

DNMI DET NORSKE METEOROLOGISKE INSTITUTT

klima

HANØYTANGEN , DECEMBER 1993

Knut A. Iden

RAPPORT NR. 15/94 KLIMA



DET NORSKE METEOROLOGISKE INSTITUTT
P.O.BOX 43, BLINDERN 0313 OSLO 3

TEL. : (02) 96 30 00

ISBN

REPORT NR.

15/94 KLIMA

DATE May 4

TITLE

HANØYTANGEN , DECEMBER 1993

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 DECEMBER 1993

CLIENT : DNMI
CONTRACT NO. : KCC/PAC004/001
PROJECT NO. :
DOCUMENT NAME : RAPPDEC.93
PROJ. MANAGER : Knut A. Iden
EXECUTED BY : Bjørn. H. Halvorsen and Knut A. Iden
APPROVED BY : Bjørn Aune *Bjørn Aune 08.03.1994*
COMPLETION DATE : 08 March 1994
REV 1. : 25 March 1994
REV 2. : 18 April 1994
REV 3. : 27 April 1994

DSU : serial no. 6602
Received : 27 January 1994

Comments regarding the data :

The DSU contains data stored from 23/11/93 to 20/01/94.

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.

Application of the calibration factors is another option in the standard software (P3059) and this results in a data set with meteorological data in engineering units.

The processing is based on this data set and conducted after the following scheme :

- . Generate a SAS data set of the data

In this step 10 min mean wind speed > 35 m/s and gust wind > 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. This is because there seem to be some disturbances connected to the measurements in the top of the mast (30 m). The other meteorological parameters are tested to be inside reasonable intervals.

- . Plots of the time series are generated and examined.
- . Unphysical 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 is generated.

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	98.8 %	m/s	6.7	4.0	19.9	160	18:1309	0.5	119	08:0129
Wind speed	18 m	100.0 %	m/s	6.5	4.0	19.8	N/A	18:1309	0.4	N/A	28:0410
Wind speed	10 m	100.0 %	m/s	6.4	4.1	20.0	174	18:1309	0.5	75	08:0209
Wind gust	30 m	98.7 %	m/s	8.9	5.1	26.4	159 ²	14:2249	1.0	119 ²	08:0129
Wind gust	18 m	100.0 %	m/s	8.7	5.1	27.0	N/A	14:2249	1.0	N/A	07:1139
Wind gust	10 m	100.0 %	m/s	8.6	5.2	27.6	164 ²	14:2249	0.7	75 ²	08:0209

OTHER METEOROLOGICAL DATA

Parameter	Height	Cover.	Unit	Mean	ST.D.	Max	D.:hour	Min	D.:hour
Air Temp.	2. m ³	100.0 %	C	2.2	2.8	10.1	19:1349	-4.6	30:0649
Rel. Hum.	2. m ³	100.0 %	%	71	12.9	90	14:1009	40	25:0839
Air pr.	0. m ³	100.0 %	hPa	995.0	11.5	1019.7	27:0940	968.1	19:1349

- 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).

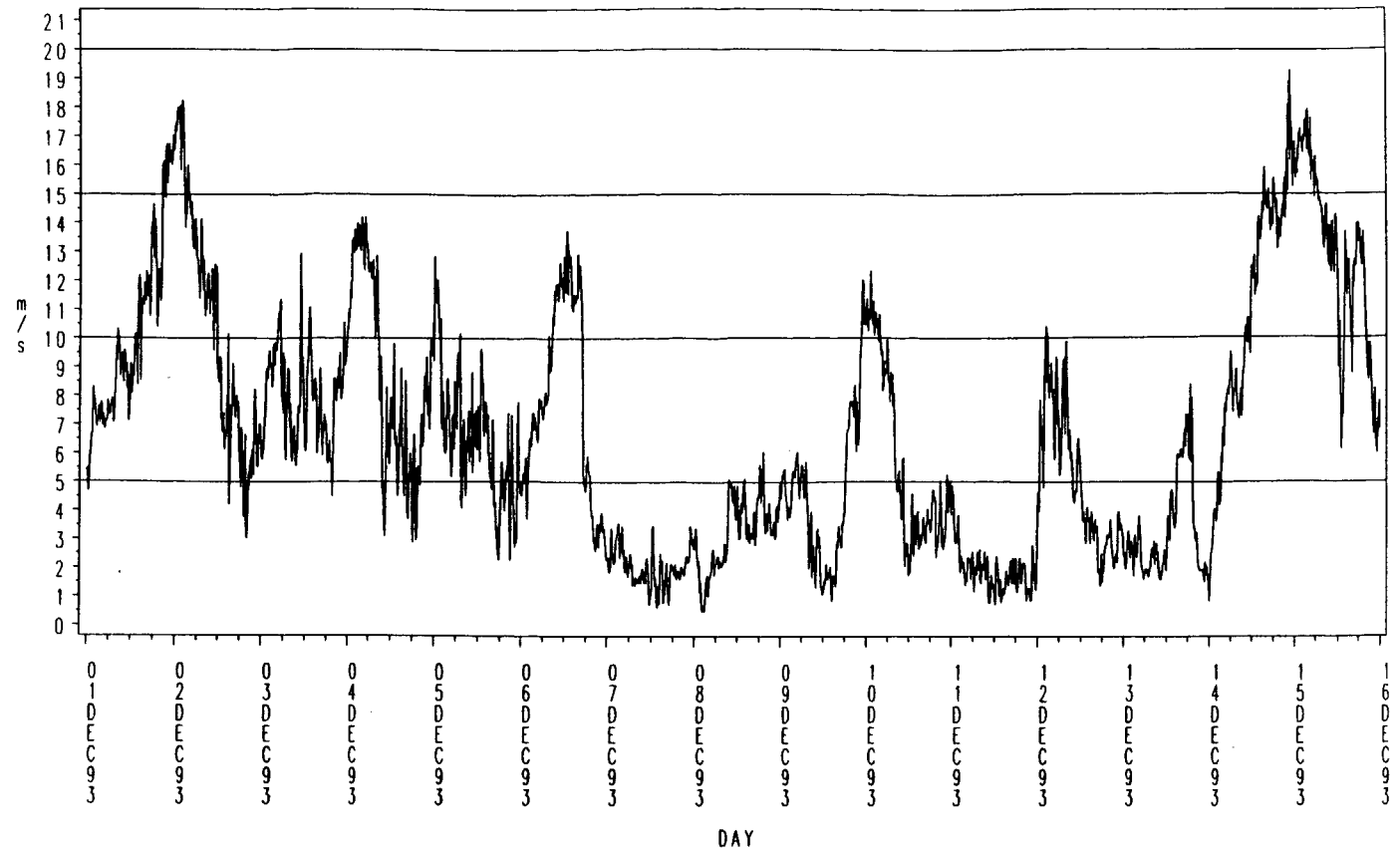
Wind data from height 30 m has obviously been disturbed on the 02,17,20 and 29 giving wind speed above 60 m/s. The unphysical values has been removed both due to an automatic filter and due to a manual inspection of the time series plot. In the corrected data set missing values has replaced these data. Appendix 2 is a documentation of the values outside the automatic filter.

It is important to note that data for the calibration of the anemometers gives 0.4 m/s as the lowest wind speed. The Beaufort 0 is therefore not present in the data.

PLOT OF TIME SERIES

HANØYTANGEN 1993

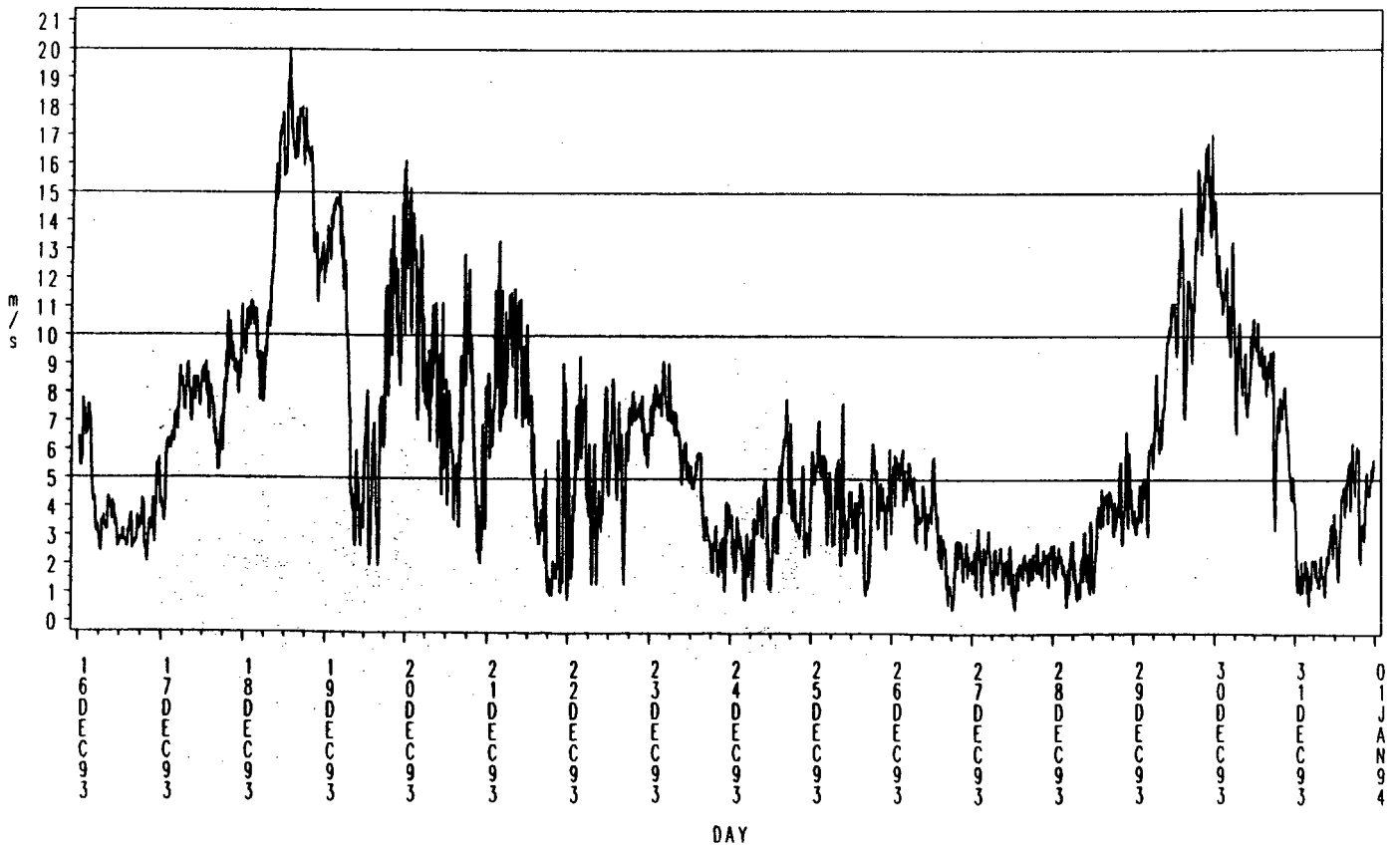
Wind speed 10 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

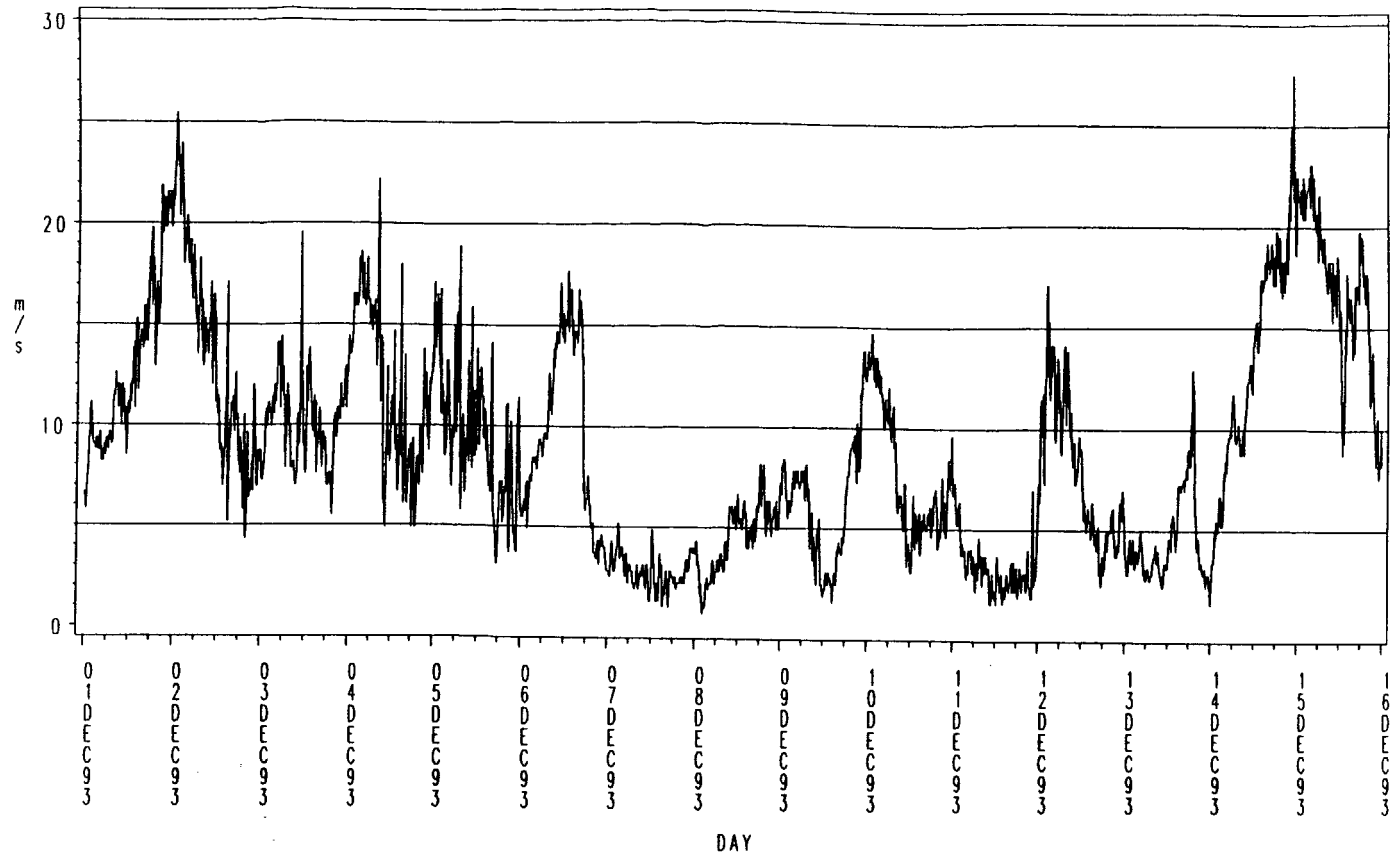
Wind speed 10 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

