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ENVIRONMENTAL DATA GULLFAKS C. ANNUAL SYNTHESIS/ANALYSIS 1996

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SUMMARY

The history of the environmental data system at Gullfaks C is presented very shortly. The system of to day is described with regard to the main environmental parameters. The performance in 1996 is described. The measurements of the main environmental parameters in 1996 are summarised. Frequency tables for wind speed /wind direction and significant wave height (Hs)/wave period(Tz) are computed. Probability values for different return periods are computed for wind speed and significant wave height based on the combined data series from Statfjord A and Gullfaks C.

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GULLFAKS C

ANNUAL SYNTHESIS/ANALYSIS 1996

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1. Introduction

This report is a summary of the environmental conditions recorded at the Gullfaks C platform during 1996. The data has been recorded by Statoil a/s , the operator of the Gullfaks field.

Oceanographic and meteorological data has been measured since November 1989 at Gullfaks C giving information of the environmental conditions the platform are influenced by. The regularity of the recording system was variable in the beginning. The data reported from the platform were in periods actually measured at platform Statfjord A. The storing system for the instrumental data was operational in November 1990 but December 1990 is the first one with data coverage near 100 %. Until December 1992 the EMS system archived hourly values and data was transferred to DNMI in the data format DF005. In December 1992 the format was changed to DF015 and later to DF022. From December 1992 values are recorded each 20 minute.

The collection of environmental data related to the oil activity is specified in the "Acts, regulations and provisions for the petroleum activities" issued by the Norwegian Petroleum Directorate.

The environmental data are collected in order to :

- Judge the safety of the installations
- Determine the long-term effects of the environment on the structures
- Improve construction requirements
- Help to plan field operations.

Three hourly weather reports are produced routinely and submitted to DNMI in the form of a coded message (SYNOP/SHIP message). The SHIP messages are important for the weather

forecasting system. The three hourly weather reports are also stored at DNMI in the general archive serving Climatological purposes.

At Gullfaks C the complete set of parameters available in the EMS are stored each 20 minute. Each month these data are retrieved from the system and copied to a streamer tape. The streamer tape is sent to MIROS a/s where the data are checked. Quality controlled data are on a monthly basis sent to DNMI together with a report. The parameters available in the complete DF022 format is given in Appendix A.

The data controlled by MIROS a/s are the basis for this annual synthesis report. It is an established practice that the first permanent platform in a new area is instrumented to record the environmental conditions. In the Statfjord/Gullfaks region this responsibility was first given to the platform Statfjord A. From this site measurements started in 1978. The reporting of environmental data from the area was transferred to the platform Gullfaks C in November 1989. Gullfaks C was from this time established as an operational centre for the helicopter traffic in the area.

2. The data collecting system (GFC-EMS)

2.1 Instrumentation

The EMS is delivered by MIROS A/S and all parameters regarding waves are measured by a MIROS wave radar. The meteorological parameters are measured by instruments from other firms. The different instruments are interfaced to the EMS with an exception for the sea temperature. This parameter is measured by personnel on board the stand by vessel each 3 hour and reported to the platform.

The main environmental parameters are measured with the following sensors :

WIND SENSORS

Manufacturer	Vaisala
Type	Wind speed and wind direction sensors
Model	WAA 15 and WAW 15
Range	0-75 m/s 0-360 °
Location B	Top of derrick 142.5 m above mean sea l. (SHIP message)
Location A	Top of antenna tower 99 m above mean sea l. (METAR)

AIR TEMPERATURE SENSOR

Manufacturer	Vaisala
Type	Platinum Resistance Element
Model	DTS 12
Range	-100 - +100 °C
Location	Top of the module LQ-L13 73 m above mean sea l.

AIR HUMIDITY SENSOR

Manufacturer	Vaisala
Type	Humicap
Model	HMP 30U
Range	0 - 100 % RH
Location	Top of the module LQ-L13 73 m above mean sea l.

AIR PRESSURE SENSOR

Manufacturer	Vaisala
Type	Vaisala aneroid
Model	PA 21
Range	500 - 1060 hPa
Location	77.5 m above mean sea l.

WAVE SENSOR

Manufacturer	MIROS a/s	
Type	MIROS Wave Radar	
Model	SH-001/03, CP-6506 (From 18.12.96 MIROS Mk.2 type no. SM-001)	
Location	SW corner of the platform 69 m above mean sea l.	
Range	Max. wave height	0-40 m
	Signif. wave height	0-20 m
	Period, mean and peak	3-30 s
	Direction, mean	0-360 °
	Direction, spread	15-90 °

2.2 Performance and data coverage

Personell from DNMI visited Gullfaks C 10-11 September on behalf of The Norwegian Petroleum Directorate (NPD). They found all sensors performing well inside the conditions prescribed by the NPD regulations.

The data coverage in 1996 for the main parameters are given in table 2.1. As mentioned above, the sea temperature (T_w) is measured by the personnel of the stand by vessel and reported from Gullfaks C to DNMI on a 3 hourly basis in the SYNOP-SHIP message. The data coverage is near 100 % throughout the year for this parameter. All the other parameters are logged in the GFC-EMS system each 20 minute. The data coverage for these parameters vary through the year. The wind parameters have a coverage near 100 % while the wave parameters have a more varying coverage. In December wave data is missing for the period 3-17 due to a replacement of the wave radar with a new type.

