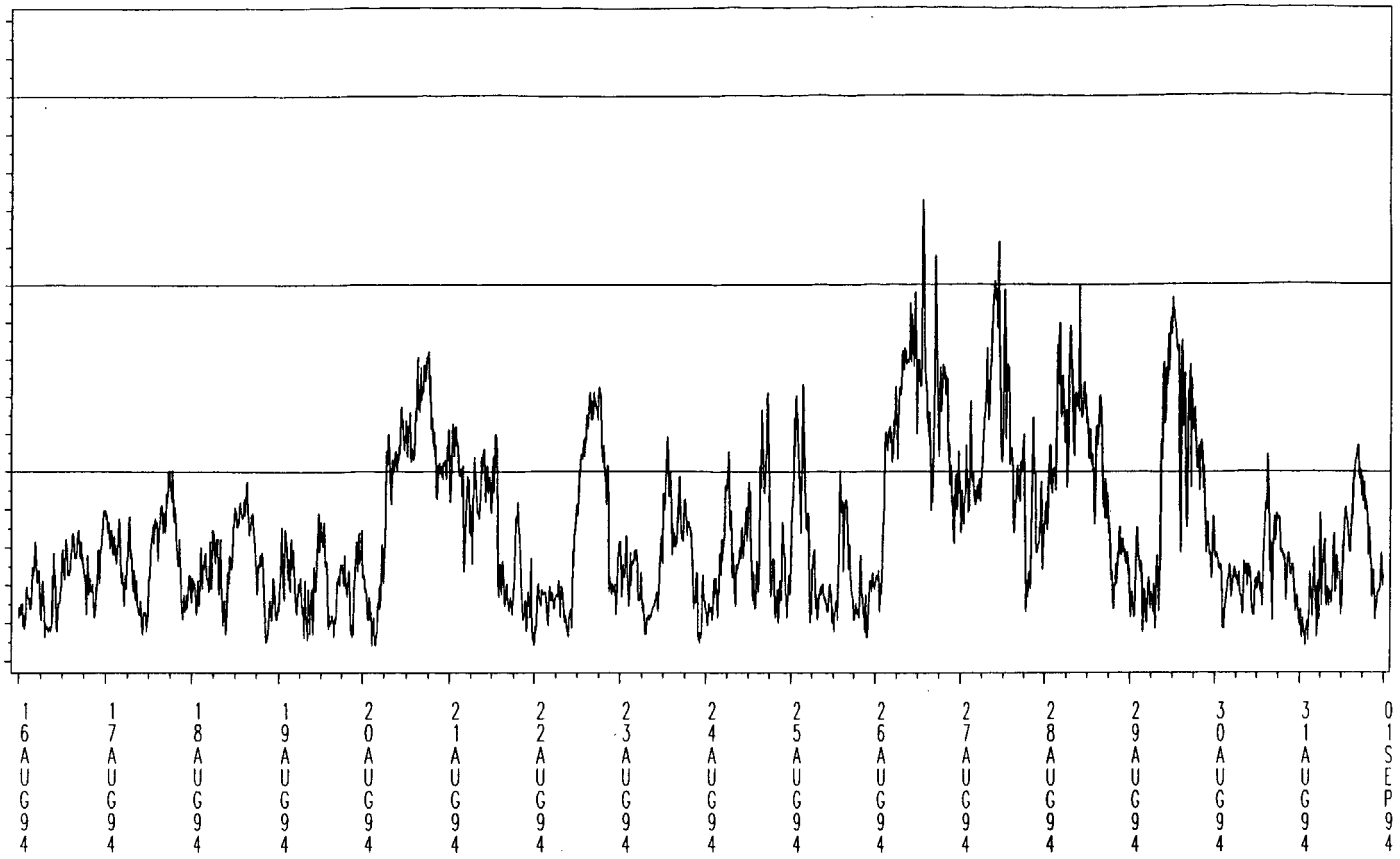
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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



16 AUG 94
17 AUG 94
18 AUG 94
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23 AUG 94
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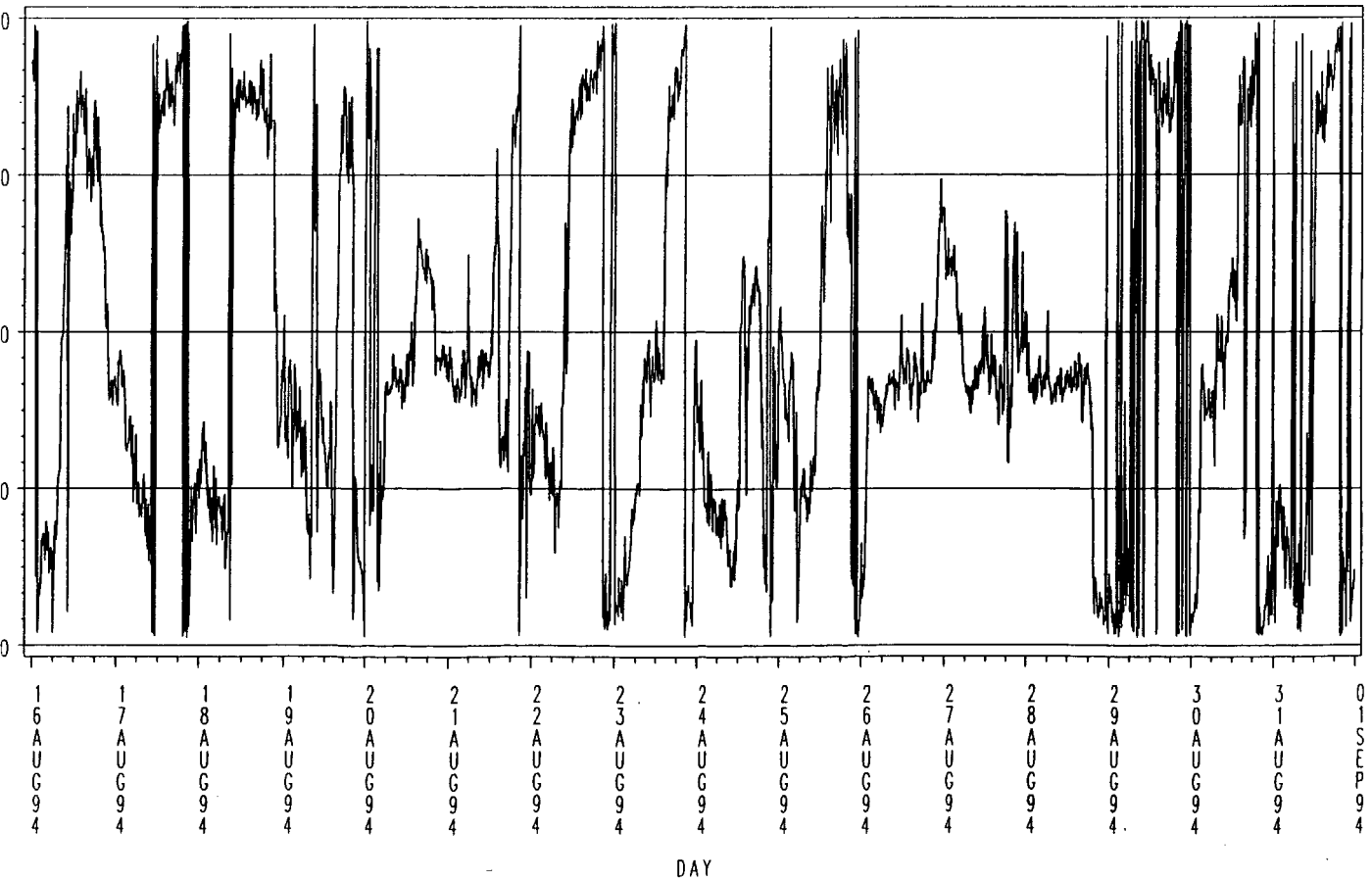
26 AUG 94
27 AUG 94
28 AUG 94
29 AUG 94
30 AUG 94
31 AUG 94
01 SEP 94

DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Wind direction 30 m above the ground



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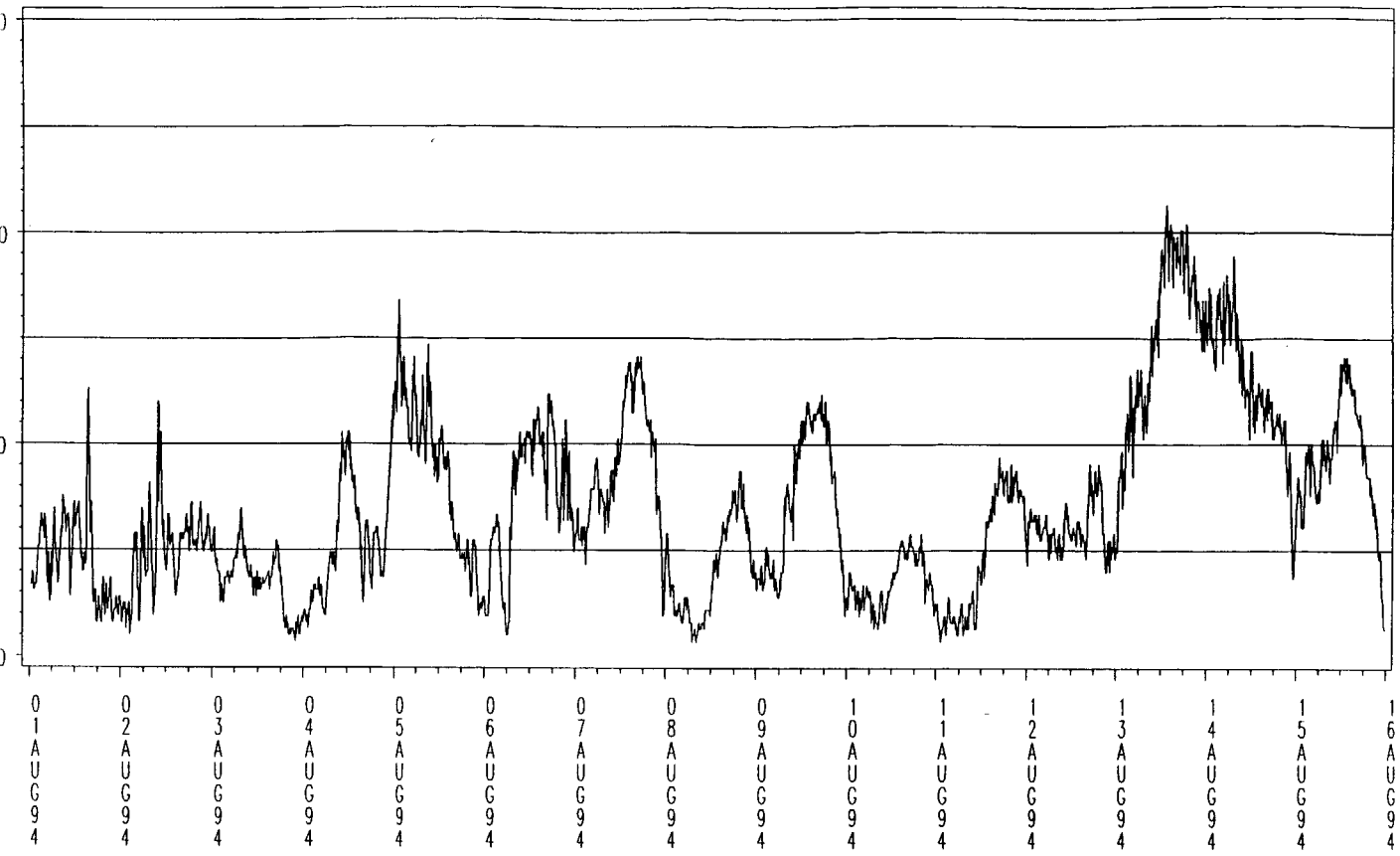
27 AUG 94
28 AUG 94
29 AUG 94.
30 AUG 94
31 AUG 94
01 SEP 94

DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

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



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DAY

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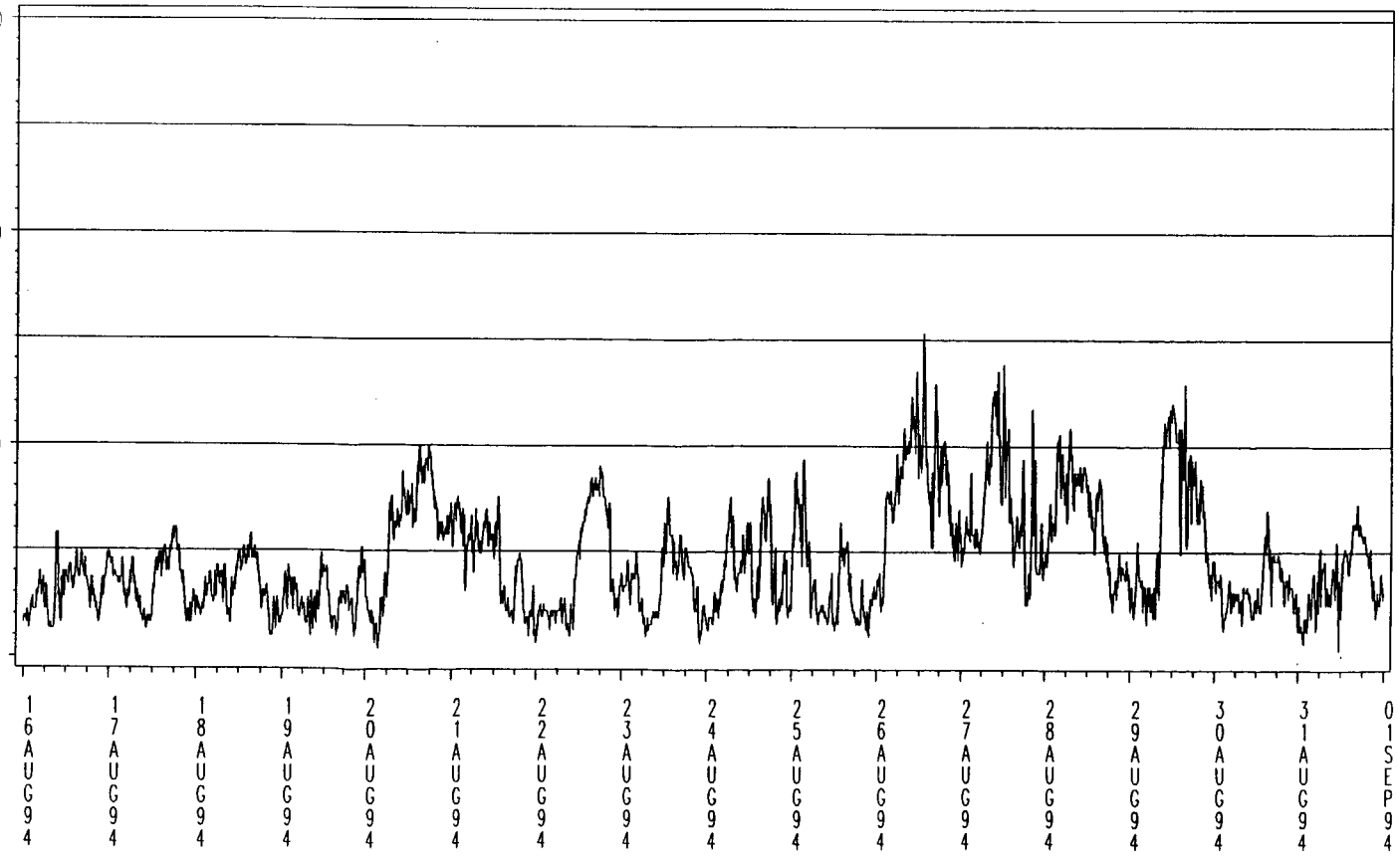