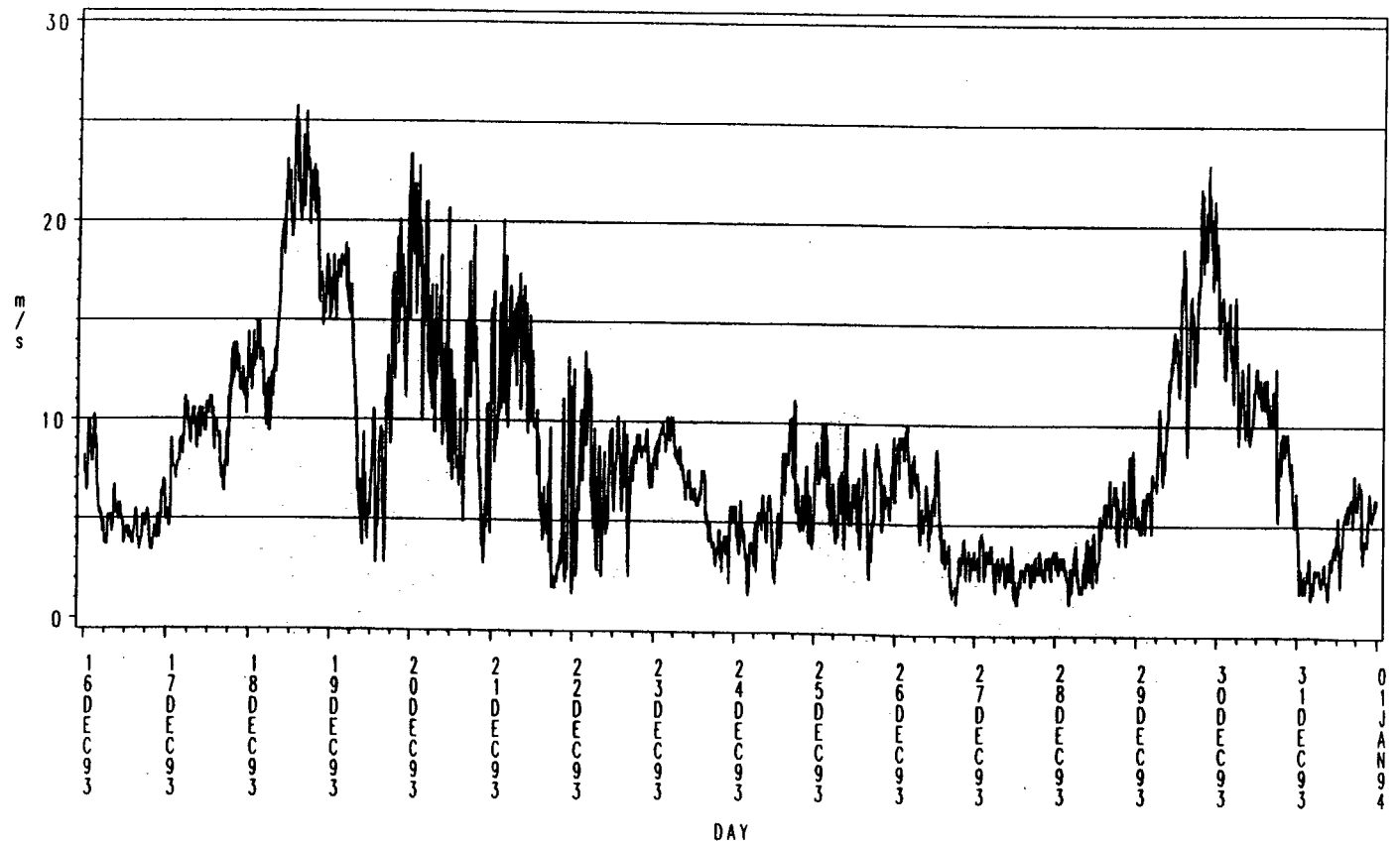
Gust Wind speed 10 m above the ground (m/s)



DNMI - KLIMAARDELINGEN

HANØYTANGEN 1993

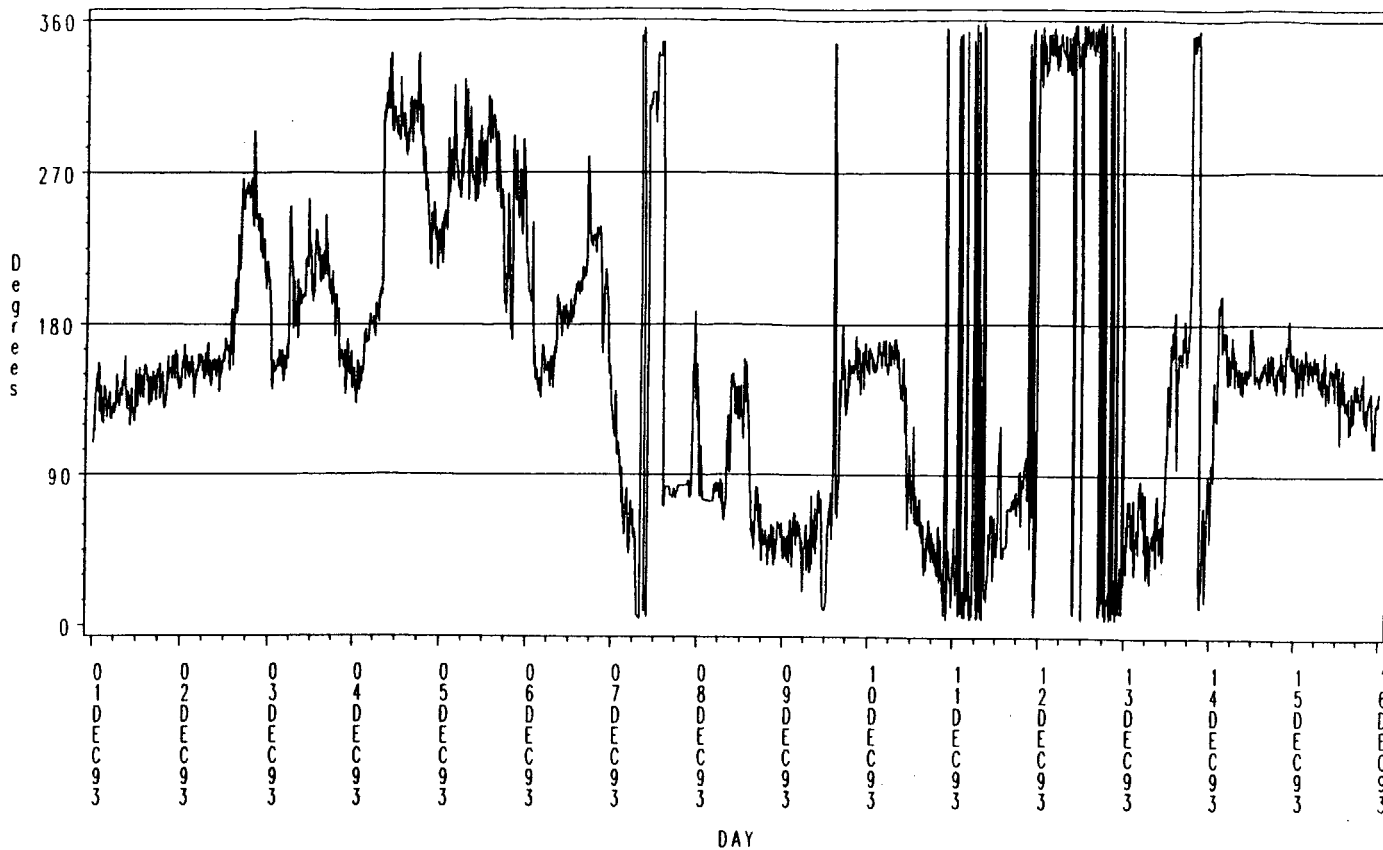
Gust Wind speed 10 m above the ground (m/s)