Table 2.1 Data coverage in percent for the main parameters at Gullfaks C in 1996.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
T	99,5	96,8	100	99,9	100	100	100	100	100	99,9	100	100	99,7
T_w	98,4	99,6	100	100	97,6	100	99,1	99,6	99,6	100	100	99,6	99,5
Hm0	99,2	96,7	99,1	96,9	96,6	89,0	97,5	96,1	93,8	99,0	97,6	46,4	92,3
Hmax	99,2	96,7	99,1	96,9	96,6	89,0	97,5	96,1	93,8	99,0	97,6	46,4	92,3
FF	99,5	96,8	100	99,9	100	100	100	100	100	99,9	100	100	99,7
FG	99,5	96,8	100	99,9	100	100	100	100	100	99,9	100	100	99,7

3. Special weather events in 1996

In the period 1980-1994 there are about 12 events recorded in the Statfjord/Gullfaks area where the significant wave height was 10 m or higher. The criterion "significant wave height ≥ 10 m" has been applied to determine weather events of some interest. In 1995 there were 6 different situations where the criterion is fulfilled. This is the highest number of events of this kind for a single year in the record.

In 1996 there are only one weather event with significant wave heights above 10 m. On this occasion the significant wave height was above 9m from 11 March 1840 GMT until 12 March 1940 GMT. Most of the time the values stayed above 10 m with 11.9 m as a maximum for H_{m0} 1100 GMT on the 12. Estimate for H_{max} was 18.5 m at the same time. Weather maps valid for 12 UTC 11 and 12 March are presented in Figure 3.1 and 3.2. The weather situation is dominated by a depression North-west of Iceland and a high pressure system with centre over the Northern part of Finland. This results in strong southerly wind in the Statfjord and other parts of the North Sea.. The direction is very stable from South during this period. Conditions for wave growth is therefore favourable. Wind speed is given in Figure 3.3 and H_{m0} and H_{max} are given in fig 3.4.

On 17 of February another weather event occurred worth mentioning. At this time swell with period of approximately 22 seconds propagated into the Northern part of the North Sea from a storm area in the Atlantic Ocean. The weather situation and wave conditions are documented in a report by Rasmus Myklebust (VPV01/96)

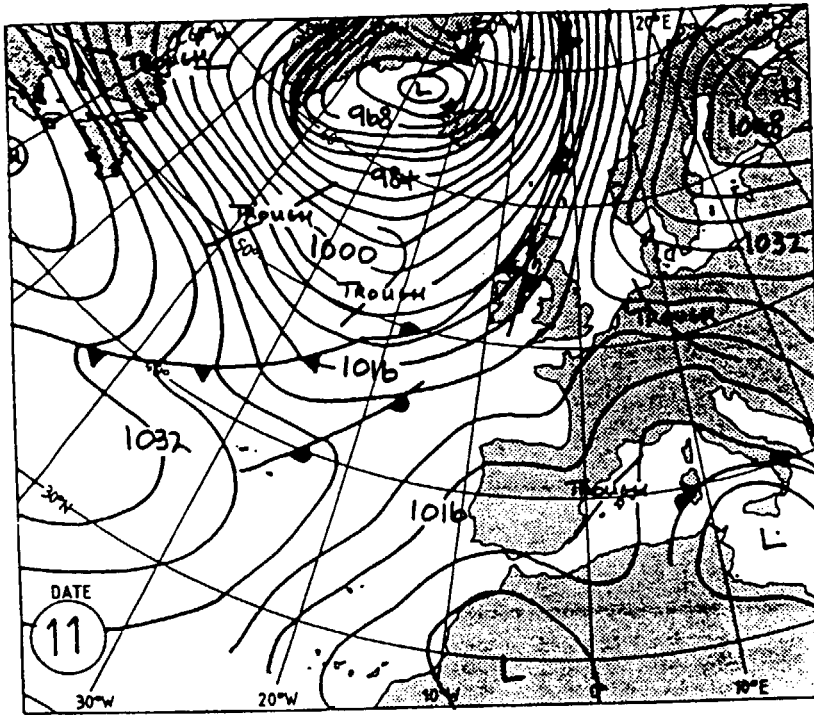


Figure 3.1 Weather map valid for 12 UTC March 11, 1996.

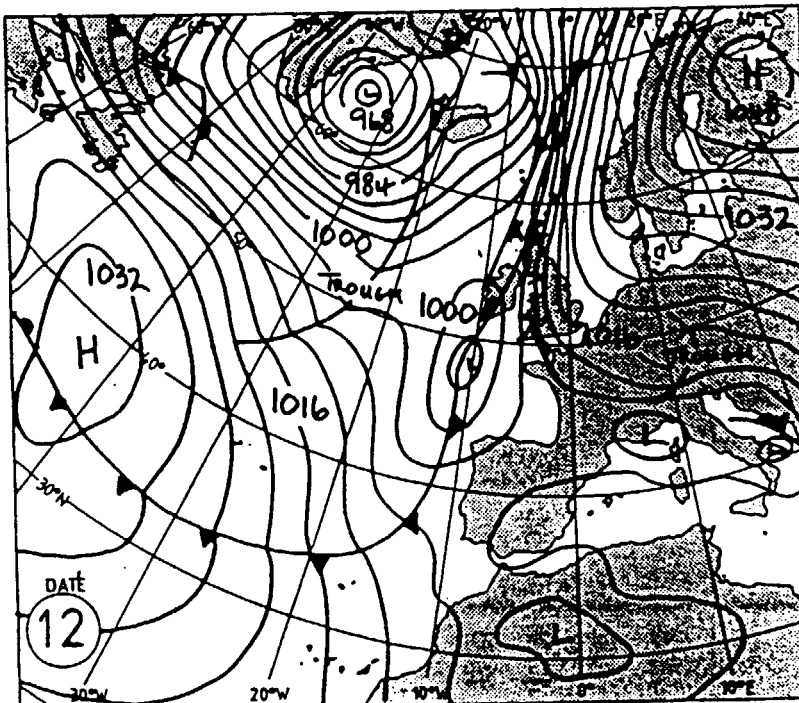


Figure 3.2 Weather map valid for 12 UTC March 12, 1996.