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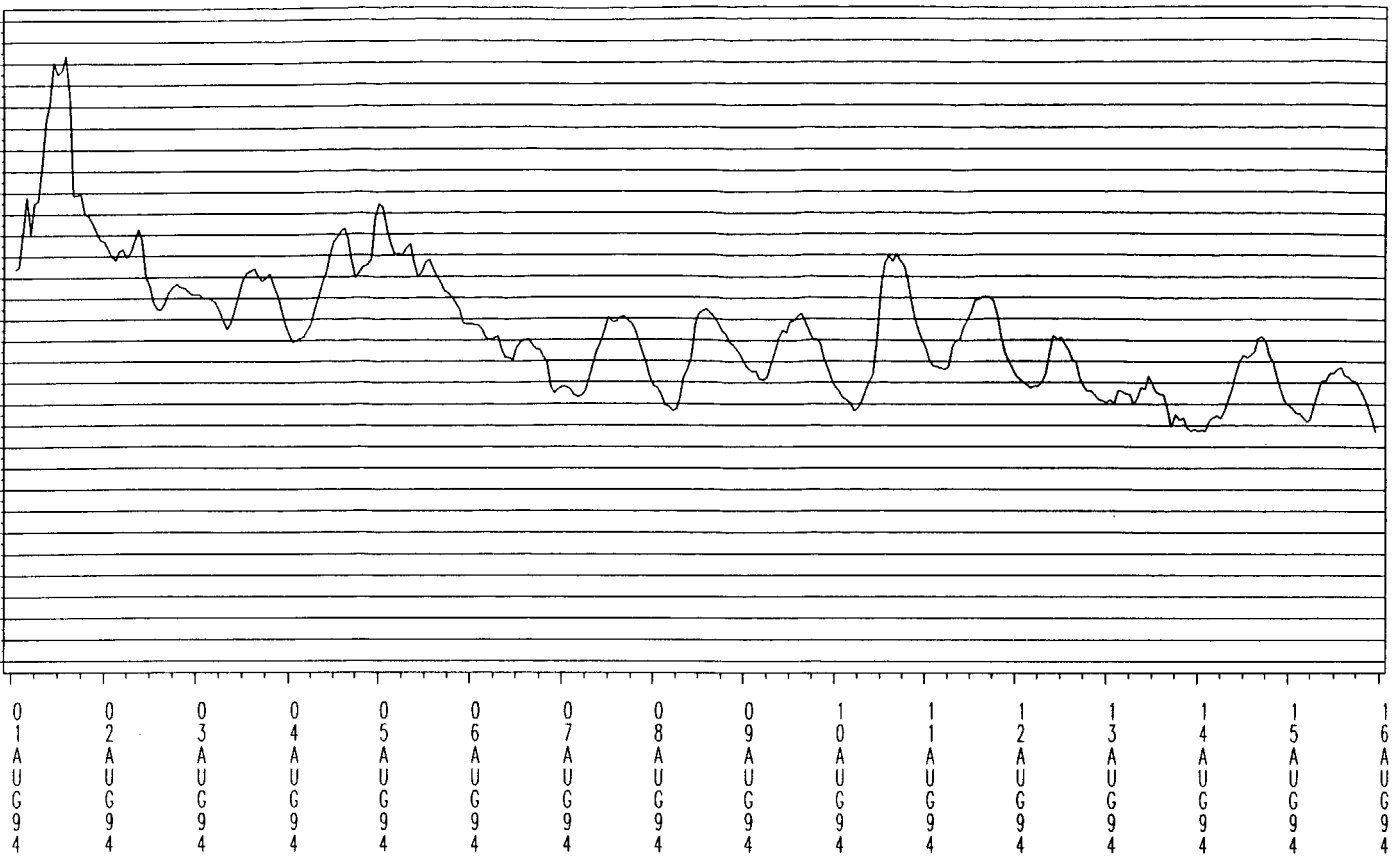
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Temperature in degrees C (Hourly Means)



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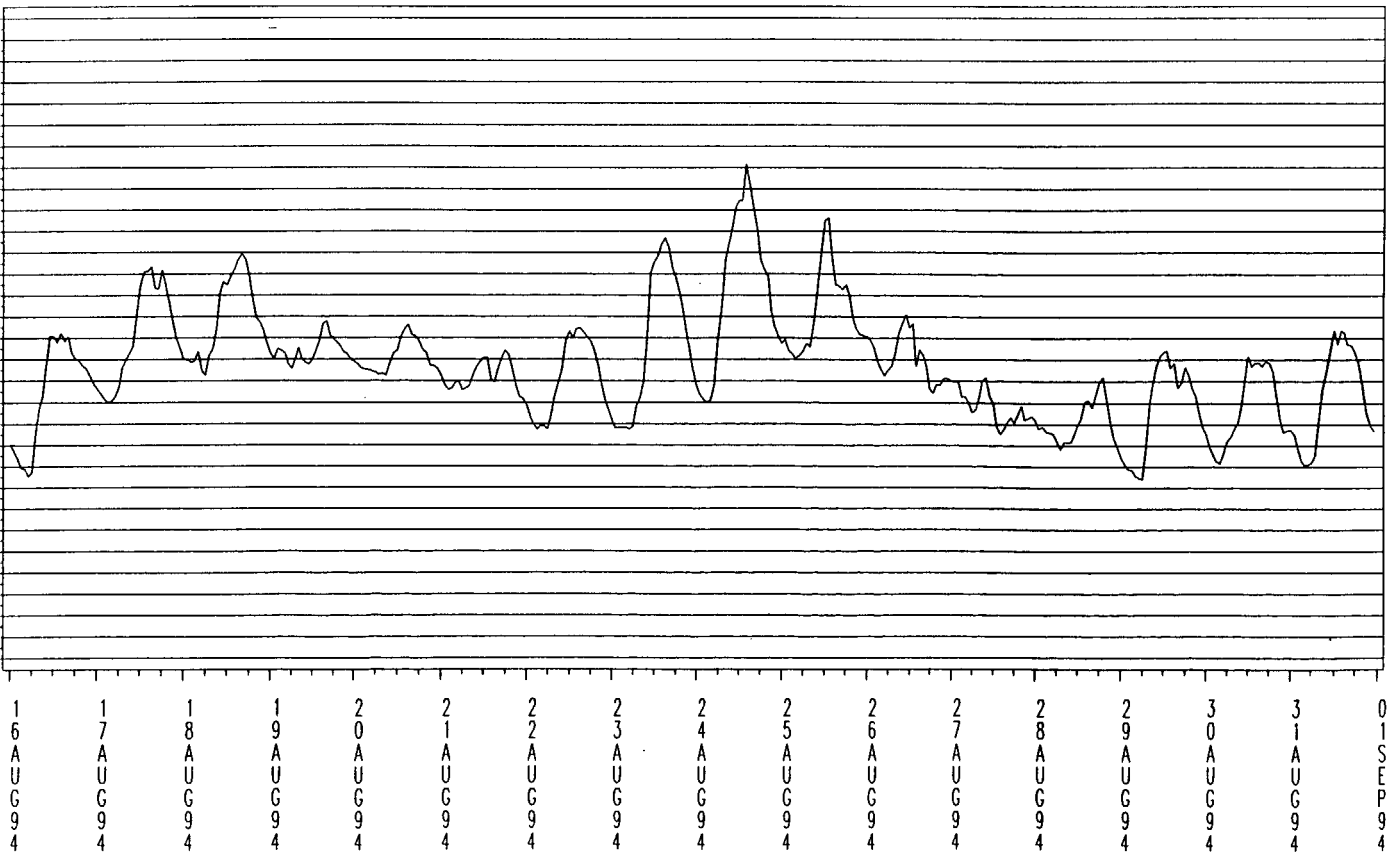
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Temperature in degrees C (Hourly Means)