DNMI - KLIMAARDELINGEN

HANØYTANGEN 1993

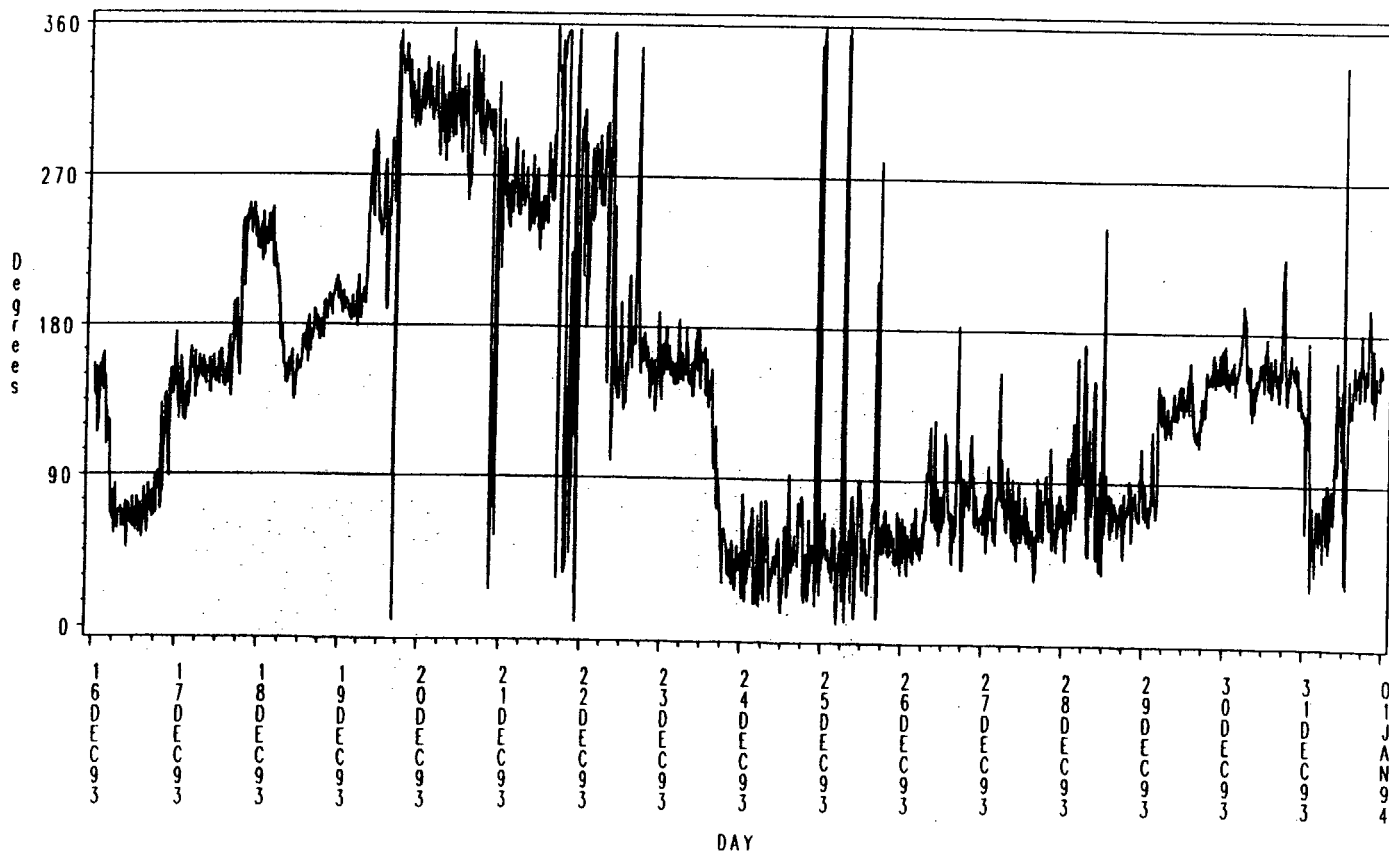
Wind direction 10 m above the ground



DNMI - KLIMADELINGEN

HANØYTANGEN 1993

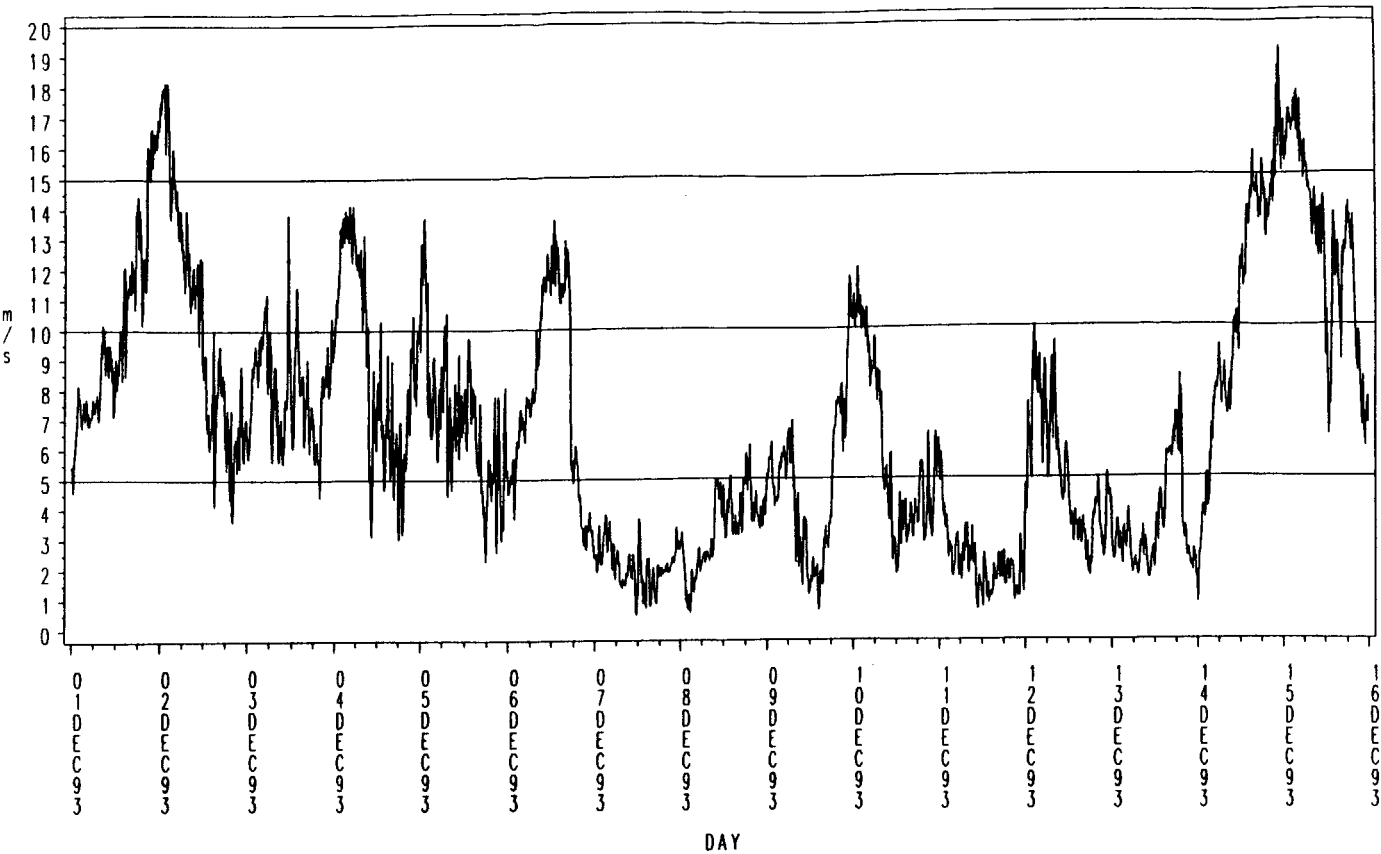
Wind direction 10 m above the ground



DNMI - KLIMADELINGEN

HANØYTANGEN 1993

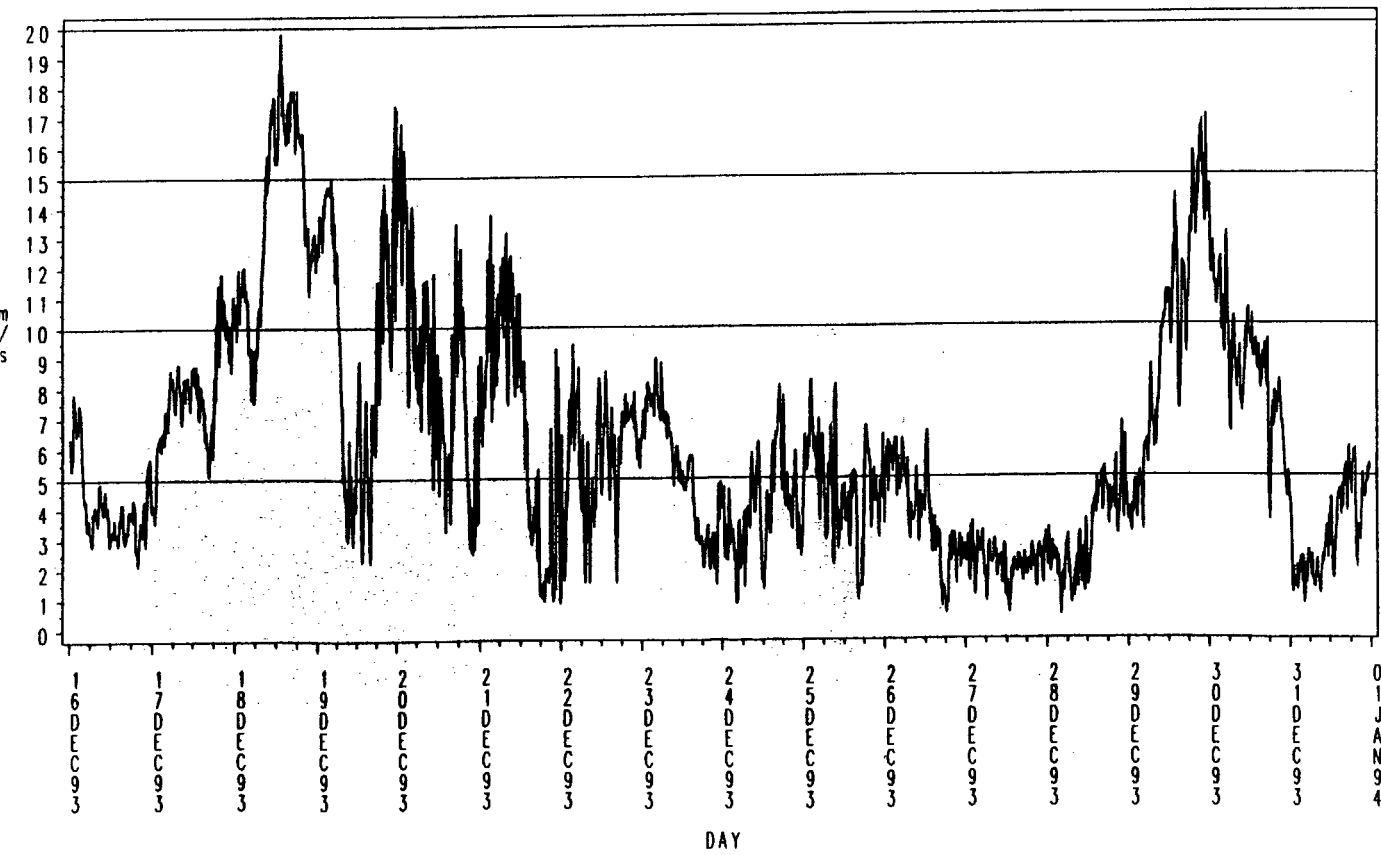
Wind speed 18 m above the ground (m/s)



DNMI - KLIMADELINGEN

HANØYTANGEN 1993

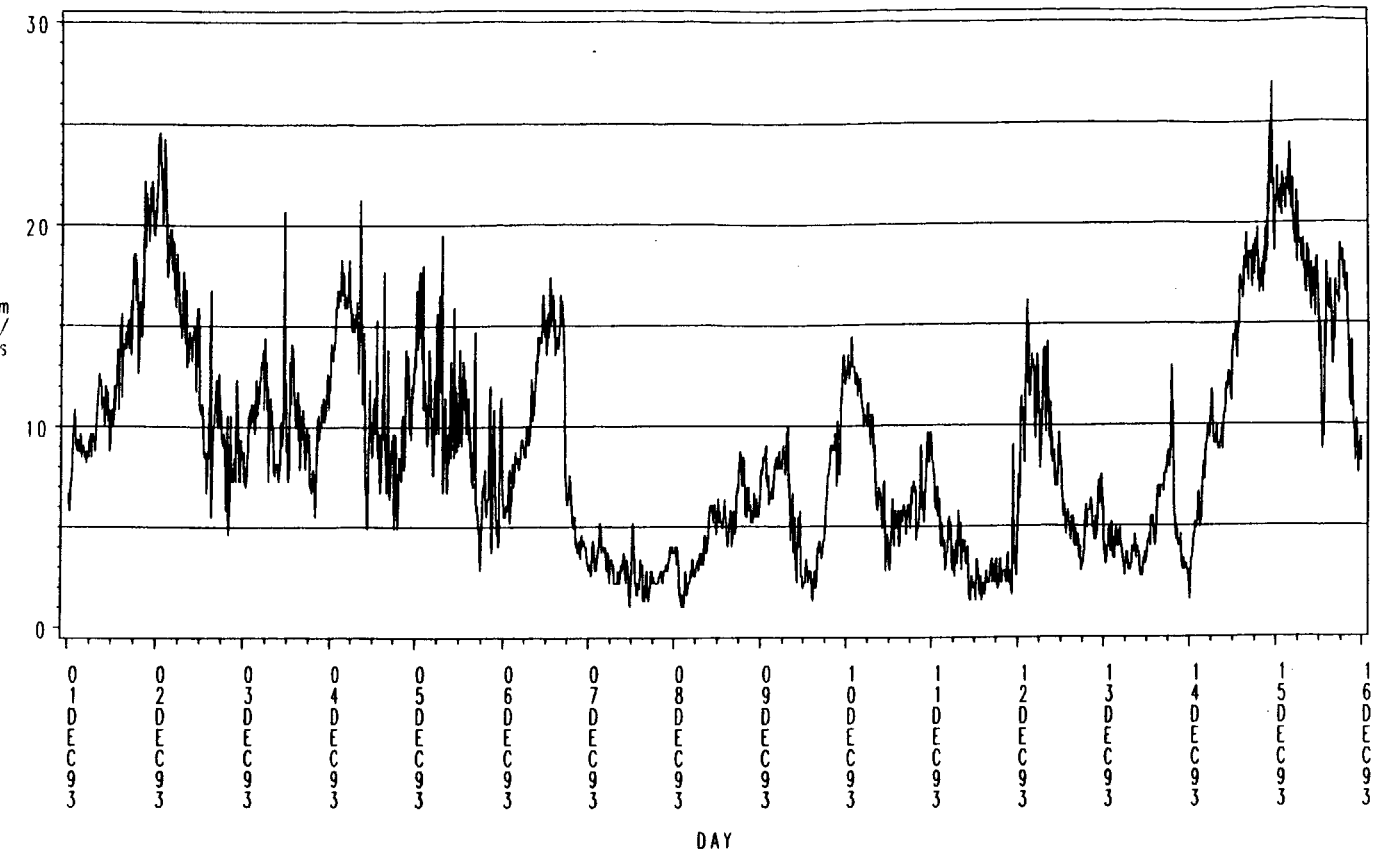
Wind speed 18 m above the ground (m/s)



DNMI - KLIMADELINGEN

HANØYTANGEN 1993

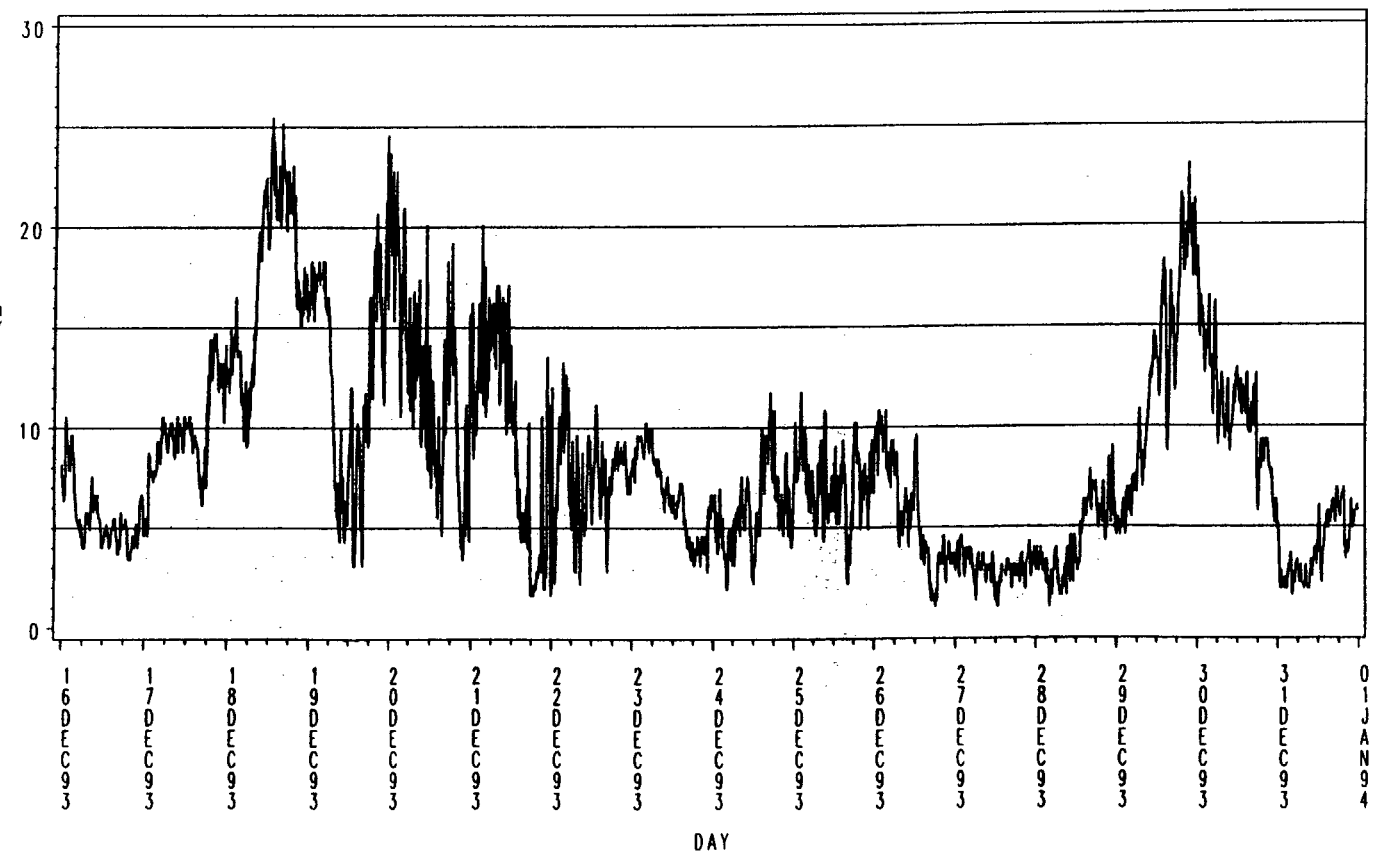
Gust Wind speed 18 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