GULLFAKS C 1996

Wind speed (m/s) measured in top of derrick reduced to 10 m o.m.s.l.
(10 min mean)

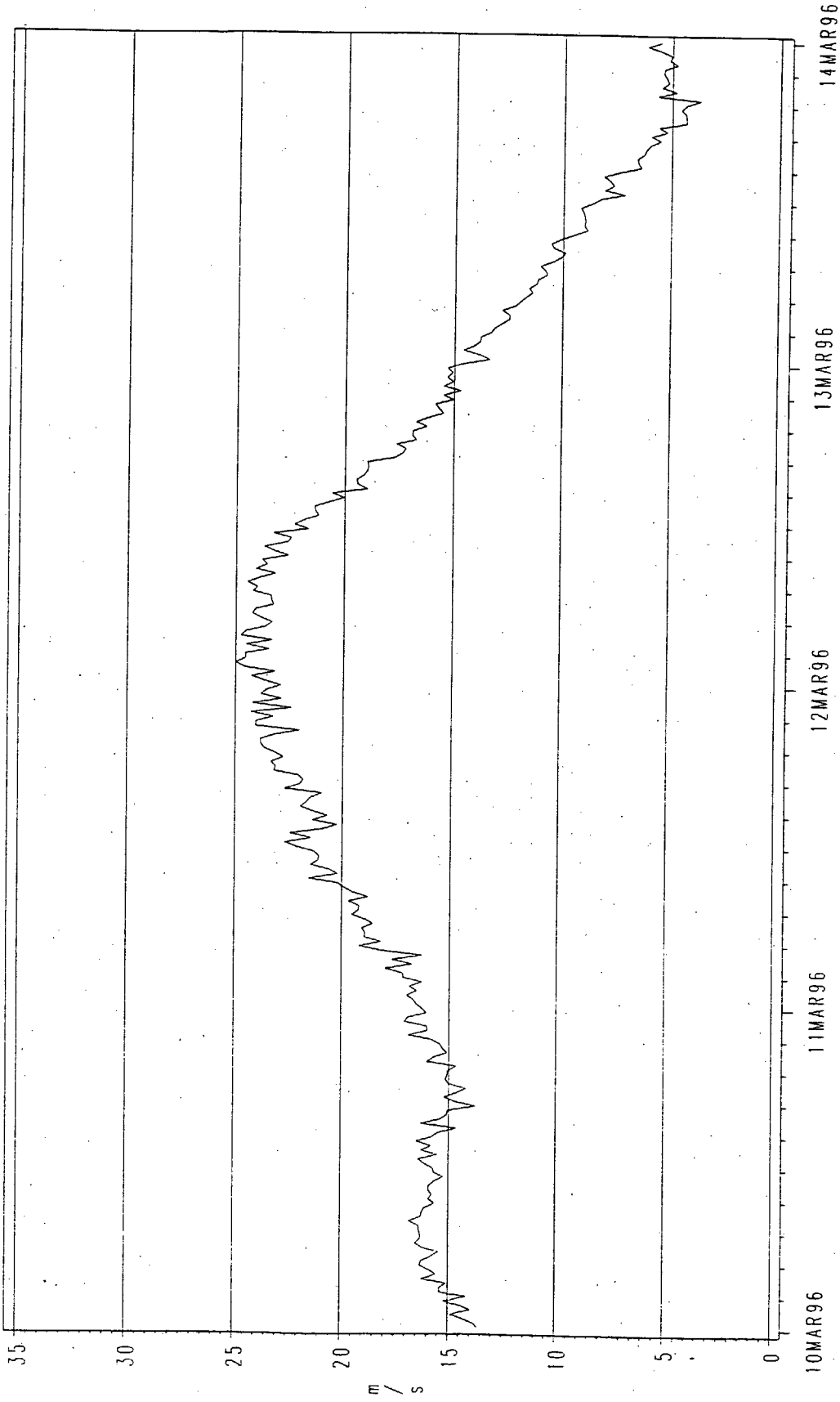


Figure 3.3 Wind speed 10-14.3.1996.