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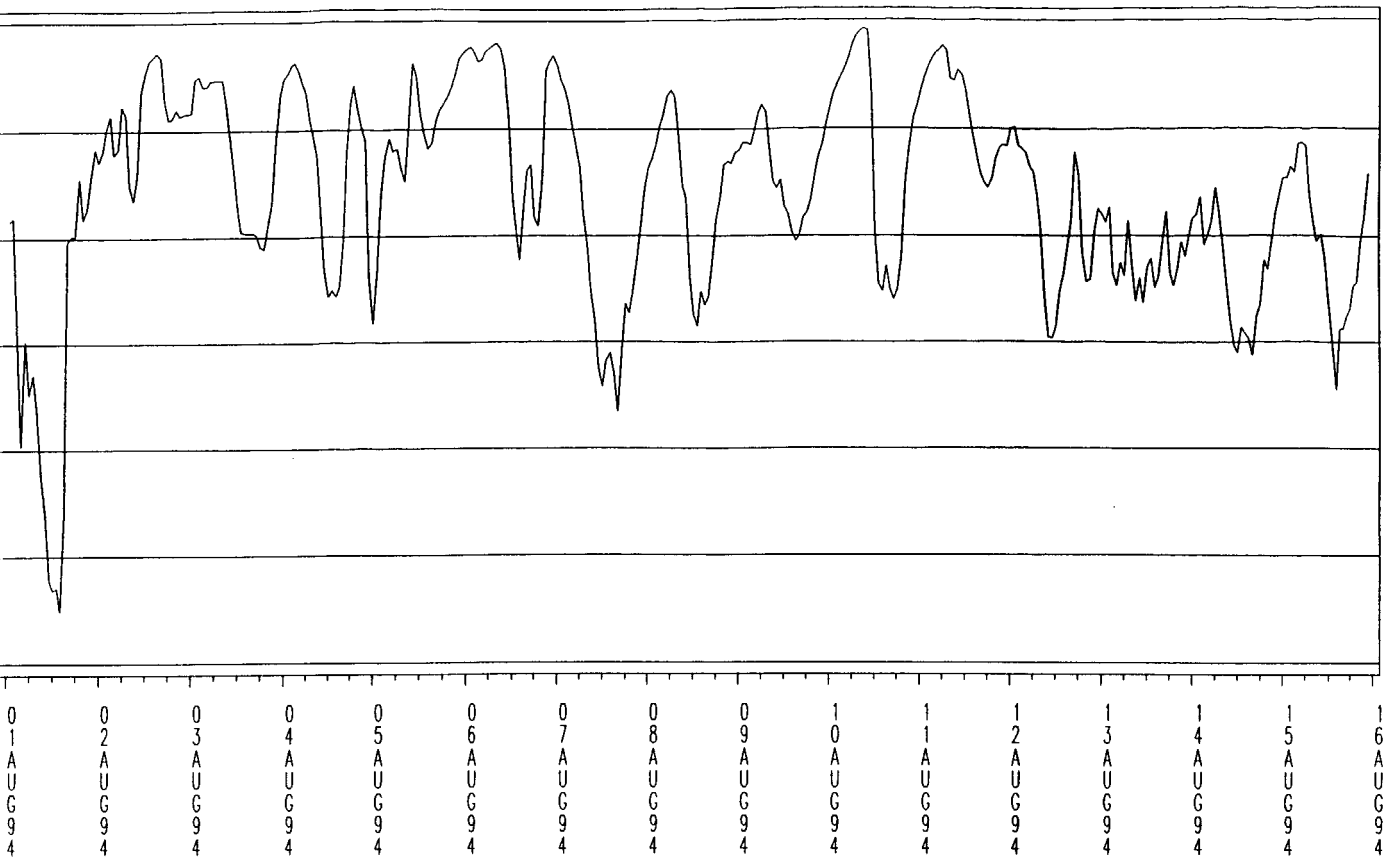
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Humidity in % (Hourly Means)



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DAY

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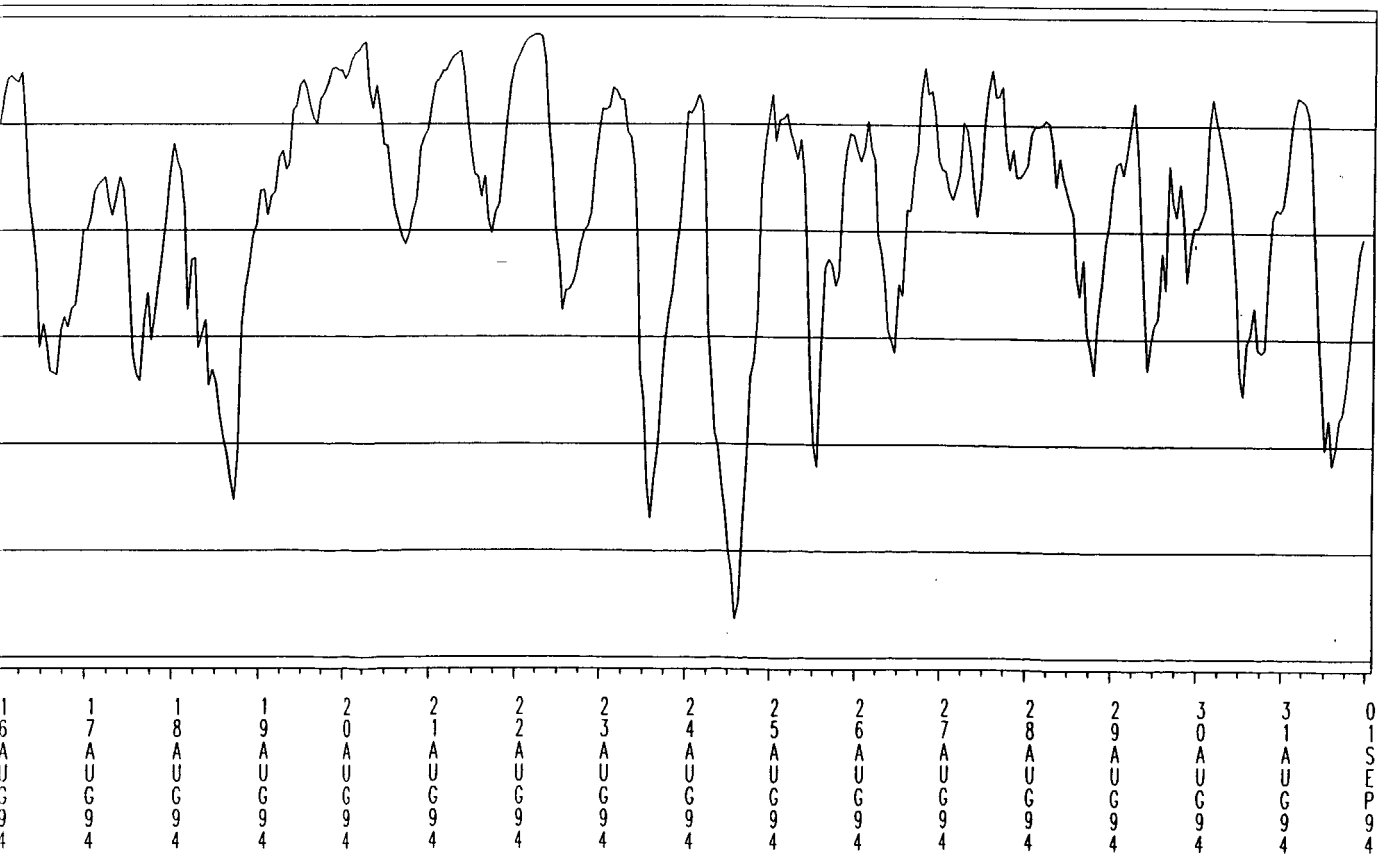