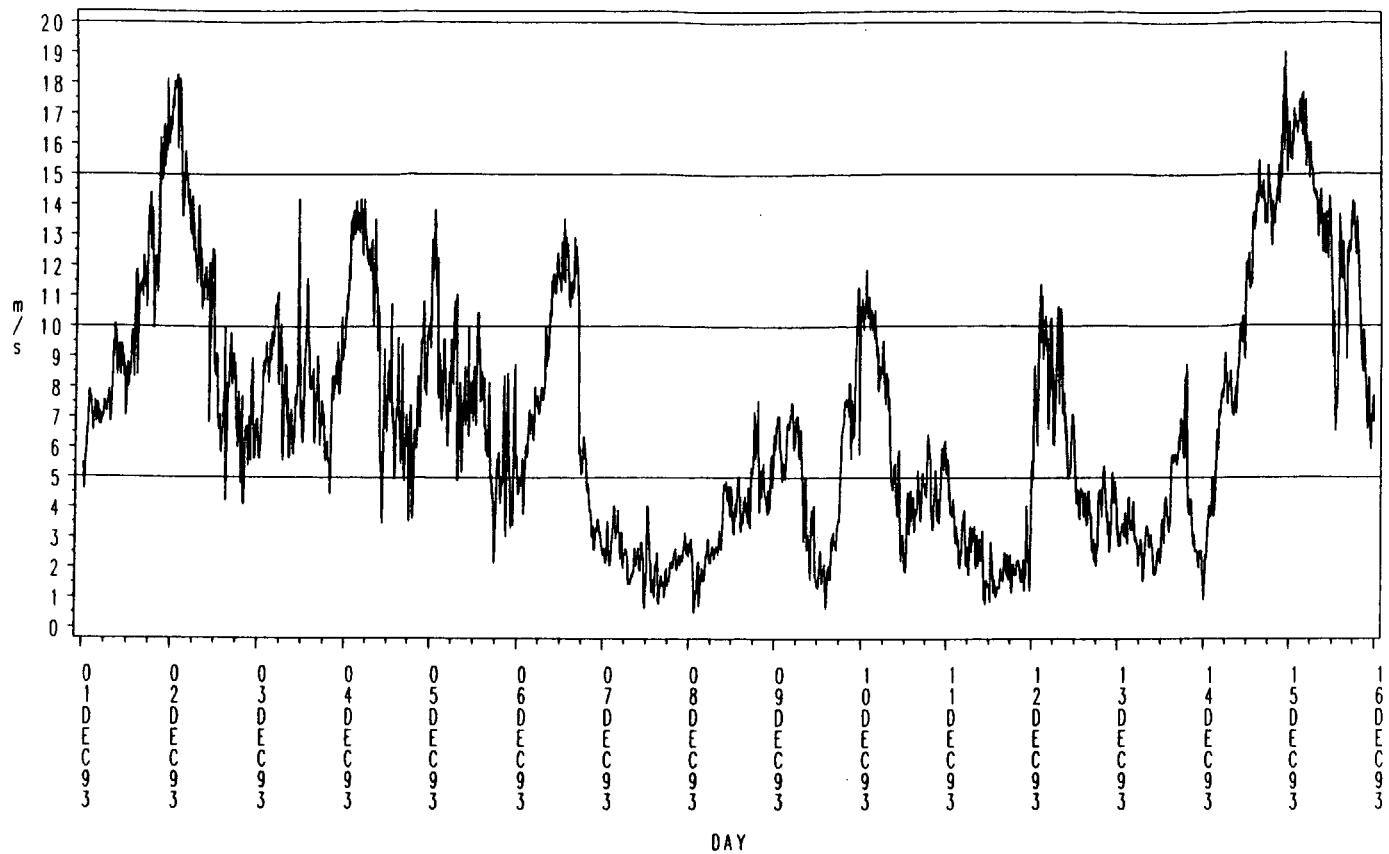
Gust Wind speed 18 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

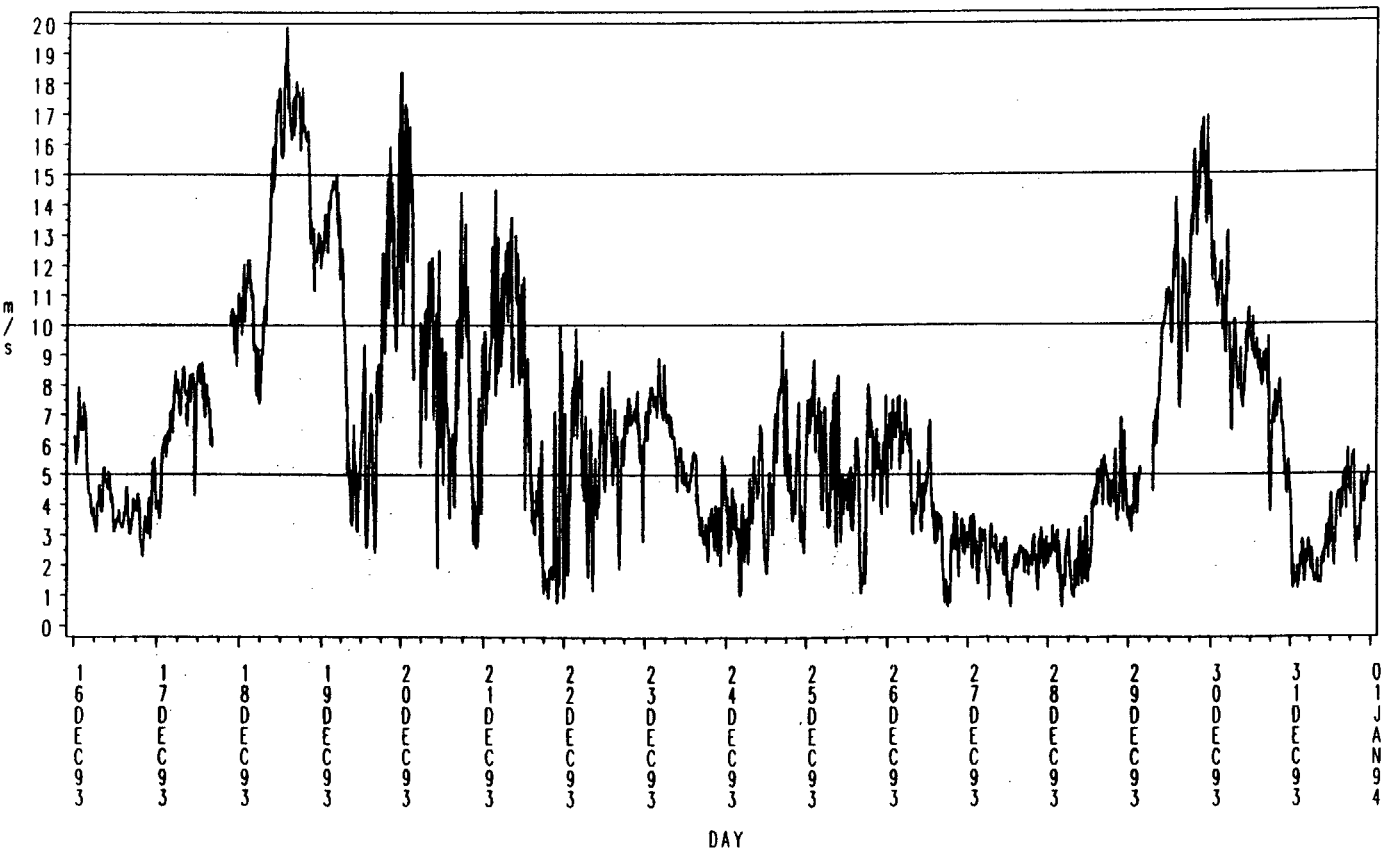
Wind speed 30 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

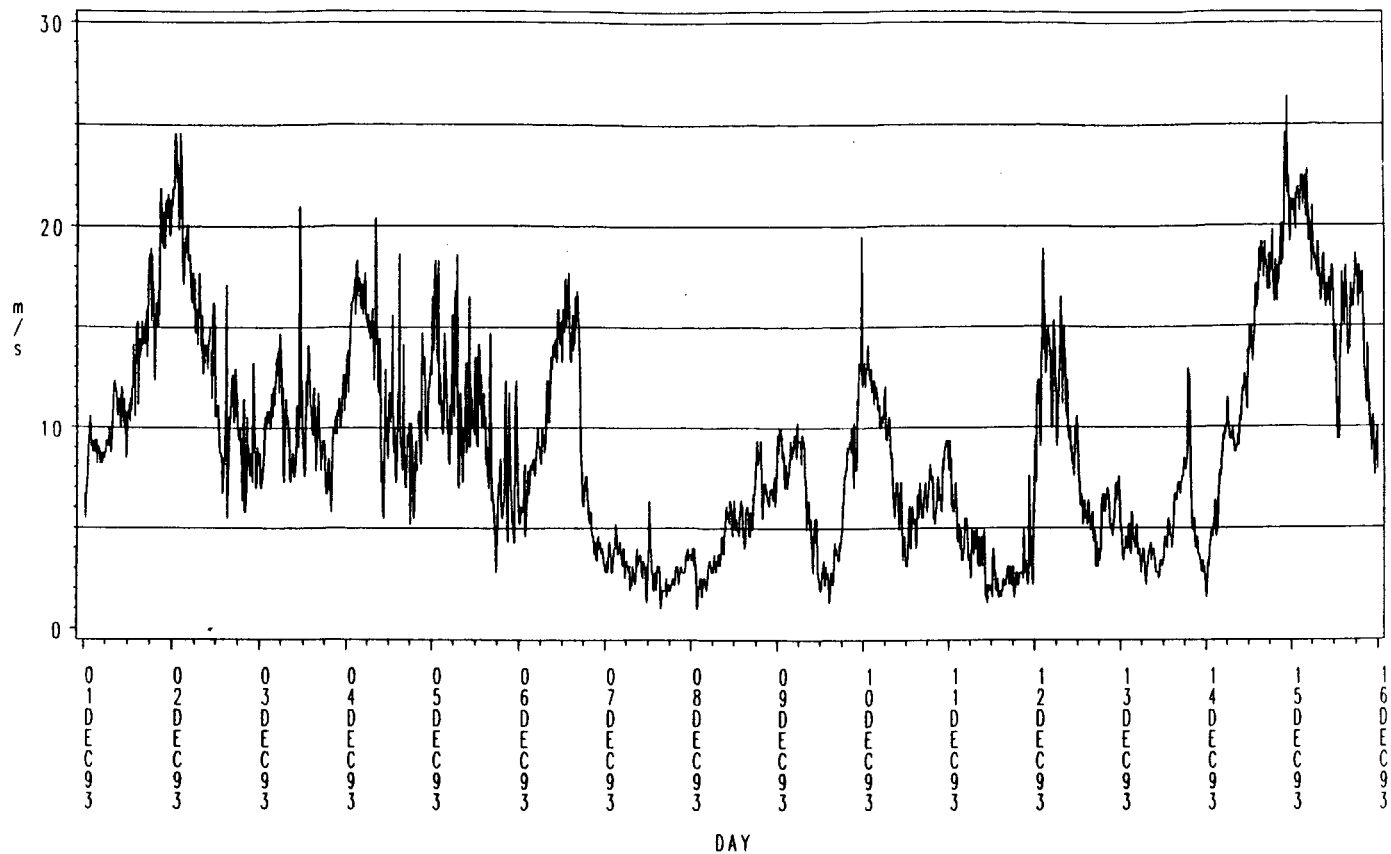
Wind speed 30 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

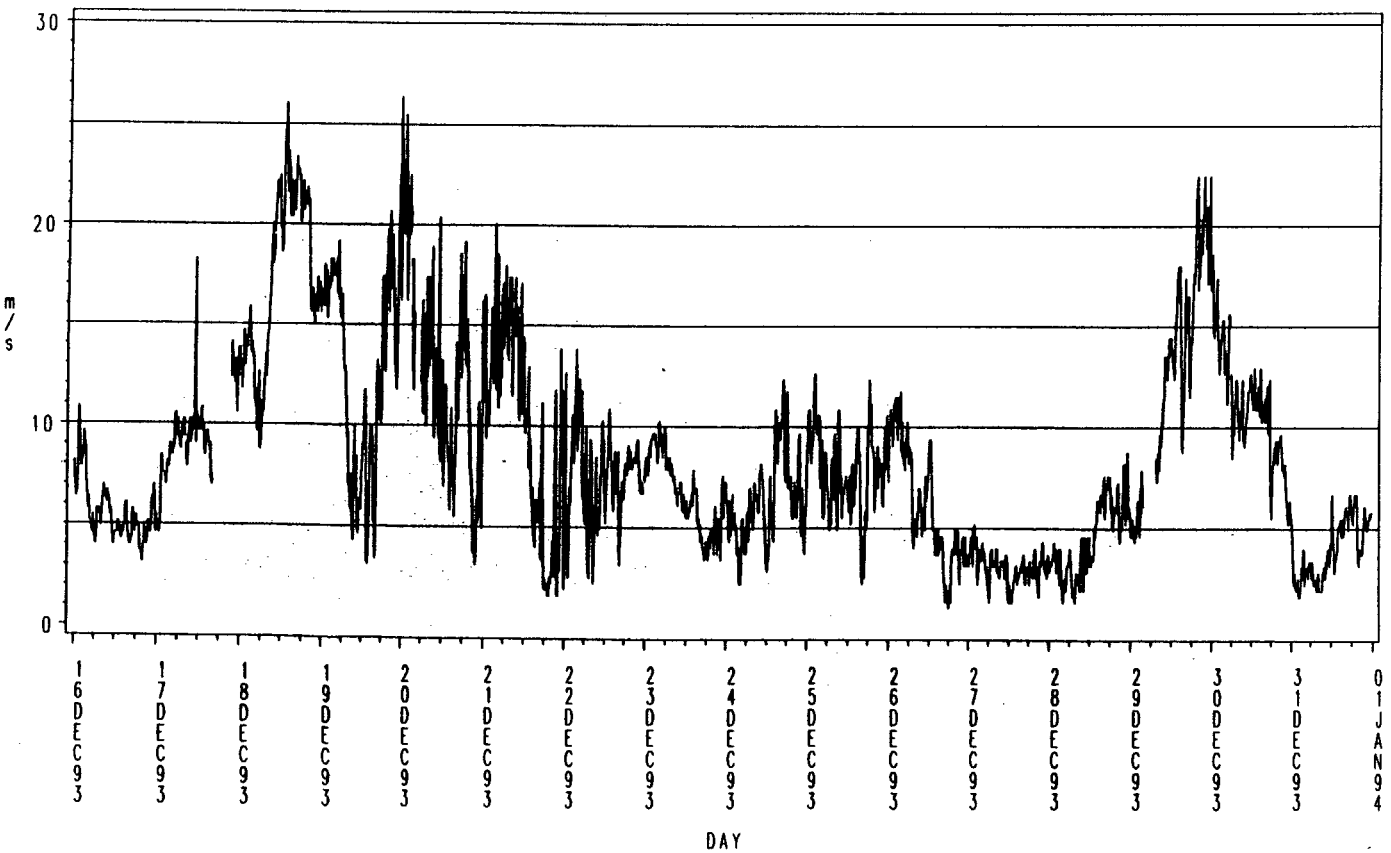
Gust Wind speed 30 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