GULLFAKS C 1996

Hmo and Hmax measured at Gullfaks C by a MIROS Wave radar

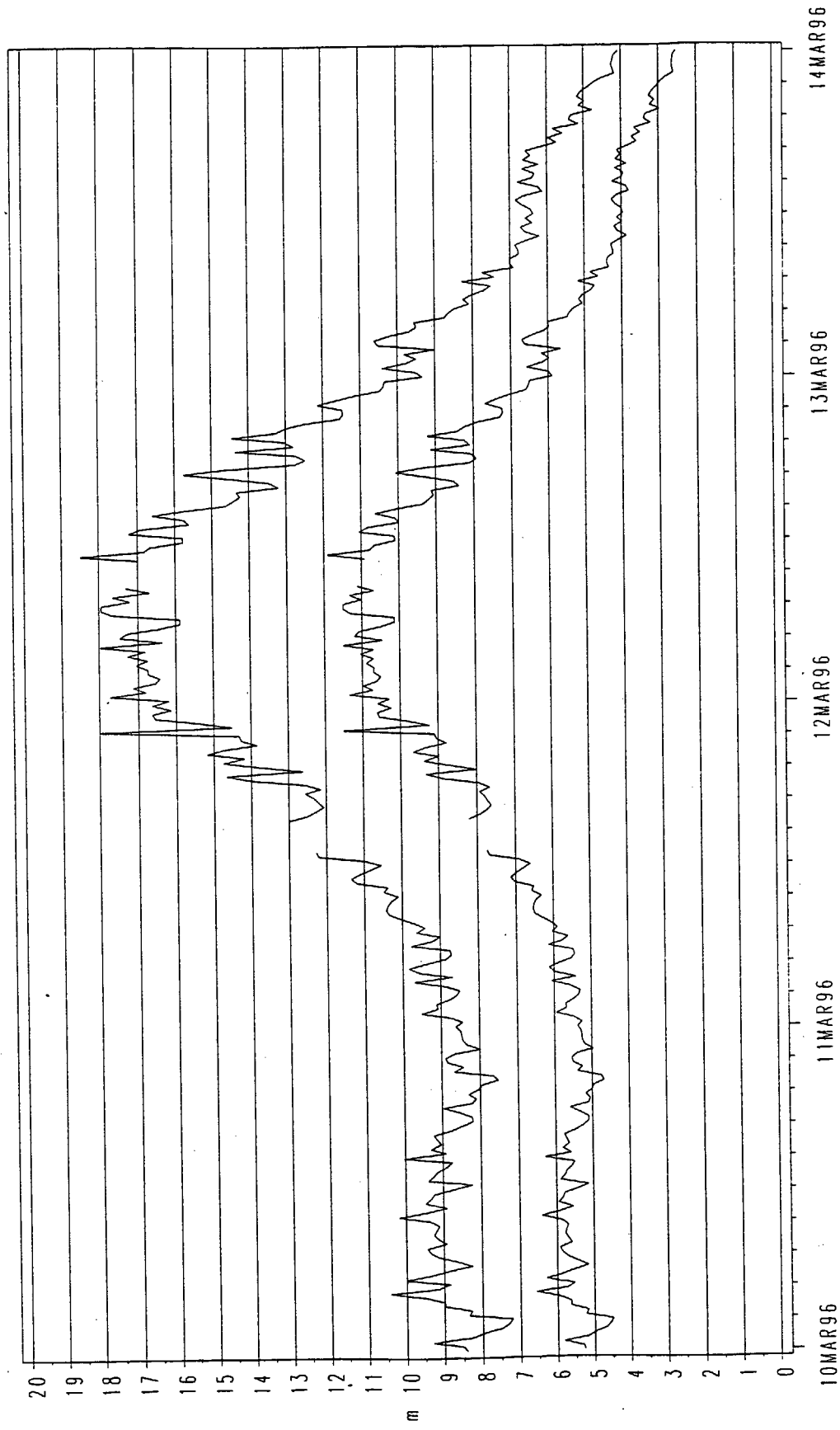


Figure 3.4 Wave height (Hmo and Hmax) 10-14.3.1996.

4. Results

4.1 Climatological summary Gullfaks C 1996

A short summary of the main parameters measured at Gullfaks C is presented in table 4.1.

The parameters presented are listed below.

- T = Air temperature measured 73 m a.m.s.level
- Tw = Sea temperature measured by the stand by vessel
- U = Air humidity in %
- QFF = Air pressure measured 77,5 m above m.s.l. reduced to m.s.l.
- Hm0 = Estimate of significant wave height
- Hmax = Estimate of maximum wave height
- FF = Wind speed (10 min mean) measured in top of derrick (142 m) and reduced to reference level 10 m a.m.s.lev
- FX = Maximum wind speed (10 min mean) ...
- FG = Gust wind speed (3 sec mean) measured in top of derrick (142 m) and reduced to reference level 10 m a.m.s.l

The reduction coefficient applied both for FF, FX and FG in the GFC-EMS is : $x=(10/142)**0.13=.708$

The reduction coefficient for the gust wind speed (FG) taken equal to the reduction to the 10 min mean wind speed (FF) is not correct. In most cases this will give a to high reduction. The reason that this is not changed is not to introduce inhomogeneities in the archive. It is easy to reconstruct the measured value in the derrick 142 m a.m.s.l. and give it a more correct treatment when needed.

The parameters are stored each 20 minute in the existing system at Gullfaks C. The 10 min mean wind speed (FF) represents the last 10 min of the 20 min period. The maximum of the 10 min mean may have occurred in the period not presented. The maximum 10 min mean of the wind speed (FX) is recorded independently and updated each 3 hour. As can be seen of the table the maximum of FX is thus \geq the maximum of FF.