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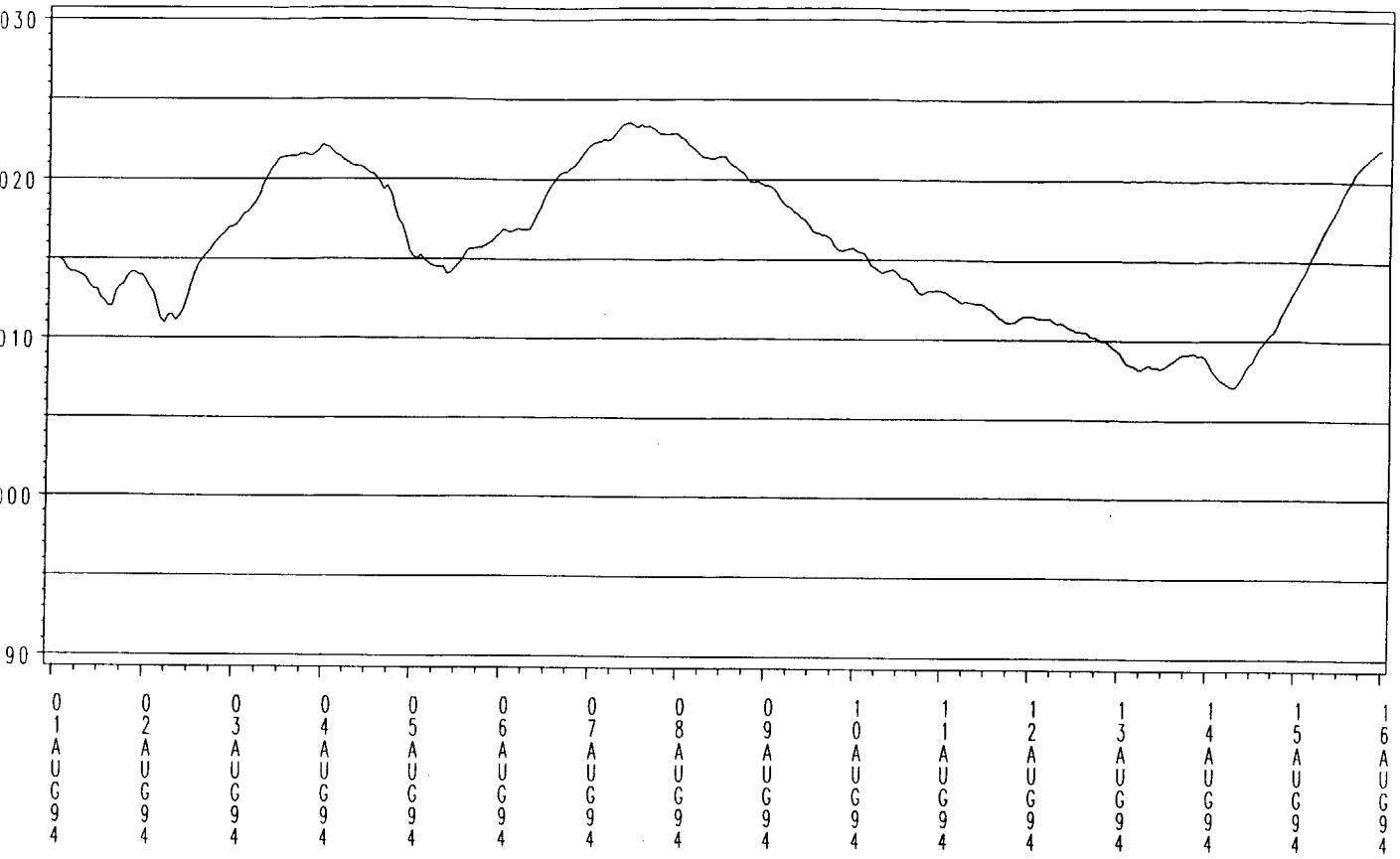
DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)