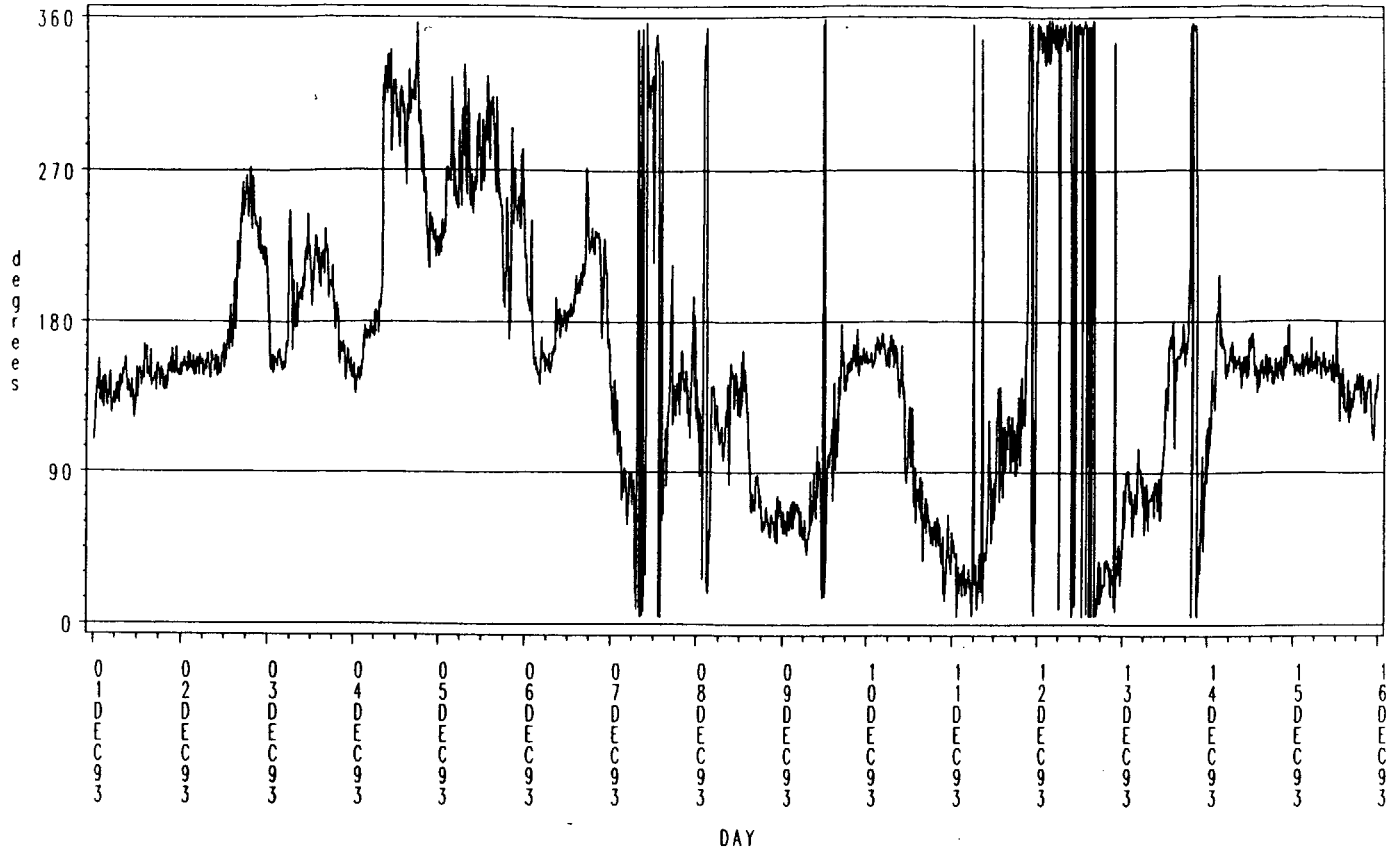
Gust Wind speed 30 m above the ground (m/s)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

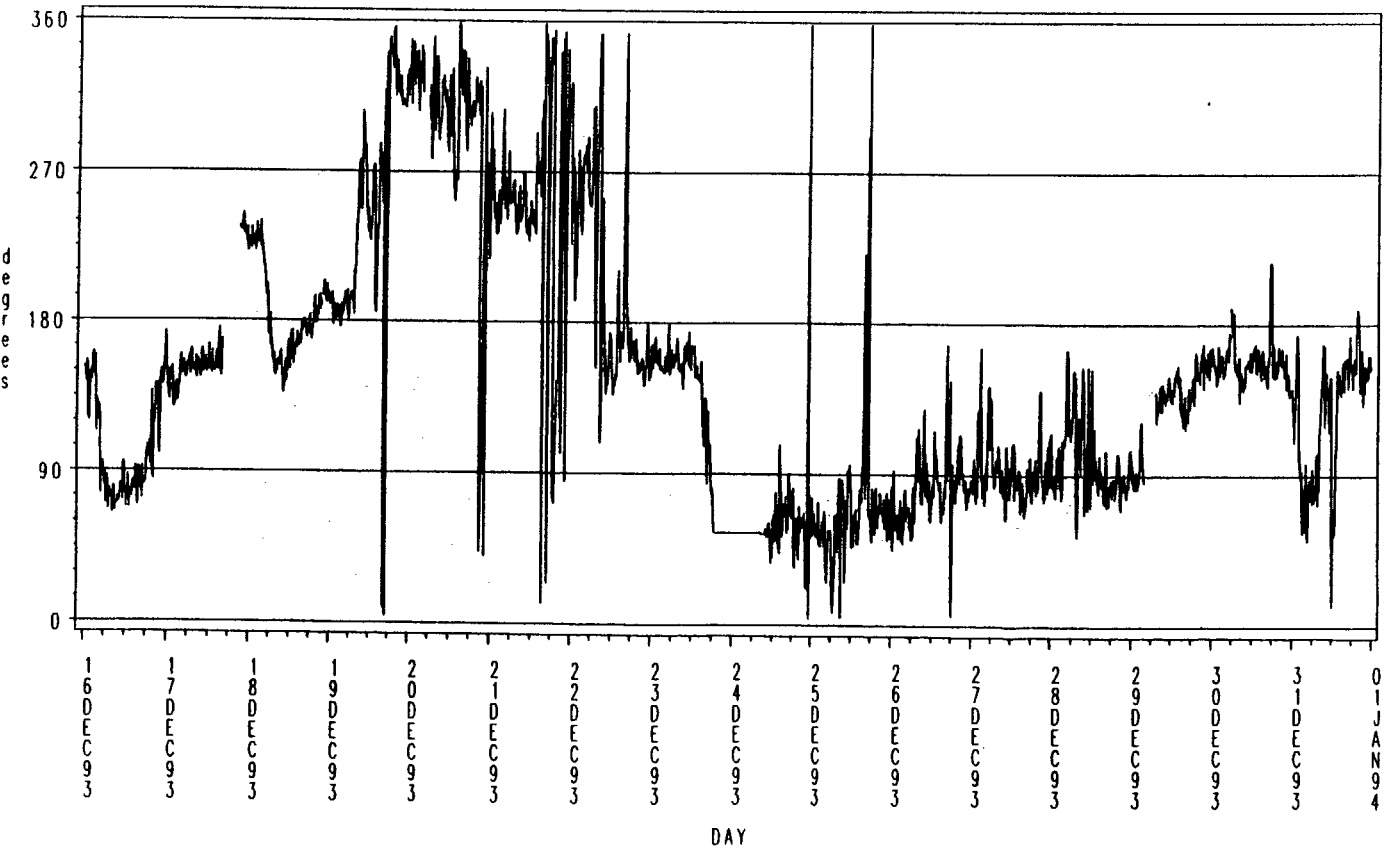
Wind direction 30 m above the ground



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

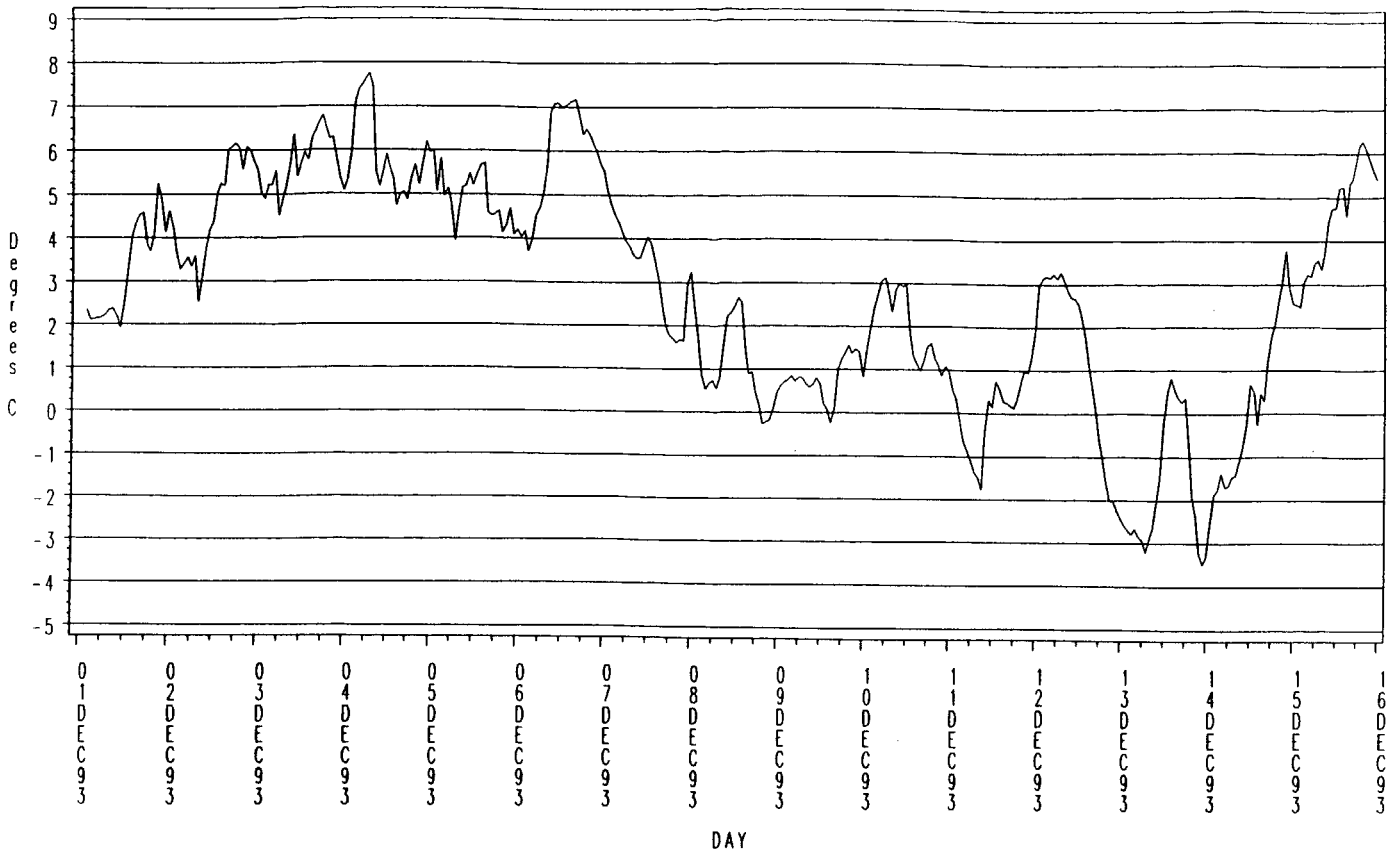
Wind direction 30 m above the ground



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

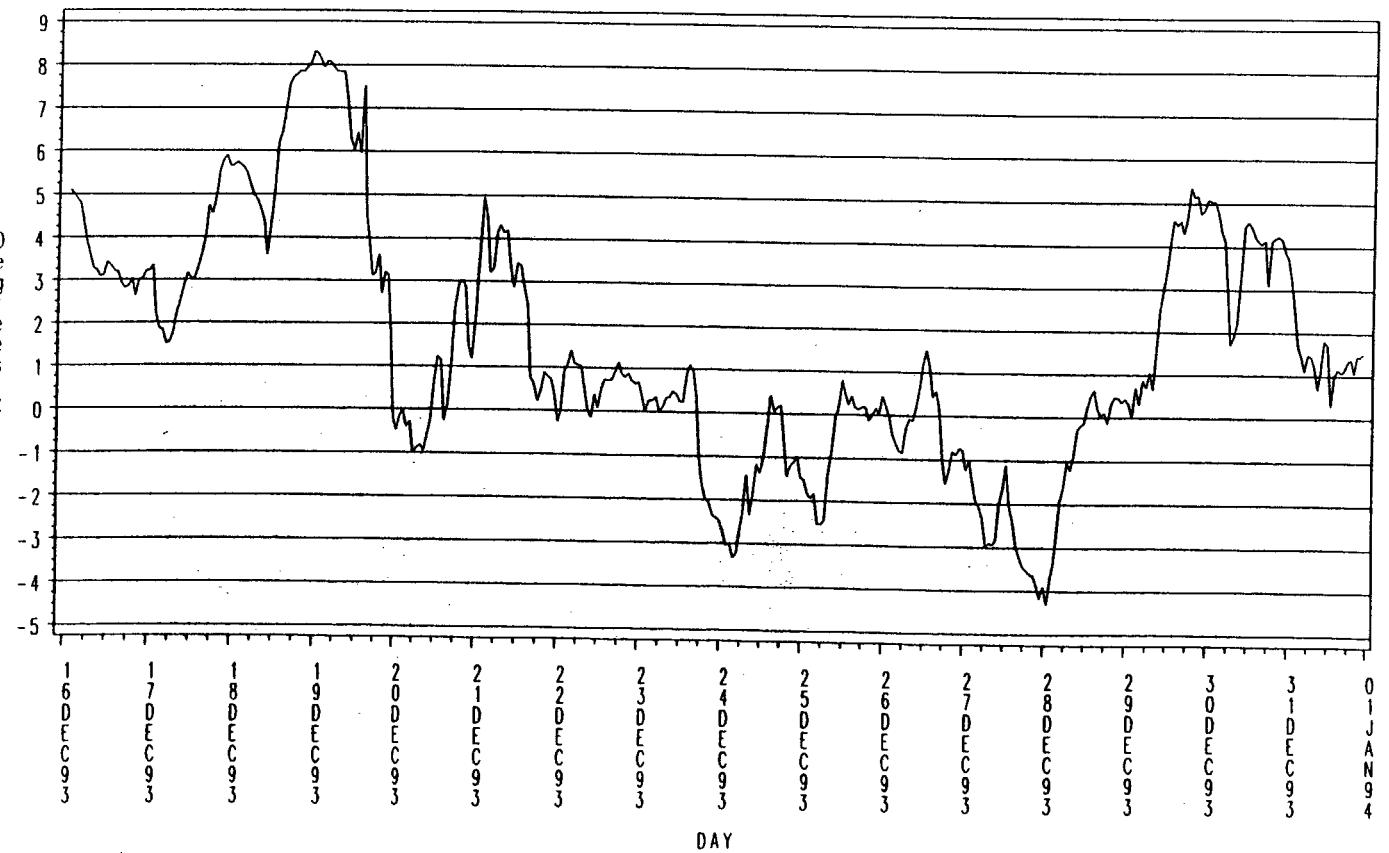
Air Temperature in degrees C (Hourly Means)



DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1993

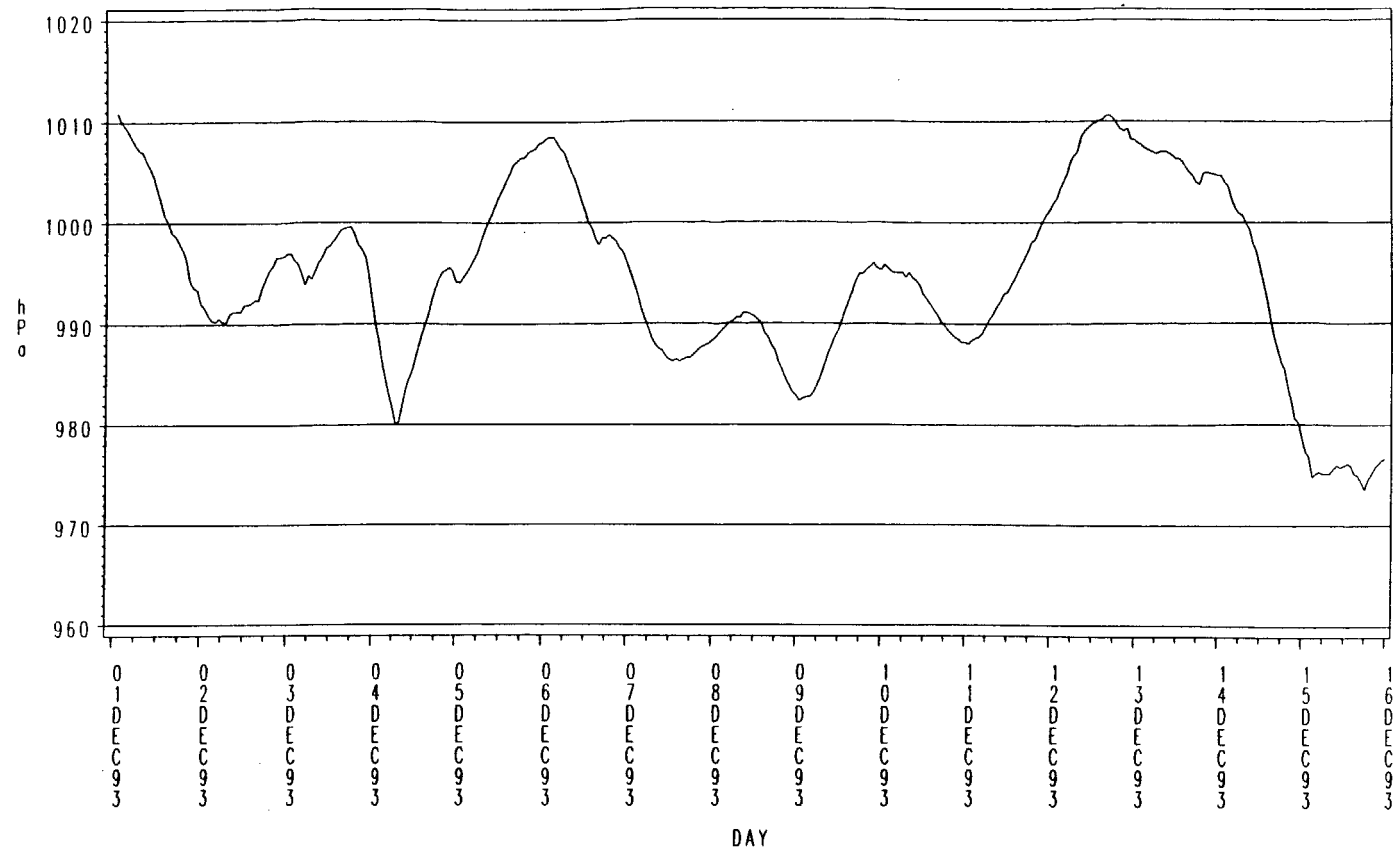
Air Temperature in degrees C (Hourly Means)



DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1993

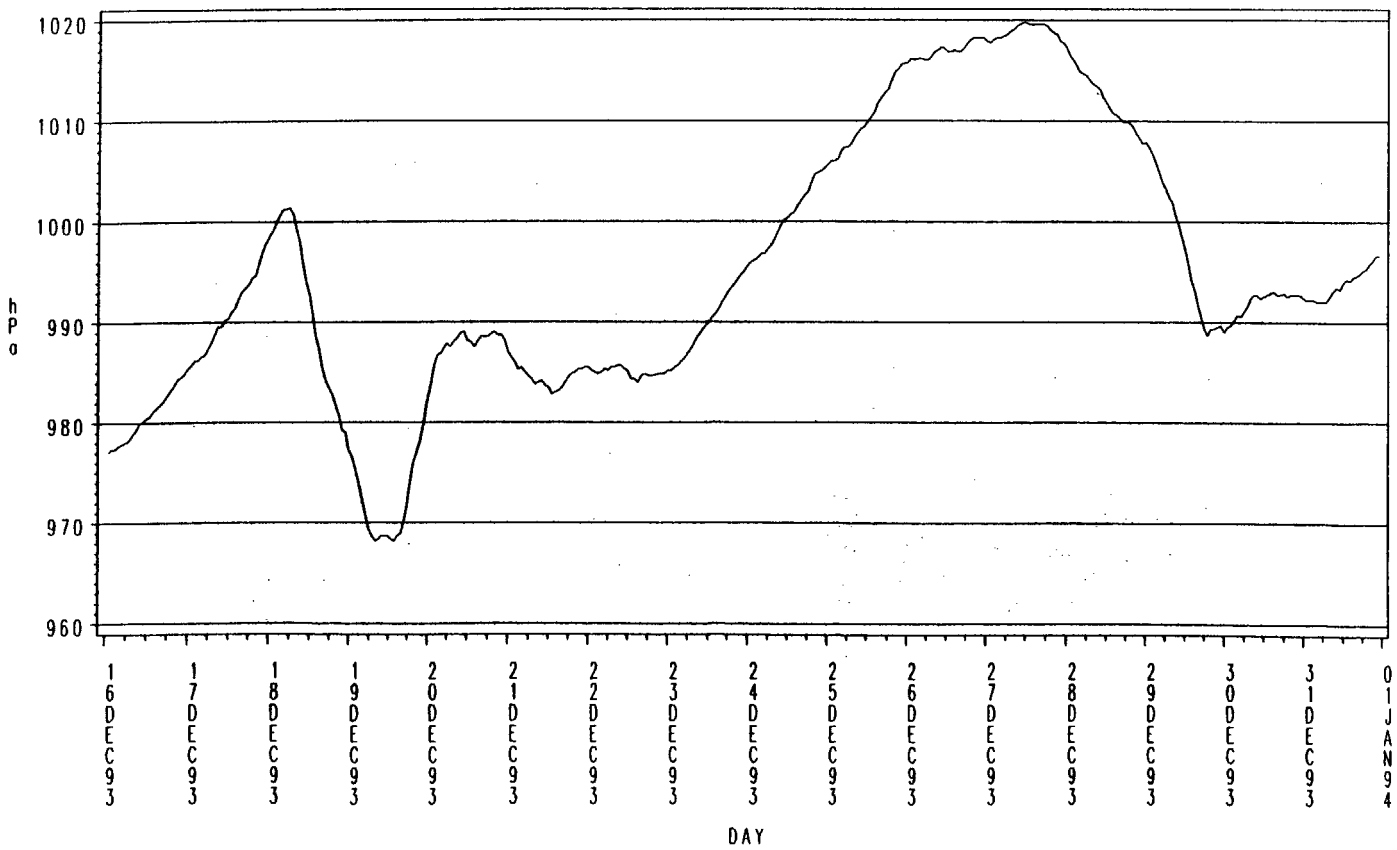
Air Pressure (QFF) in hPa (Hourly Means)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

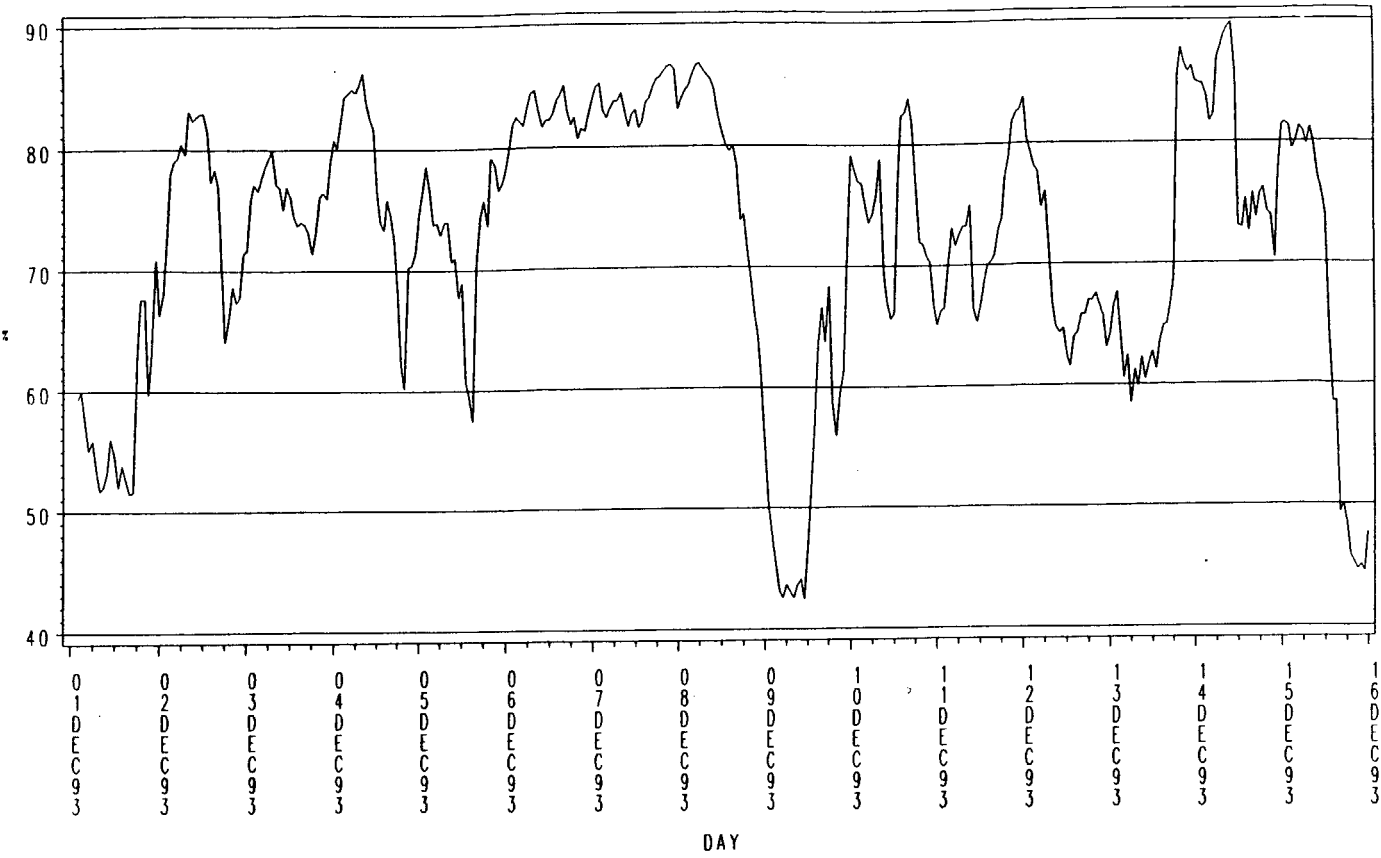
Air Pressure (QFF) in hPa (Hourly Means)