Table 4.1 Summary of the main parameters measured at Gullfaks C in 1996.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
T													
Max	8.8	8.1	11.2	10.9	12.1	12.8	13.2	21.5	18.1	12.9	11.5	9.3	21.5
Mean	5.3	3.4	4.7	6.5	7.0	9.4	10.8	14.0	12.0	9.8	5.3	5.1	7.8
Min	0.4	-1.6	-2.1	3.3	2.3	7.4	8.2	10.1	8.7	4.0	-0.1	-0.2	-2.1
Cover.	99.5	96.8	100	99.9	100	100	100	100	100	99.9	100	100	99.7
Tw													
Max	9	8.2	8	7.8	8.7	12.8	14.1	14.2	14.6	11.2	9.9	9.6	14.6
Mean	8.5	7.8	7.7	7.2	7.7	10.1	12.3	13.3	13.2	10.5	9.4	8.8	9.7
Min	7.7	6.8	6.9	6.1	6.2	8	11	12.3	10.8	9.6	7.5	6.5	6.1
Cover.	94	99.6	98.4	98.3	96.4	96.3	100	99.2	98.8	99.6	100	99.6	98.3
U													
Max	98	98	98	96	96	97	99	100	100	99	100	100	100
Mean	79	76	69	79	75	87	86	84	83	84	70	76	79
Min	47	33	39	27	42	59	58	39	58	42	45	40	27
Cover.	98.7	96.8	100	99.9	100	100	100	100	100	99.9	97.1	97.5	99.2
QFF													
Max	1039.6	1036.6	1034.8	1030.0	1035.1	1032.3	1031.9	1023.4	1031.4	1018.8	1020.1	1036.3	1039.6
Mean	1018.9	1010.1	1022.3	1014.5	1014.0	1013.9	1011.4	1014.7	1016.8	1004.7	1002.4	1013.0	1013.1
Min	993.7	981.8	999.9	995.7	992.5	996.8	992.7	999.4	982.0	984.6	969.2	984.2	969.2
Cover.	98.7	96.2	99.5	99.7	100	100	99.2	99.0	98.9	98.9	99.1	99.1	99.0
Hm0													
Max	8.6	7.7	11.9	5.8	5.8	5.8	4.0	3.7	7.5	8.0	5.9	7.0	11.9
Mean	3.8	3.9	2.8	2.1	2.0	1.9	1.4	1.4	2.1	3.5	2.7	2.3	2.5
Min	0.6	1.1	0.6	0.5	0.7	0.7	0.5	0.3	0.5	1.4	1.0	0.7	0.3
Cover.	99.2	96.7	99.1	96.9	96.6	89.0	97.5	96.1	93.8	99.0	97.6	46.4	92.3
Hmax													
Max	13.6	12.2	18.5	9.3	9.3	9.3	6.5	6.0	11.9	12.6	9.5	11.0	18.5
Mean	6.1	6.2	4.5	3.4	3.3	3.2	2.3	2.3	3.4	5.6	4.3	3.7	4.1
Min	1.0	1.8	0.9	0.8	1.2	1.1	0.8	0.6	0.8	2.3	1.6	1.2	0.6
Cover.	99.2	96.7	99.1	96.9	96.6	89.0	97.5	96.1	93.8	99.0	97.6	46.4	92.3
FF													
Max	23.1	21.8	25.0	18.1	21.8	17.3	14.0	16.4	23.0	20.5	18.9	20.4	25.0
Mean	10.5	10.6	7.9	7.4	7.8	7.9	6.2	7.7	7.2	10.3	7.6	7.1	8.2
Min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cover.	99.5	96.8	100	99.9	100	100	100	100	100	99.9	100	100	99.7
FX													
Max	23.3	22.1	25.3	18.25	21.8	17.8	14.3	17.2	23.9	20.8	18.9	20.6	25.3
Cover.	99.1	96.6	99.6	99.9	100	100	100	99.8	100	99.9	100	99.5	99.5
FG													
Max	26.6	24.5	27.9	20.0	24.2	19.6	16.3	18.4	26.6	23.8	21.5	23.1	27.9
Mean	13.3	12.2	9.3	8.4	8.9	8.8	7.1	8.4	8.2	11.5	9.0	8.4	10.7
Min	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cover.	99.1	96.8	100	99.9	100	100	100	100	100	99.9	100	100	99.7

4.2 Frequency tables wind speed/wind direction

Environmental data has been measured in the Gullfaks area since 1978. From 1978 until November 1989 the measurements were performed at the platform Statfjord A. The logging of environmental data was operational from 1981. For the period 1978-1980 3 hourly data is available. Below we have based the computations on the combined series from Statfjord A and Gullfaks C covering the period 1981-1996. In doing so hourly values of the parameters have been extracted from the period covered by Gullfaks C.

The reason for this is the change in storing frequency from December 1992. Until November 1992 only hourly values are available both from Statfjord A and Gullfaks C. From December 1992 measurements exist each 20 minute. Without reduction to hourly values the period after December 1992 would have been given too much weight.

The data coverage varies through the period analysed. The year to year variations are presented in figure 4.1. It is seen that data coverage are low in 1988, 1990 and 1992. Statistical parameters of the frequency distribution are given in figure 4.2.