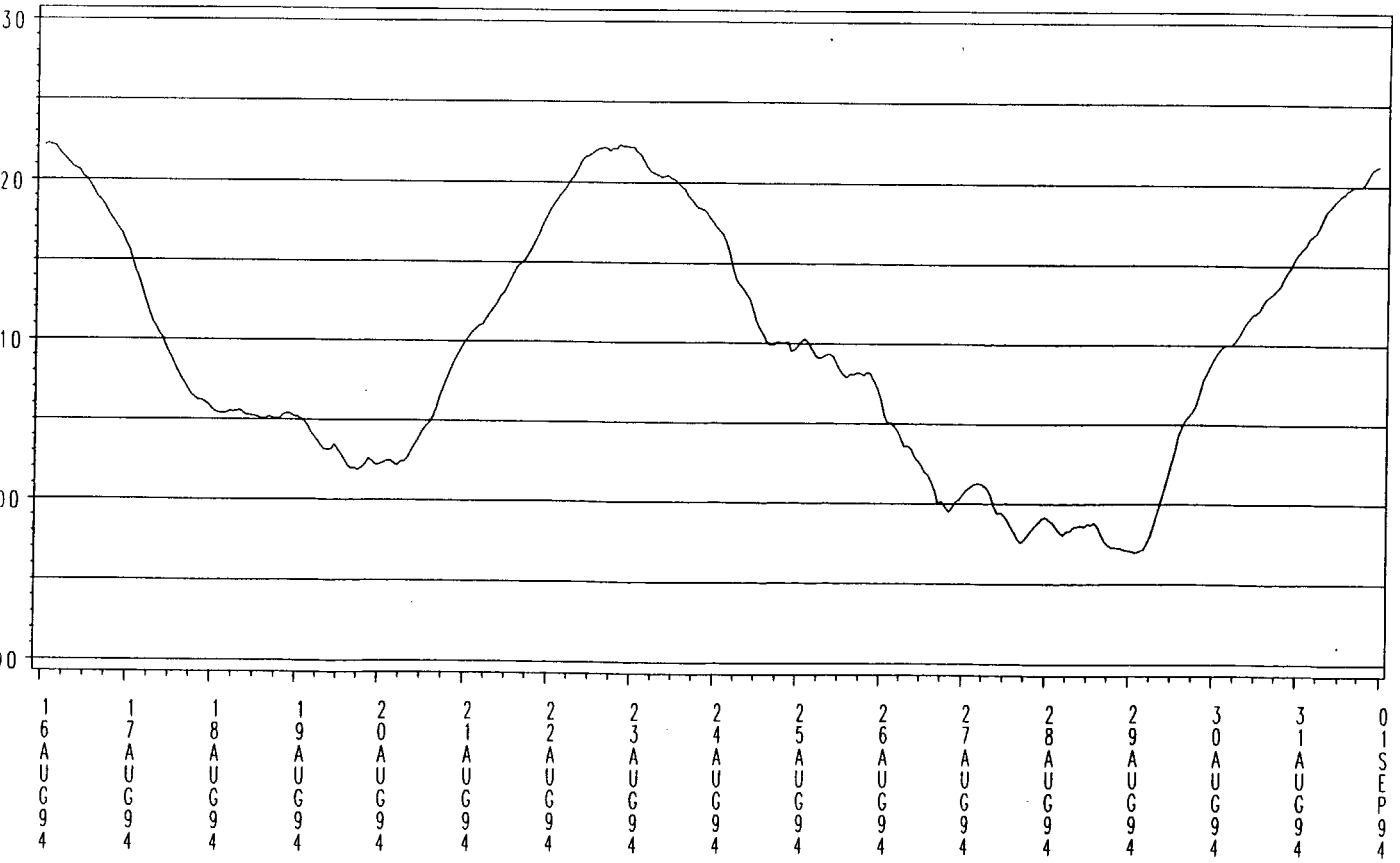


DAY

DNMI - KLIMAAVDELINGEN

HANØYTANGEN 1994

Air Pressure (QFF) in hPa (Hourly Means)



DAY

DNMI - KLIMAAVDELINGEN

DISTRIBUTION TABLES / WIND ROSES

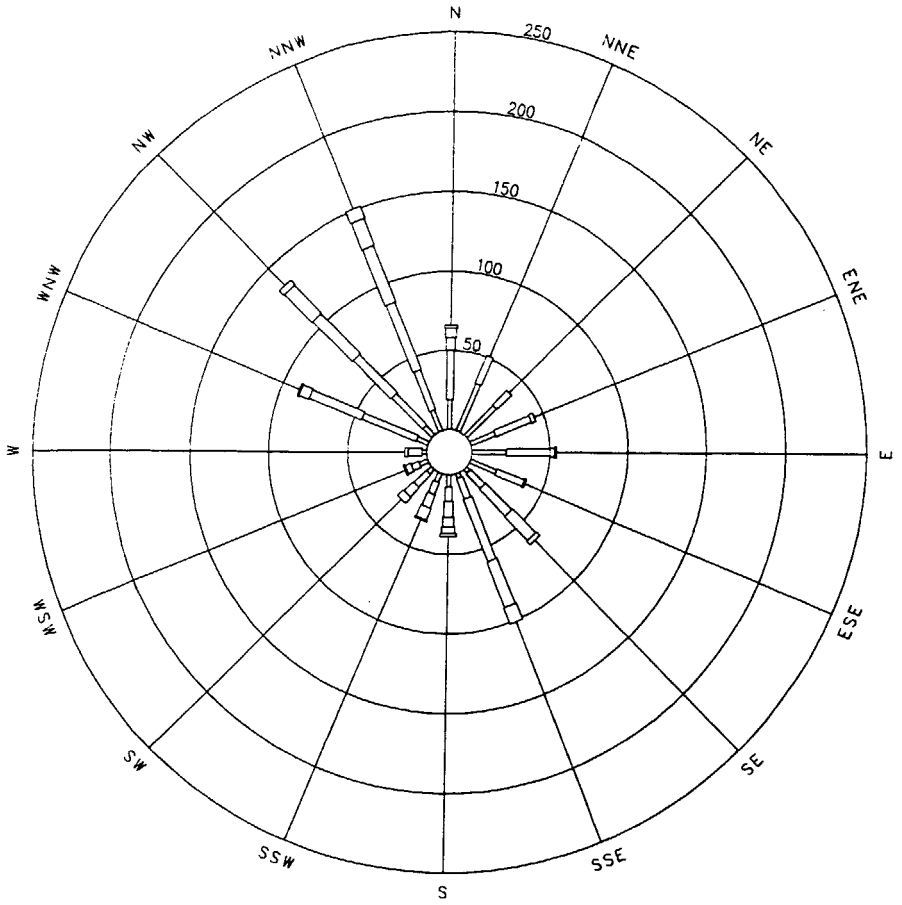
The distribution table gives details about the distribution of the wind speed for a certain wind direction or the distribution of the wind directions for a certain wind speed.

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.

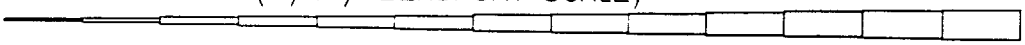
The frequencies in the table are given per thousand (Prm) of the data available this month.

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 AUG. 1994 WIND DISTRIBUTION 10 M