DNMI - KLIMA-AVDELINGEN

HANØYTANGEN 1993

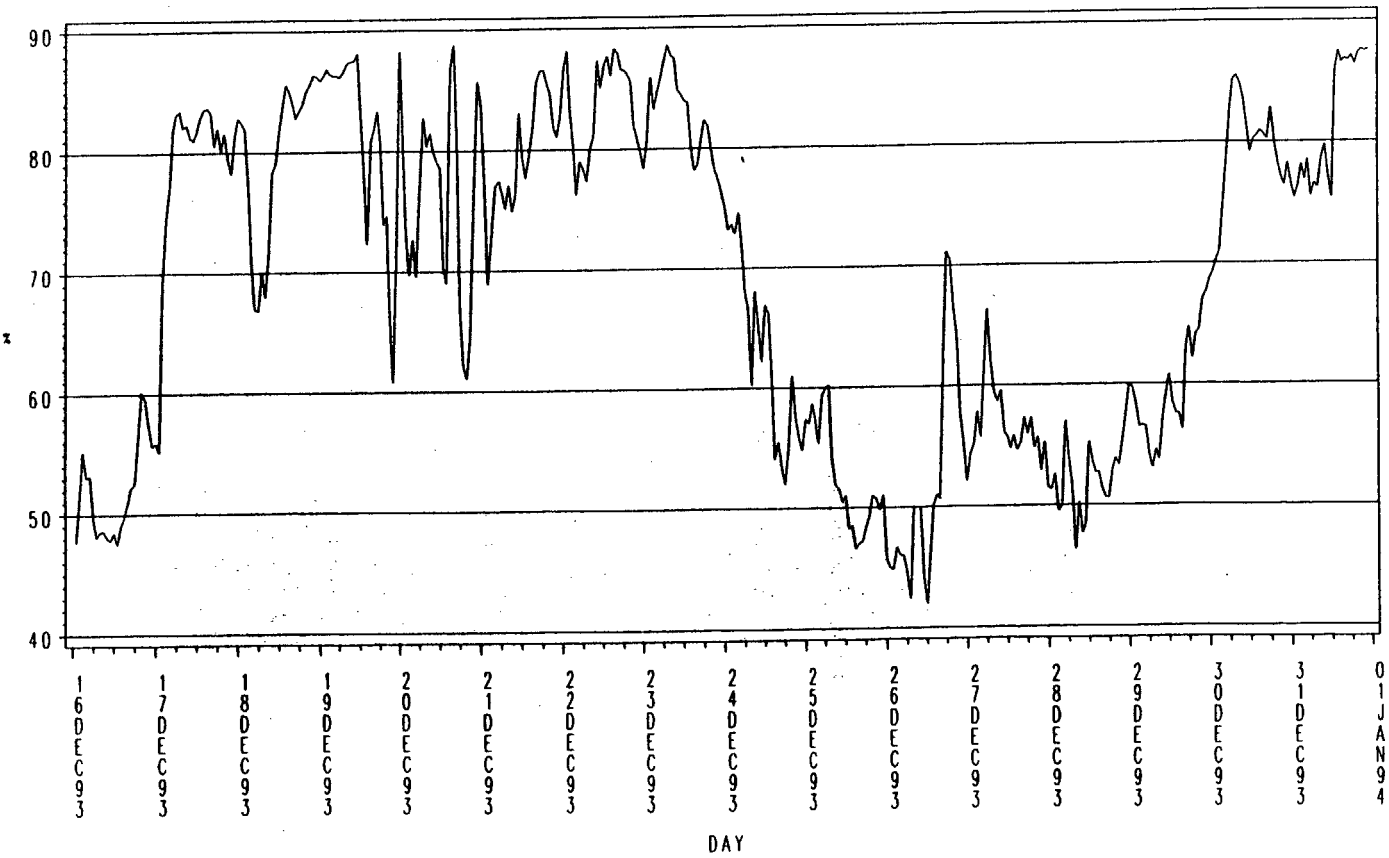
Air Humidity in % (Hourly Means)



DNMI - KLIMAÅVDELINGEN

HANØYTANGEN 1993

Air Humidity in % (Hourly Means)



DNMI - KLIMAÅVDELINGEN

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.

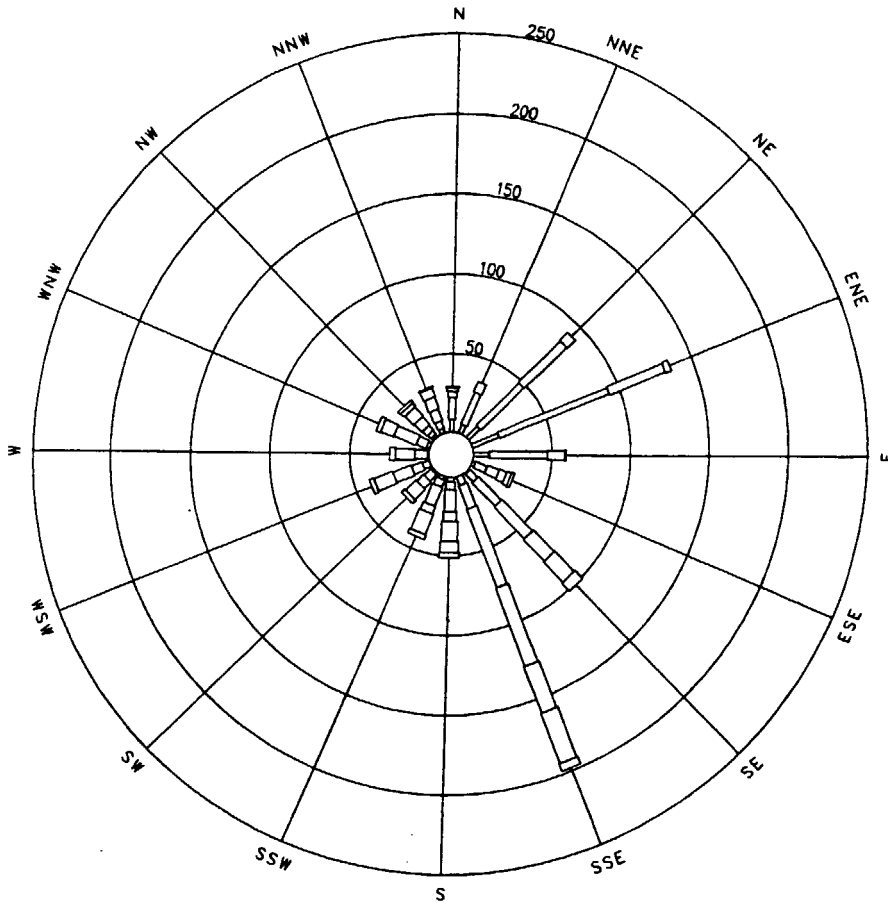
If for example, it is of interest to know the directions for which wind force 5 Beaufort have occurred this month, one has to look at the line for 5 Beaufort in the table.

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.

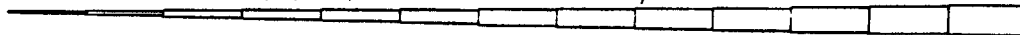
The frequencies in the table are given per thousand (Prm) of the data available this month.

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 DEC 1993 WIND DISTRIBUTION 10 M



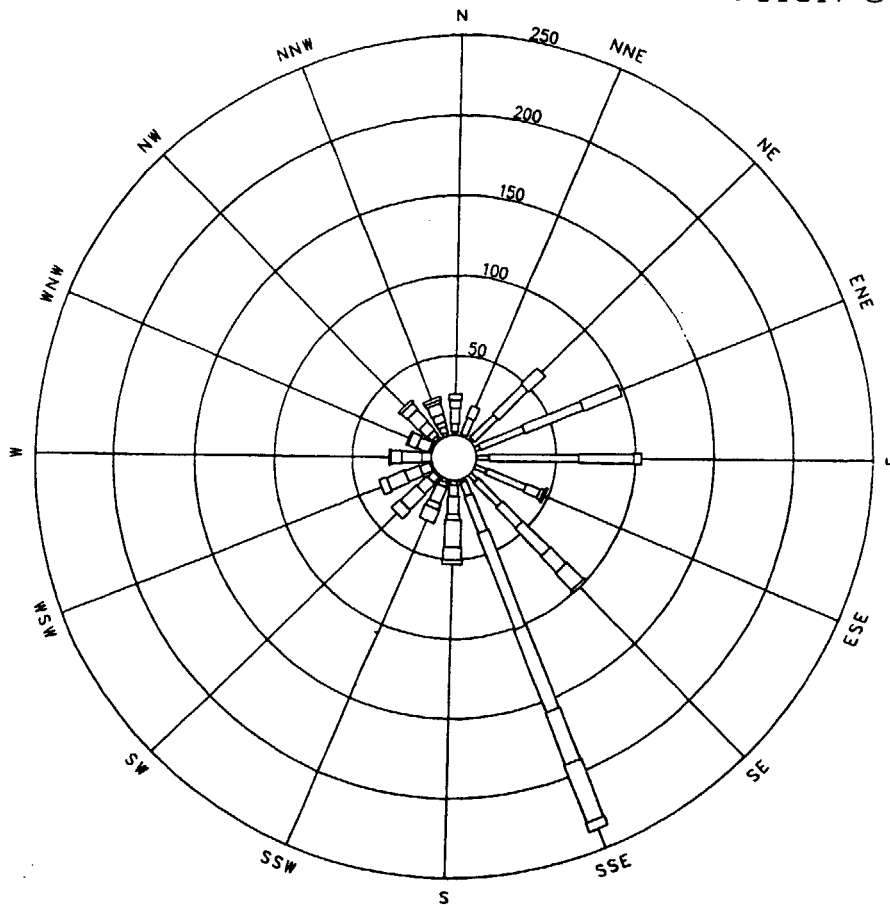
LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
 WIDTH = SPEED (M/S / BEAUFORT SCALE)



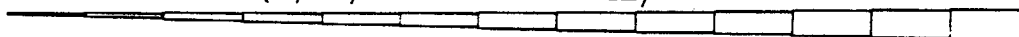
Wind direction (DD) / Wind speed (Beaufort and m/s) 10 m above the ground.

m / s	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	
0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.2	1	8	6	10	18	10	2	1	0	0	0	0	0	0	0	2	3	66
1.5	2	14	22	38	75	37	8	7	6	3	2	1	5	1	2	3	5	236
3.3	3	4	7	37	38	11	8	21	16	5	5	6	7	8	7	4	8	199
5.4	4	2	0	7	4	1	5	28	53	14	13	6	12	12	15	7	8	194
7.9	5	1	.	.	.	.	3	19	53	6	5	9	13	4	9	8	6	139
10.7	6	.	.	.	.	.	2	18	31	13	14	3	3	0	3	3	1	96
13.8	7	.	.	.	.	.	.	7	34	7	3	.	.	.	0	2	0	55
17.1	8	.	.	.	.	.	.	0	5	3	.	.	.	.	.	.	.	9
20.7	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL		31	36	94	136	60	31	103	202	54	44	28	42	28	38	31	35	1000

HANOYTANGEN DEC 1993 WIND DISTRIBUTION 30 M



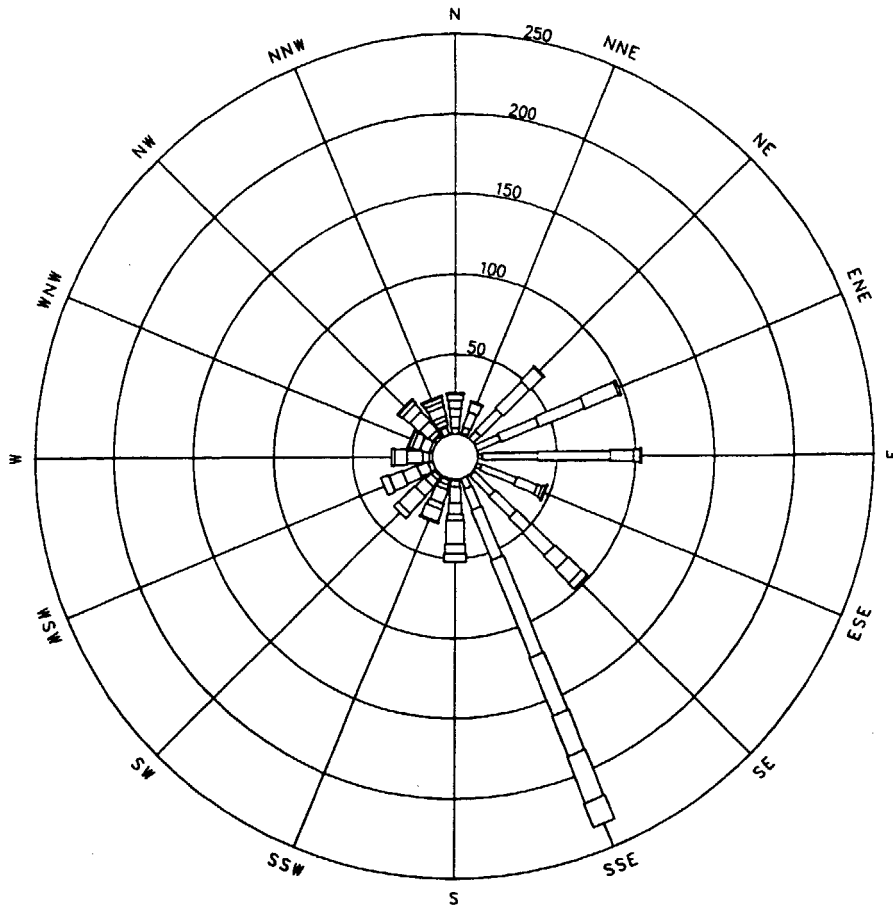
LENGTH : (NUMBER OF OBS/NUMBER OF DATA) * 1000
 WIDTH = SPEED (M/S / BEAUFORT SCALE)



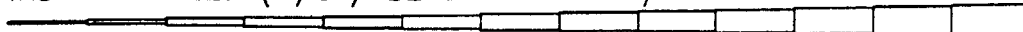
Wind direction (DD) / Wind speed (Beaufort and m/s) 30 m above the ground

m / s	Be- au- fo- rt	DD																ALL
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
		Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	Prc	
0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.2																		
1	2	1	2	3	8	8	6	2	0	0	0	0	0	0	1	2	43	
1.5																		
2	5	11	20	30	56	27	21	9	3	2	1	1	0	1	2	4	201	
3.3																		
3	10	8	26	39	35	9	18	25	7	3	5	7	6	1	4	3	214	
5.4																		
4	5	0	14	26	5	2	24	65	11	11	9	10	13	8	7	5	221	
7.9																		
5	4	.	0	0	0	1	14	56	4	4	14	12	7	7	10	7	146	
10.7																		
6	.	.	.	.	.	1	15	35	17	9	7	5	1	1	5	2	102
13.8																		
7	.	.	.	.	.	.	2	39	8	0	.	0	.	0	2	2	57
17.1																		
8	.	.	.	.	.	.	0	6	3	0	0	0	.	0	0	0	11
20.7																		
9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24.4																		
10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
28.4																		
11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
32.6																		
12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	29	23	63	101	105	50	104	240	57	33	39	39	29	20	34	28	1000	