STATFJORD A / GULLFAKS C

Number of measurements of Wind speed

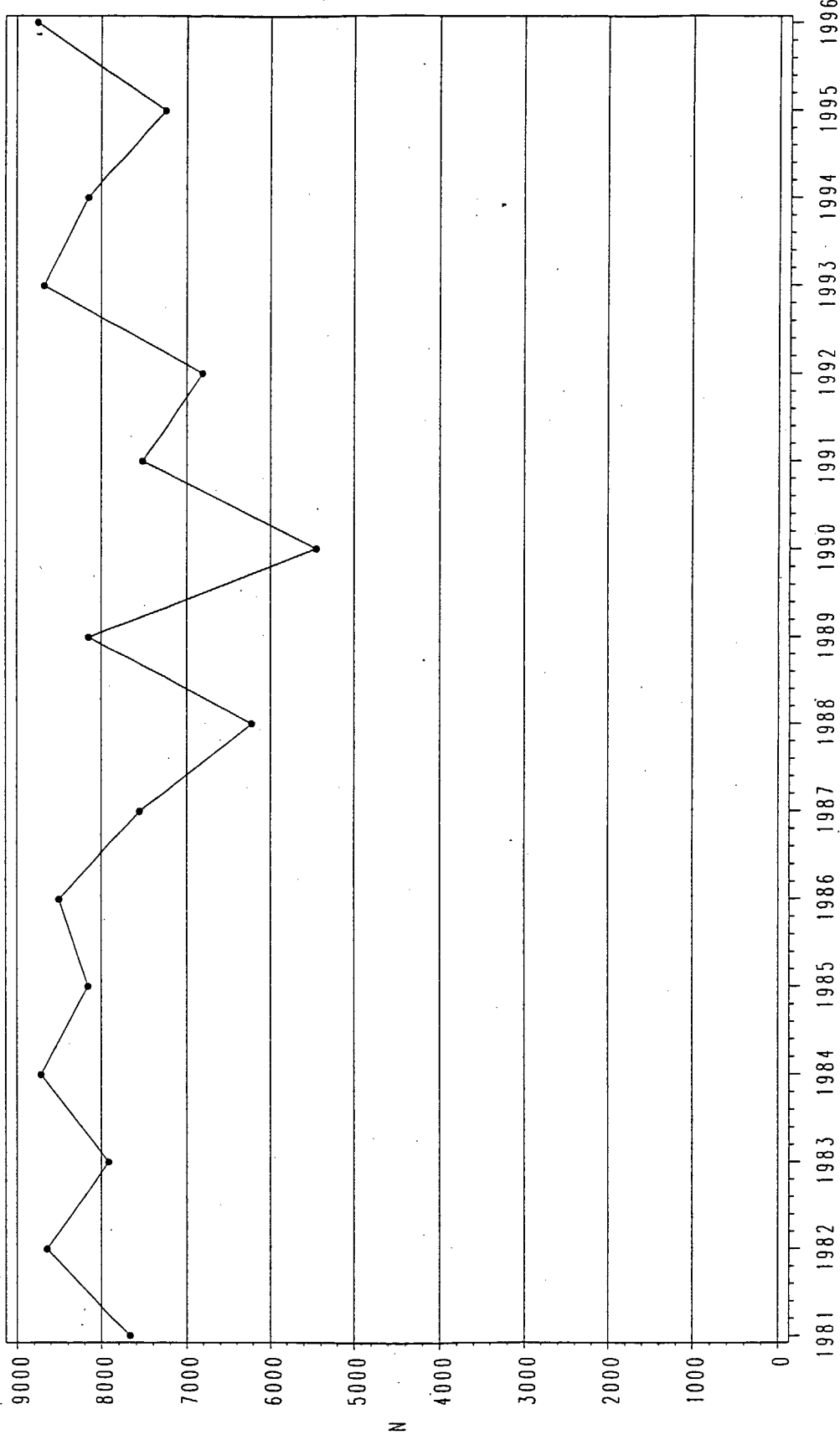


Figure 4.1 Data coverage for wind speed given as number of observations each year. 8760/8784 observations /year represents 100 % coverage.

STATFJORD A /GULLFAKS C

Statistical parameters based on Wind speed 10 m a. m.s.l.