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

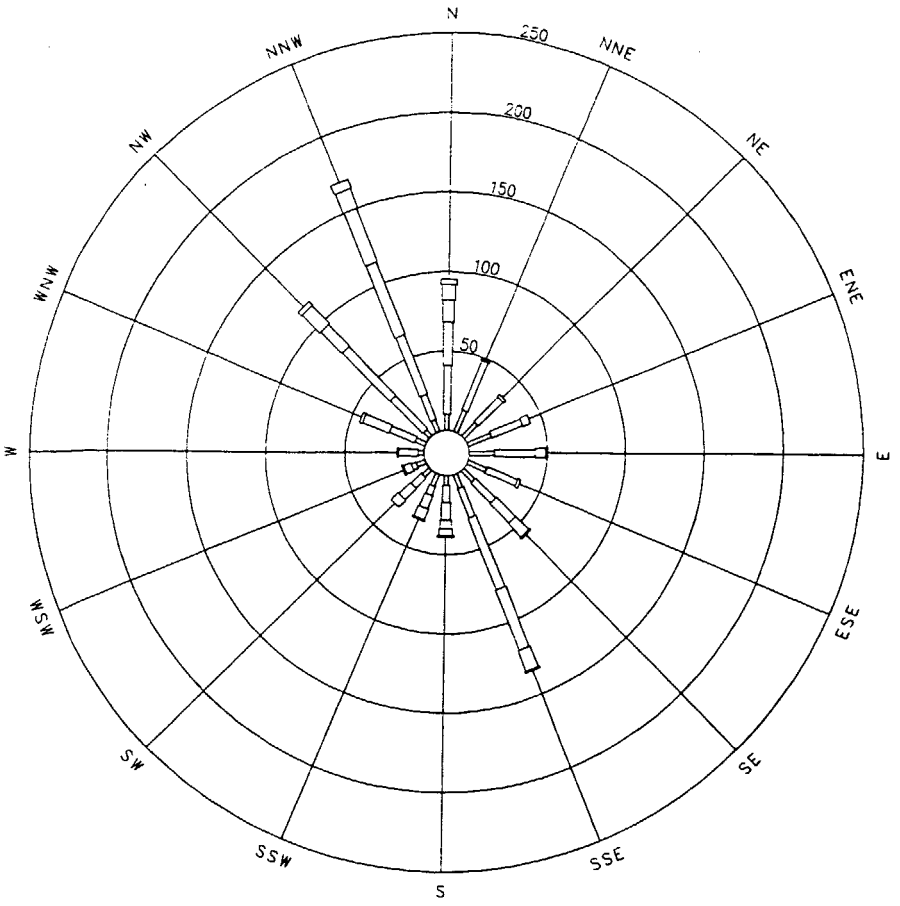


Wind direction (DD) / Wind speed (Beaufort and m/s) 10 m above the ground

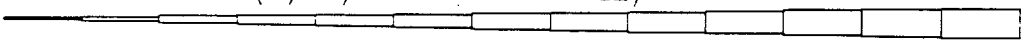
	Beaufort	DD																	
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	ALL
		Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm	Prm
.2	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1.5	1	19	32	26	17	22	18	3	3	8	6	4	6	3	8	8	14	205
3.3	2	31	19	13	24	28	19	13	14	9	8	11	5	9	37	28	27	301
5.4	3	8	0	0	3	3	1	24	42	10	9	8	4	2	36	34	46	237
7.9	4	6	.	.	0	1	0	21	31	6	8	5	1	0	7	36	38	166
10.7	5	2	.	.	.	.	.	3	11	4	1	0	0	.	1	25	18	70
13.8	6	.	.	.	.	.	.	.	0	2	.	.	.	.	0	4	8	16
17.1	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0	1
20.7	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	ALL	68	52	40	46	55	40	65	104	42	35	31	17	15	91	138	155	1000

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
REPORT 10 : September 22 1994

HANOYTANGEN AUG. 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
.2	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1.5	1	10	15	12	16	16	13	10	9	6	8	6	6	4	7	5	8	158
3.3	2	31	33	21	21	26	21	18	20	11	6	9	3	12	17	29	17	303
5.4	3	27	1	2	5	7	2	17	49	11	9	10	5	1	18	43	40	254
7.9	4	14	0	.	0	1	0	12	41	6	7	6	1	.	2	19	49	164
10.7	5	10	0	.	.	.	.	1	14	4	1	0	0	.	0	16	36	86
13.8	6	3	0	.	.	.	.	.	1	1	.	.	.	.	.	3	13	24
17.1	7	0	.	.	.	.	.	.	.	.	.	.	.	.	.	0	6	7
20.7	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	ALL	97	51	36	43	52	38	61	137	41	34	33	18	18	45	119	171	1000

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
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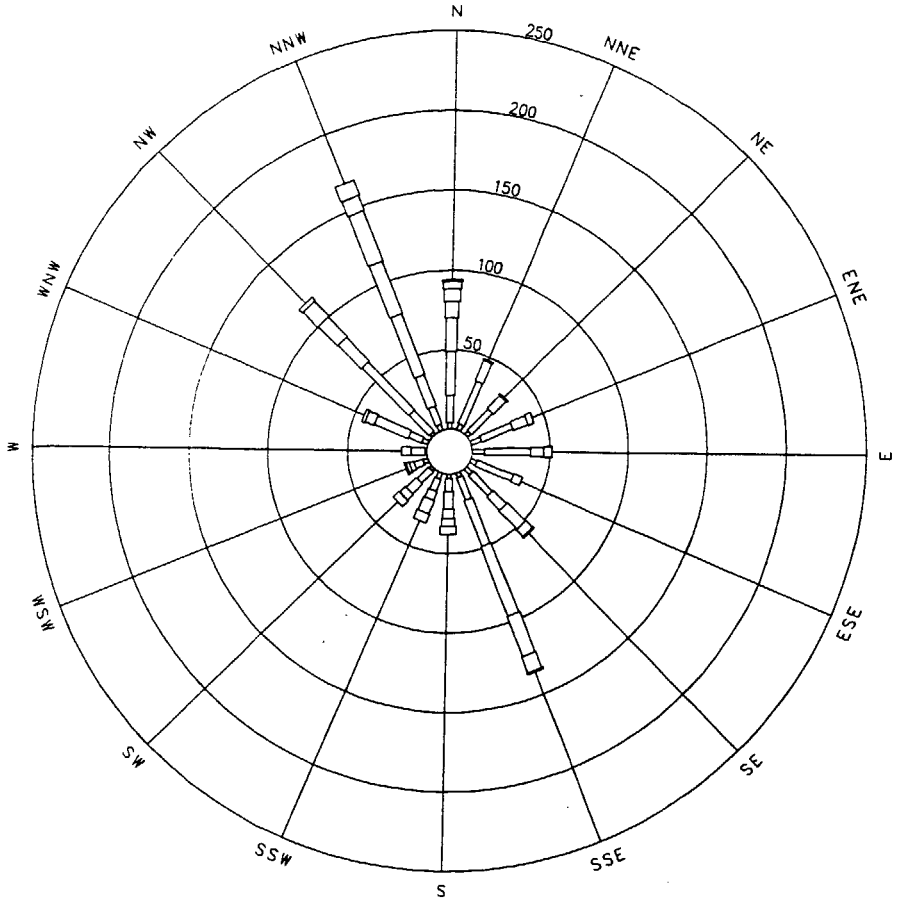
HANOYTANGEN AUG. 1994 GUST WIND DISTR. 30 M



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	4	4	3	7	8	4	5	3	3	4	2	3	1	4	2	4	66
1.6-3.3	17	29	19	21	29	25	18	15	8	8	10	6	9	9	18	12	259
3.4-5.4	28	14	11	10	9	6	12	31	11	6	9	3	6	23	42	21	250
5.5-7.9	21	1	1	4	5	0	16	47	6	9	5	2	0	6	21	41	192
8.0-10.7	10	0	.	.	.	0	6	27	5	6	5	1	.	2	17	35	119
10.8-13.8	8	.	.	.	.	.	1	11	5	0	.	0	.	.	13	34	75
13.9-17.1	5	0	.	.	.	.	.	1	0	.	.	.	.	.	3	10	21
17.2-20.7	1	0	.	.	.	.	.	.	.	.	.	.	.	.	0	10	12
20.8-24.5	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
24.5-28.4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.5-32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
> 32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	97	51	36	43	52	38	61	137	41	34	33	18	18	45	118	171	1000

PAC 004 WEATHER ANALYSIS IN HANØYTANGEN
REPORT 10 : September 22 1994

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 AUG 1994

QUOTIENT F30/F18

F30/F18 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	*	64	64	1.44	1.44
0.80	*	51	115	1.15	2.58
0.85	*	70	185	1.57	4.15
0.90	**	118	303	2.65	6.80
0.95	*******	352	655	7.90	14.71
1.00	********************************	1454	2109	32.65	47.36
1.05	******************	842	2951	18.91	66.27
1.10	*********	436	3387	9.79	76.06
1.15	******	307	3694	6.89	82.96
1.20	*****	269	3963	6.04	89.00
1.25	****	201	4164	4.51	93.51
1.30	***	134	4298	3.01	96.52
1.35	*	52	4350	1.17	97.69
1.40	*	31	4381	0.70	98.38
1.45		23	4404	0.52	98.90
1.50		17	4421	0.38	99.28
1.55		9	4430	0.20	99.48
1.60		4	4434	0.09	99.57
1.65		2	4436	0.04	99.62
1.70		2	4438	0.04	99.66
1.75		3	4441	0.07	99.73
1.80		12	4453	0.27	100.00