HANOYTANGEN DEC 1993 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	
	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	Pcm	
0-.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0.3-1.5	0	1	0	0	3	3	1	0	.	0	.	0	.	.	.	.	11
1.6-3.3	4	4	6	16	35	24	18	7	1	1	1	0	0	0	2	5	132
3.4-5.4	7	10	19	26	46	14	18	14	4	3	3	3	2	0	1	1	178
5.5-7.9	5	6	23	31	15	3	13	34	10	3	5	7	4	2	3	3	176
8.0-10.7	5	1	12	23	4	2	20	66	7	9	8	10	10	6	7	3	200
10.8-13.8	4	.	1	2	1	0	11	39	4	4	14	9	8	5	8	6	125
13.9-17.1	1	.	.	.	.	1	12	27	15	8	4	5	2	2	6	3	91
17.2-20.7	.	.	.	.	.	.	5	31	6	1	0	0	0	1	3	3	53
20.8-24.5	.	.	.	.	.	.	0	16	5	0	.	0	.	.	1	1	26
24.5-28.4	.	.	.	.	.	.	.	0	0	.	.	.	.	.	0	0	2
28.5-32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
> 32.6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALL	29	23	63	102	105	50	103	240	56	33	39	38	29	19	34	28	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 0.05 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 (1.775-1.824). 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 DECEMBER 1993

QUOTIENT F30/F18

F30/F18 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75		18	18	0.41	0.41
0.80		16	34	0.36	0.77
0.85		27	61	0.61	1.38
0.90	*	45	106	1.02	2.40
0.95	*****	414	520	9.39	11.79
1.00	*****	1847	2367	41.87	53.66
1.05	*****	727	3094	16.48	70.14
1.10	*****	478	3572	10.84	80.98
1.15	****	297	3869	6.73	87.71
1.20	****	286	4155	6.48	94.20
1.25	**	153	4308	3.47	97.66
1.30	*	44	4352	1.00	98.66
1.35		16	4368	0.36	99.03
1.40		12	4380	0.27	99.30
1.45		7	4387	0.16	99.46
1.50		5	4392	0.11	99.57
1.55		2	4394	0.05	99.61
1.60		2	4396	0.05	99.66
1.65		5	4401	0.11	99.77
1.70		2	4403	0.05	99.82
1.75		0	4403	0.00	99.82
1.80		8	4411	0.18	100.00

HANØYTANGEN DECEMBER 1993

QUOTIENT F30/F10

F30/F10 Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0.75	*	28	28	0.63	0.63
0.80		11	39	0.25	0.88
0.85		22	61	0.50	1.38
0.90	**	84	145	1.90	3.29
0.95	*****	651	796	14.76	18.05
1.00	*****	1240	2036	28.11	46.16
1.05	*****	288	2324	6.53	52.69
1.10	*****	398	2722	9.02	61.71
1.15	*****	467	3189	10.59	72.30
1.20	*****	319	3508	7.23	79.53
1.25	*****	252	3760	5.71	85.24
1.30	*****	232	3992	5.26	90.50
1.35	***	153	4145	3.47	93.97
1.40	*	71	4216	1.61	95.58
1.45	*	55	4271	1.25	96.83
1.50	*	45	4316	1.02	97.85
1.55		22	4338	0.50	98.35
1.60		17	4355	0.39	98.73
1.65		16	4371	0.36	99.09
1.70		6	4377	0.14	99.23
1.75		6	4383	0.14	99.37
1.80	*	28	4411	0.63	100.00

HANØYTANGEN DECEMBER 1993

QUOTIENT F18/F10

F18/F10 Midpoint	Freq	Cum. Freq	Percent	Cum. Percent	
0.75	7	7	0.16	0.16	
0.80	10	17	0.22	0.38	
0.85	7	24	0.16	0.54	
0.90	24	48	0.54	1.08	
0.95	*****	406	454	9.09	10.17
1.00	*****	1930	2384	43.23	53.39
1.05	*****	787	3171	17.63	71.02
1.10	*****	571	3742	12.79	83.81
1.15	*****	343	4085	7.68	91.49
1.20	**	156	4241	3.49	94.98
1.25	*	96	4337	2.15	97.13
1.30	*	62	4399	1.39	98.52
1.35	*	38	4437	0.85	99.37
1.40		17	4454	0.38	99.75
1.45		6	4460	0.13	99.89
1.50		1	4461	0.02	99.91
1.55		1	4462	0.02	99.93
1.60		1	4463	0.02	99.96
1.65		1	4464	0.02	99.98
1.70		0	4464	0.00	99.98
1.75		0	4464	0.00	99.98
1.80		1	4465	0.02	100.00

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

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	1993	11	24	23	29	645	7.11	66.94	159.25	7.26	9.05	7.41	9.35	160.99	3.70	56.42	1021.79
2	1993	11	26	2	39	645	10.25	3.68	152.62	11.37	15.62	11.52	15.92	147.38	3.43	74.66	1023.82
3	1993	11	26	23	19	645	5.32	64.26	161.34	5.25	6.07	5.32	6.07	172.51	4.61	78.30	1033.62
4	1993	11	29	4	19	645	5.03	0.40	145.64	5.17	6.67	5.32	6.67	137.96	0.52	68.58	1031.26
5	1993	11	29	13	59	645	9.95	0.40	171.46	6.44	9.05	6.67	9.05	182.28	0.61	67.77	1027.71
6	1993	12	2	8	59	645	64.63	6.07	151.22	12.04	14.13	12.26	14.42	157.50	3.15	81.95	989.32
7	1993	12	2	10	19	645	6.82	27.85	148.43	11.29	14.72	11.44	15.02	139.70	3.79	82.66	989.49
8	1993	12	4	20	9	645	5.99	0.40	265.34	5.47	7.26	4.88	6.96	261.16	5.89	60.27	993.21
9	1993	12	17	8	19	645	1.74	9.35	150.17	7.93	9.65	8.08	9.95	156.46	2.06	82.36	986.78
10	1993	12	17	16	19	645	18.38	5.03	170.07	6.07	7.26	6.22	7.56	164.13	4.43	83.57	991.35
11	1993	12	17	16	29	645	57.77	57.77	191.70	5.77	6.67	5.92	6.96	192.75	4.61	82.76	991.35
12	1993	12	17	16	39	645	6.96	40.16	185.77	5.10	6.07	5.25	6.37	193.80	4.80	80.33	991.52
13	1993	12	17	16	49	645	52.99	18.30	169.37	5.25	6.37	5.32	6.37	169.72	4.89	80.33	991.52
14	1993	12	17	16	59	645	3.98	0.92	185.42	5.99	7.56	6.14	7.86	182.98	4.70	79.92	991.52
15	1993	12	17	17	9	645	36.28	9.80	180.89	6.37	7.56	6.52	7.56	189.26	4.80	79.52	991.52
16	1993	12	17	17	19	645	9.65	58.59	189.26	6.52	7.86	6.67	7.86	195.54	4.61	80.33	991.86
17	1993	12	17	17	29	645	38.67	29.20	194.50	6.89	9.05	7.11	9.35	190.66	4.61	80.53	991.86
18	1993	12	17	17	39	645	0.47	67.32	173.21	6.22	8.16	6.37	8.46	175.65	4.80	81.55	991.69
19	1993	12	17	17	49	645	36.28	7.64	164.13	5.70	6.96	5.92	7.56	158.20	4.61	82.36	992.03
20	1993	12	17	17	59	645	0.47	38.67	177.40	7.04	11.14	7.34	11.14	171.46	4.34	82.76	991.86
21	1993	12	17	18	9	645	0.55	38.74	164.13	6.89	8.16	7.11	9.05	157.15	4.52	82.76	991.86
22	1993	12	17	18	19	645	0.55	48.14	152.27	8.38	12.63	8.38	11.74	149.13	4.43	81.85	991.69
23	1993	12	17	18	29	645	67.32	38.67	173.91	7.56	10.55	7.64	10.84	183.68	4.43	81.95	991.86
24	1993	12	17	18	39	645	1.59	0.47	236.73	7.79	11.44	7.86	11.44	235.33	5.71	83.06	992.03
25	1993	12	17	18	49	645	29.27	57.92	247.89	10.10	14.42	9.43	13.53	241.61	5.07	79.72	992.36
26	1993	12	17	18	59	645	10.10	48.29	244.75	9.35	12.93	8.31	11.74	243.71	4.89	80.33	992.53
27	1993	12	17	19	9	645	29.94	67.47	236.38	9.80	14.42	8.68	13.53	243.36	4.80	76.99	992.53
28	1993	12	17	19	19	645	19.72	57.84	209.85	11.44	14.13	10.84	13.83	218.58	4.70	78.30	992.53
29	1993	12	17	19	29	645	29.12	29.12	195.89	8.76	12.34	8.83	12.04	202.52	5.07	81.85	992.70
30	1993	12	17	19	39	645	19.72	19.72	232.54	9.13	12.63	9.05	12.63	244.75	5.34	83.47	992.53
31	1993	12	17	19	49	645	31.51	10.17	227.30	11.22	14.13	10.40	12.63	236.03	5.62	81.95	992.53
32	1993	12	17	19	59	645	19.80	48.37	234.28	10.99	14.13	9.87	13.53	238.12	5.71	81.44	992.70
33	1993	12	17	20	9	645	67.47	48.37	246.50	11.81	14.72	10.47	13.83	248.59	5.80	80.33	993.04
34	1993	12	17	20	19	645	57.99	22.11	241.26	10.99	13.83	9.80	12.93	247.20	5.71	80.23	993.21
35	1993	12	17	20	29	645	29.27	19.72	236.38	9.95	13.83	9.05	12.34	241.96	5.53	80.33	993.21
36	1993	12	17	20	39	645	57.92	19.65	237.07	10.84	14.72	9.65	13.23	253.13	5.71	81.04	993.55
37	1993	12	17	20	49	645	48.74	43.52	234.28	10.99	14.13	9.72	13.23	245.80	5.99	79.01	993.72
38	1993	12	17	20	59	645	26.88	29.27	244.75	10.40	13.53	9.13	12.34	245.45	5.80	79.32	993.89
39	1993	12	17	21	9	645	20.77	0.55	237.42	10.84	13.23	9.35	11.74	248.94	5.89	78.71	994.06
40	1993	12	17	21	19	645	10.32	1.89	236.38	10.02	12.34	8.83	11.44	234.63	5.89	79.01	994.22
41	1993	12	18	21	59	645	2.71	16.51	195.19	12.41	16.51	12.41	16.22	198.34	8.10	86.31	977.31
42	1993	12	20	2	49	645	14.05	37.40	335.49	13.53	19.20	12.63	19.50	312.81	0.07	68.17	984.59
43	1993	12	20	3	59	645	30.91	29.27	319.09	13.23	17.11	12.34	16.81	303.04	0.25	61.69	984.92
44	1993	12	20	4	9	645	38.74	48.29	308.62	11.14	14.72	10.47	14.72	306.53	0.25	62.50	985.09
45	1993	12	20	4	19	645	19.50	57.99	297.80	11.89	20.69	11.22	20.99	305.83	-0.83	71.82	985.43
46	1993	12	20	4	29	645	0.62	46.06	279.65	14.05	20.99	13.53	20.69	300.24	-0.56	73.64	985.26
47	1993	12	20	4	39	645	48.44	10.10	288.03	13.08	19.80	13.01	20.99	281.40	0.07	63.72	984.92
48	1993	12	20	4	49	645	29.34	29.27	329.91	13.53	18.30	13.01	18.30	321.88	-0.29	67.36	985.09
49	1993	12	20	4	59	645	38.74	29.20	341.43	10.25	16.22	9.72	16.22	334.79	-0.47	73.24	985.43
50	1993	12	20	5	9	645	0.55	48.29	326.42	8.61	13.83	8.01	12.34	308.27	-0.11	73.04	985.43

RECORDS WITH PARAMETERS OUTSIDE THE CRITERIONS

OBS	AAR	MND	DAG	TIME	MIN	REF	F30	G30	DD30	F18	G18	F10	G10	DD10	T	UU	P
51	1993	12	20	5	19	645	67.69	29.27	315.25	11.37	15.02	10.69	16.22	305.83	-0.38	66.35	985.77
52	1993	12	20	5	29	645	57.84	29.27	306.18	11.07	15.02	10.47	14.13	295.36	-0.38	69.39	985.77
53	1993	12	20	5	39	645	10.10	38.74	315.25	9.50	12.34	8.76	12.04	317.69	-0.56	72.43	985.77
54	1993	12	20	5	49	645	5.25	1.89	301.29	8.90	11.74	8.53	12.63	289.08	-0.65	75.26	985.94
55	1993	12	21	8	52	645	6.14	16.81	254.87	11.74	16.22	10.55	15.02	249.99	4.34	74.25	981.88
56	1993	12	22	23	29	645	2.79	0.40	145.64	5.32	6.67	5.40	6.67	144.24	0.70	79.42	983.06
57	1993	12	24	2	9	645	4.58	55.90	54.90	3.91	5.47	3.46	5.17	54.55	-2.99	71.82	994.22
58	1993	12	29	4	0	645	30.24	2.34	91.19	5.03	6.96	4.58	6.67	69.21	0.16	57.23	1001.02
59	1993	12	29	4	10	645	39.34	67.32	109.69	4.65	5.77	4.20	5.77	77.58	0.34	56.42	1002.85
60	1993	12	29	4	20	645	10.10	57.77	125.05	3.98	5.77	3.83	5.77	77.58	0.07	57.44	1002.85
61	1993	12	29	4	30	645	48.22	19.57	132.72	3.23	5.47	3.01	4.58	105.15	0.43	58.85	1002.68
62	1993	12	29	4	40	645	36.28	7.26	143.19	5.03	6.67	5.03	6.37	148.43	1.07	56.83	1002.68
63	1993	12	29	4	50	645	72.09	23.15	140.40	5.85	7.26	5.99	7.56	132.37	1.07	55.41	1002.17
64	1993	12	29	5	0	645	67.32	67.32	142.84	6.07	7.56	6.07	7.26	144.59	0.88	54.40	1002.00
65	1993	12	29	5	10	645	9.35	40.98	139.01	5.85	6.67	5.92	6.96	143.89	1.07	57.84	1002.17
66	1993	12	29	5	20	645	67.32	67.39	148.08	5.92	6.96	5.99	6.96	137.61	0.70	55.61	1002.00
67	1993	12	29	5	30	645	59.11	38.82	130.63	6.22	7.56	6.29	7.26	125.05	0.70	54.80	1001.66
68	1993	12	29	5	40	645	57.77	67.32	127.84	6.07	7.56	6.14	7.26	129.93	0.61	55.41	1001.50
69	1993	12	29	5	50	645	57.77	57.77	141.45	5.70	6.96	5.85	7.26	140.40	0.52	55.21	1001.50
70	1993	12	29	6	0	64											