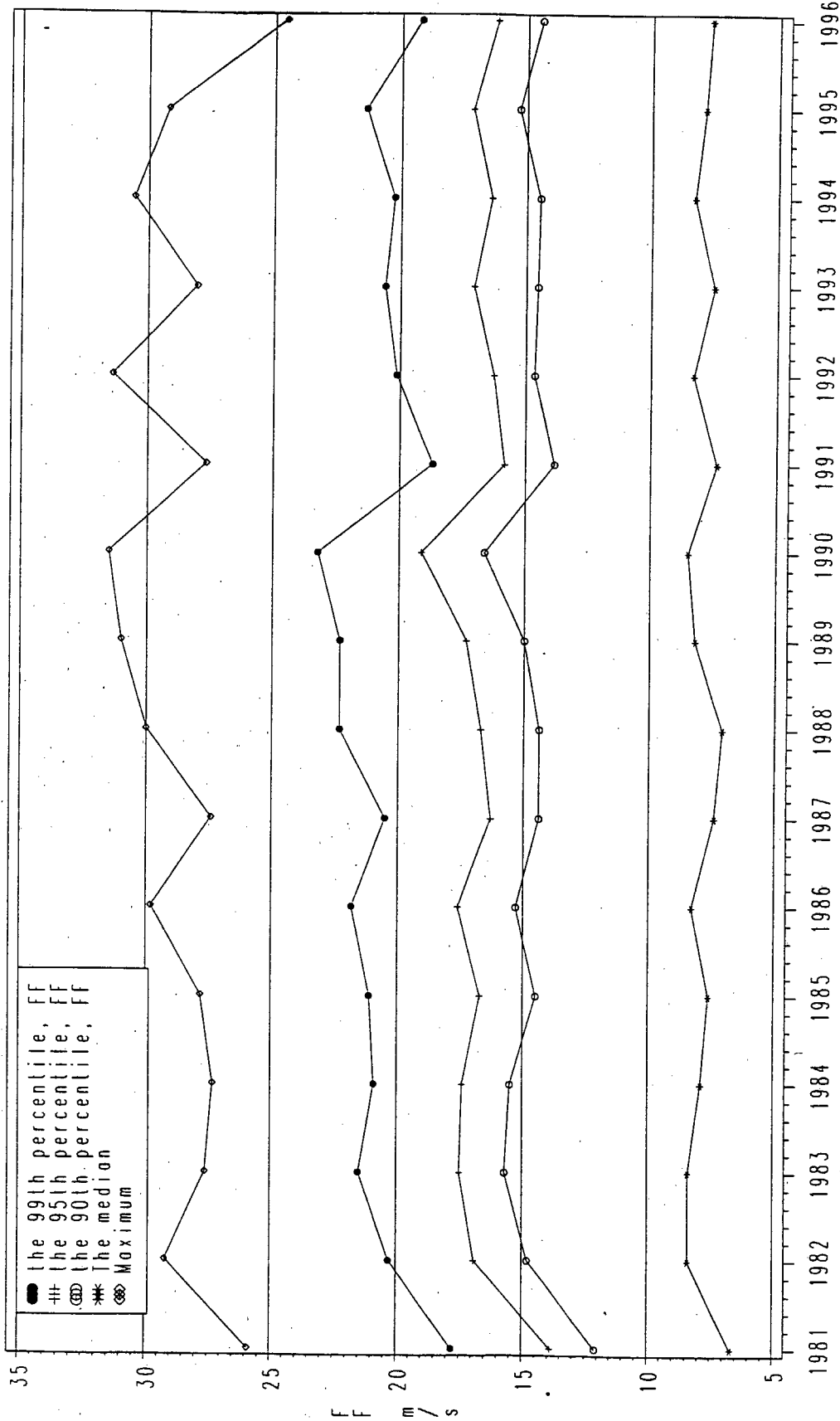


Figure 4.2 Statistical parameters based on the yearly frequency distributions of wind speed. Valid for 10 m a.m.s.l. (Statfjord A/Gullfaks C).

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
January 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<= 1.9	15	13	27	31	16	20	15	22	28	28	65	16	17	69	0.67	
2.0-	3.9	55	42	71	95	44	72	63	99	99	61	65	58	774	7.57	11.03
4.0-	5.9	85	88	99	69	93	101	77	96	96	94	127	91	1102	10.77	21.80
6.0-	7.9	96	127	86	57	48	110	114	129	129	105	106	142	1204	11.77	33.57
8.0-	9.9	156	113	69	38	27	121	179	213	174	117	126	176	1509	14.75	48.32
10.0-	11.9	138	98	23	7	23	106	203	164	153	125	98	143	1281	12.52	60.85
12.0-	13.9	115	88	8	3	15	95	250	241	169	115	66	88	1253	12.25	73.10
14.0-	15.9	76	23	8	2	4	114	297	212	135	107	55	53	1086	10.62	83.71
16.0-	17.9	36	6	4	15	83	252	164	71	49	91	28	38	788	7.70	91.42
18.0-	19.9	13	4	2	10	35	116	77	49	68	9	26	409	4.00	95.42	
20.0-	21.9	5	2	2	20	54	60	51	29	30	7	9	219	2.14	97.56	
22.0-	23.9	1	2	2	20	54	36	20	20	15	3	4	155	1.52	99.07	
24.0-	25.9	1	7	24	11	6	6	6	6	6	6	6	6	54	0.53	99.60
26.0-	27.9	1	1	9	1	4	3	1	4	4	3	3	3	18	0.18	99.78
28.0-	29.9	1	1	8	5	5	4	4	4	4	1	1	1	18	0.18	99.95
>=30.0														4	1	5
Sum		791	596	384	334	280	849	1750	1451	1170	1003	706	846	10229		
Rel.fr.		7.7	5.8	3.8	3.3	2.7	8.3	17.1	14.2	11.4	9.8	6.9	8.3			
Cum.fr.		7.7	13.6	17.3	20.6	23.3	31.6	48.7	62.9	74.3	84.2	91.1	99.3			
Max. FF		22.4	19.6	17.7	19.3	23.3	26.8	29.8	29.5	31.4	29.7	23.4	30.5			
Mean FF		9.8	8.7	6.2	5.1	7.6	11.4	13.1	12.4	11.0	10.9	8.9	9.6			
St.dev. FF		4.1	3.5	3.2	2.8	4.8	5.3	5.3	5.1	5.4	5.8	4.4	4.4			

DATA COVERAGE: 85.9%

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
February 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<= 1.9	21	26	37	31	23	19	9	17	27	18	8	12	248	2.47	2.68	
2.0- 3.9	68	66	76	60	56	59	60	111	116	95	53	64	884	8.80	11.47	
4.0- 5.9	88	100	71	66	74	88	148	166	168	165	93	107	1334	13.28	24.75	
6.0- 7.9	99	92	76	52	24	106	221	234	191	163	101	129	1488	14.81	39.56	
8.0- 9.9	95	68	55	24	18	94	308	287	215	204	102	132	1582	15.74	55.30	
10.0- 11.9	79	40	50	20	44	106	271	223	195	184	74	93	1379	13.72	69.03	
12.0- 13.9	55	34	10	11	18	149	259	162	149	139	48	69	1103	10.98	80.01	
14.0- 15.9	41	19	9	4	18	146	247	114	76	84	36	48	842	8.38	88.39	
16.0- 17.9	22	7	4	.	6	58	209	92	41	48	22	23	532	5.29	93.68	
18.0- 19.9	14	.	1	1	12	46	107	64	33	19	16	18	331	3.29	96.97	
20.0- 21.9	6	.	.	.	2	19	81	36	18	9	2	6	179	1.78	98.76	
22.0- 23.9	1	.	.	.	.	15	20	29	7	4	3	6	85	0.85	99.60
24.0- 25.9	.	.	.	.	.	1	8	13	1	.	1	2	26	0.26	99.86
26.0- 27.9	1	.	.	.	.	.	1	2	2	.	.	.	6	0.06	99.92
28.0- 29.9	.	.	.	.	.	.	.	3	.	.	.	.	1	0.04	99.96
>=30.0	.	.	.	.	.	.	.	1	2	.	.	.	4	0.04	100.00
Sum	590	452	389	269	295	906	1949	1534	1241	1132	559	711	10048			
Rel.fr.	5.9	4.5	3.9	2.7	2.9	9.0	19.4	15.3	12.4	11.3	5.6	7.1				
Cum.fr.	5.9	10.4	14.2	16.9	19.9	28.9	48.3	63.5	75.9	87.2	92.7	99.8				
Max. FF	26.6	17.3	18.0	18.3	21.5	24.2	27.4	30.4	31.5	22.8	25.0	31.0				
Mean FF	8.8	7.2	6.5	5.7	7.6	11.2	11.9	10.5	9.4	9.3	8.9	9.2				
St.dev. FF	4.6	3.7	3.6	3.5	4.9	5.0	4.8	5.2	4.6	4.3	4.4	4.6				