400 800 1200

Frequency

HANØYTANGEN AUG 1994

QUOTIENT F30/F10

F30/F10 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	*****	100	100	2.25	2.25
0.80	***	51	151	1.15	3.39
0.85	***	57	208	1.28	4.67
0.90	*****	96	304	2.16	6.83
0.95	**********	330	634	7.41	14.24
1.00	**********	788	1422	17.70	31.93
1.05	**********	673	2095	15.11	47.05
1.10	**********	741	2836	16.64	63.69
1.15	**********	488	3324	10.96	74.65
1.20	**********	299	3623	6.71	81.36
1.25	**********	198	3821	4.45	85.81
1.30	*******	136	3957	3.05	88.86
1.35	******	124	4081	2.78	91.65
1.40	***	69	4150	1.55	93.20
1.45	***	60	4210	1.35	94.54
1.50	***	61	4271	1.37	95.91
1.55	**	40	4311	0.90	96.81
1.60	*	26	4337	0.58	97.40
1.65	**	33	4370	0.74	98.14
1.70	*	14	4384	0.31	98.45
1.75	*	21	4405	0.47	98.92
1.80	**	48	4453	1.08	100.00

100 200 300 400 500 600 700

Frequency

HANØYTANGEN AUG 1994

QUOTIENT F18/F10

F18/F10 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75		10	10	0.22	0.22
0.80		19	29	0.43	0.65
0.85	*	42	71	0.94	1.59
0.90	**	90	161	2.02	3.61
0.95	**********	482	643	10.82	14.43
1.00	**********	1622	2265	36.41	50.84
1.05	**********	987	3252	22.15	73.00
1.10	**********	539	3791	12.10	85.10
1.15	*****	261	4052	5.86	90.95
1.20	***	151	4203	3.39	94.34
1.25	*	70	4273	1.57	95.91
1.30	*	73	4346	1.64	97.55
1.35	*	48	4394	1.08	98.63
1.40	*	31	4425	0.70	99.33
1.45		11	4436	0.25	99.57
1.50		7	4443	0.16	99.73
1.55		5	4448	0.11	99.84
1.60		2	4450	0.04	99.89
1.65		5	4455	0.11	100.00
1.70		0	4455	0.00	100.00
1.75		0	4455	0.00	100.00
1.80		0	4455	0.00	100.00

400 800 1200 1600

Frequency

CLIMATOLOGICAL SUMMARY

Observation Period :											Location:	
From : 01/08/94											Level:	2 m a.gr.
To : 31/08/94						HANØYTANGEN 1994						
Coverage : 99.8 %												
Number of data :4455												
						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				
Abs min	-4	-6.3	-5.1	0.3	1.1	4	8.7	8.1				
Mean Day max.	3.8	3.3	5.3	8.4	13.2	12.3	19.4	17.7				
Abs max.	6.7	6.4	10.5	14.9	22.7	18.4	26.4	29				
Mean	2.1	0.1	3	5.9	9.5	10.2	15.8	14.6				
Relative Humidity												
Mean Day min.	61	44	59	57	44	64	56	57				
Abs min.	44	27	29	30	19	40	25	32				
Mean Day max.	81	73	84	84	80	86	85	84				
Abs max.	89	90	89	91	89	93	91	89				
Mean	70	60	73	72	63	78	72	73				
Air pressure												
Mean Day min.	991.6	1016.7	993.4	1004.4	1013.7	1008.3	1017.7	1010.1				
Abs min.	966.2	989.7	969.4	970.9	1004.7	991.9	1010.8	996.9				
Mean Day max.	1003.5	1023.6	1004.7	1011.8	1018	1015.8	1020.9	1015.1				
Abs max.	1019.6	1045.2	1024.3	1028.8	1027.8	1028.1	1026.4	1023.5				
Mean	998	1020	999.1	1008.2	1016	1012.2	1019.3	1012.5				
Coeficient Transfert												
from level 10 to 18	1.051	1.046	1.024	1.022	1.049	1.035	1.04	1.048				
from level 10 to 30	1.117	1.088	1.055	1.053	1.119	1.067	1.077	1.117				
from level 18 to 30	1.059	1.036	1.029	1.032	1.063	1.03	1.032	1.063				
Remarks:												
The summary is based on air temperature, humidity and pressure measured each 10 minute.												

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 :01/08/94		AUGUST 1994								Level : 10 m a.gr.
To : 31/08/94										Coordinates:
Coverage : 99.8 %		HANØYTANGEN								X = 71908
Number of data: 4455										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		2	34	69	98	117	121	123	123	
12 H		0	13	27	46	57	60	61	61	
18 H		0	1	15	27	38	40	41	41	
24 H		0	0	8	18	27	30	30	30	
48 H		0	0	2	6	13	15	15	15	
72 H		0	0	1	3	8	10	10	10	
Remarks : Based on maximum 10mn wind speed within the interval period, in any direction, at 10 metres level										

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 August 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 3.2-31.8.1994 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 3.2-31.8.1994.

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°
0.65 0.92	0.72 1.01	0.73 1.04	0.82 1.09	0.64 1.00	0.66 0.97	0.60 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.

	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 3.2-31.8.1994.

	SUMMER		WINTER	
	May - August		September - April	
DIRECTION	$V_{10}10$	$V_{10}100$	$V_{10}10$	$V_{10}100$
030-060°	8.0	9.6	12.5	14.1
070-100°	8.5	10.1	10.8	12.2
110-120°	11.8	14.4	15.9	17.9
130-150°	14.8	17.7	20.4	23.0
160-190°	17.4	20.7	22.3	25.1
200-220°	19.5	23.3	25.0	28.2
230-290°	13.8	16.5	17.7	20.0
300-330°	13.9	16.6	18.9	21.3
340-020°	13.0	15.5	17.0	19.4

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 3.2-31.8.1994.

	SUMMER		WINTER	
	May - August		September - April	
DIRECTION	V_g10	V_g100	V_g10	V_g100
030-060°	11.3	13.5	17.7	20.0
070-100°	12.0	14.3	15.3	17.3
110-120°	16.7	19.9	22.4	25.4
130-150°	20.8	24.8	28.6	32.3
160-190°	24.8	29.5	31.7	35.8
200-220°	25.9	31.0	33.2	37.5
230-290°	21.6	25.8	27.6	31.2
300-330°	20.5	24.4	27.7	31.3
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 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	8	6	10	21	645	7.56	0.4	341.77	6.74	9.35	6.14	9.05	327.12	14.12	85.60	1016.55
2	1994	8	7	14	21	645	14.72	0.4	319.09	10.10	12.93	8.38	13.53	318.04	15.89	58.85	1021.28
3	1994	8	13	12	1	645	7.79	18.9	347.01	13.31	18.60	12.93	17.41	344.22	12.72	66.15	1006.40
4	1994	8	31	11	20	645	19.50	0.4	114.92	0.40	0.40	0.40	0.40	116.67	14.86	43.15	1017.39