DATA COVERAGE: 92.6%

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
March 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<=	1.9	29	27	23	17	36	22	23	19	19	19	15	29	82	0.78	
2.0-	3.9	92	72	100	65	60	77	79	105	94	93	82	86	1005	9.54	12.96
4.0-	5.9	125	116	127	83	73	111	166	147	121	119	129	86	1403	13.32	26.28
6.0-	7.9	135	90	56	56	84	94	189	198	183	154	103	90	1432	13.60	39.88
8.0-	9.9	120	64	44	32	70	123	264	203	232	186	113	97	1548	14.70	54.58
10.0-	11.9	107	43	43	17	63	95	262	182	187	140	81	123	1343	12.75	67.33
12.0-	13.9	102	28	20	10	54	119	216	219	143	125	60	102	1198	11.38	78.71
14.0-	15.9	69	19	8	11	17	105	229	161	100	74	37	59	889	8.44	87.15
16.0-	17.9	33	13	3	3	9	97	175	116	67	51	22	31	620	5.89	93.04
18.0-	19.9	23	10	.	.	5	71	136	57	33	32	16	14	397	3.77	96.81
20.0-	21.9	13	8	.	.	3	27	91	38	15	11	5	4	215	2.04	98.85
22.0-	23.9	4	3	.	.	3	18	42	12	6	4	2	1	95	0.90	99.75
24.0-	25.9	.	2	.	.	.	1	10	2	1	2	.	1	19	0.18	99.93
26.0-	27.9	.	2	.	.	.	.	1	.	.	.	.	.	3	0.03	99.96
28.0-	29.9	.	2	.	.	.	.	.	.	.	1	.	.	3	0.03	99.99
>=	30.0	.	1	.	.	.	.	.	.	.	.	.	.	1	0.01	100.00
Sum		852	500	424	294	477	960	1883	1459	1201	1011	665	723	10531		
Rel.fr.		8.1	4.7	4.0	2.8	4.5	9.1	17.9	13.9	11.4	9.6	6.3	6.9			
Cum.fr.		8.1	12.8	16.9	19.7	24.2	33.3	51.2	65.0	76.4	86.0	92.4	99.2			
Max. FF		22.7	30.0	17.0	16.9	22.5	24.0	26.6	24.2	24.3	28.0	22.1	24.2			
Mean FF		9.1	7.9	6.2	6.3	8.0	11.1	12.0	10.7	9.9	9.7	8.6	9.2			
St.dev. FF		4.8	5.1	3.4	3.5	4.4	5.4	5.3	4.9	4.4	4.6	4.4	4.6			

DATA COVERAGE: 88.5%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
April 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel.	Cum.			
		15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0	fr.	fr.	fr.			
<= 1.9	68	52	46	20	34	40	43	48	53	Number of calms							28	0.28	
2.0-	182	123	99	150	135	106	143	184	114	120	1596	16.01	21.46	45	41	26	516	5.18	5.46
4.0-	245	199	116	113	100	123	179	190	115	99	109	150	1738	17.43	38.89				
6.0-	216	243	122	72	61	139	213	214	130	104	86	97	1697	17.02	55.91				
8.0-	145	187	73	24	35	105	240	281	183	85	63	88	1509	15.13	71.05				
10.0-	90	152	49	17	19	72	257	210	132	43	73	95	1209	12.13	83.17				
12.0-	70	129	19	11	27	66	187	104	54	35	44	73	819	8.21	91.39				
14.0-	43	115	6	2	8	48	118	44	16	18	14	60	492	4.93	96.32				
16.0-	22	53	2		1	18	65	12	8	3	12	30	226	2.27	98.59				
18.0-	23	32				11	17	3	2	1	6	10	105	1.05	99.64				
20.0-	7				1	4	8	4		2			28	0.28	99.92				
22.0-					1	1	2	2			1			7	0.07	99.99			
24.0-						1								1	0.01	100.00			
26.0-															0	0.00	100.00		
28.0-															0	0.00	100.00		
>=30.0															0	0.00	100.00		
Sum	1111	1285	532	409	422	734	1472	1296	807	534	590	751	9971						
Rel.fr.	11.1	12.9	5.3	4.1	4.2	7.4	14.8	13.0	8.1	5.4	5.9	7.5							
Cum.fr.	11.1	24.0	29.4	33.5	37.7	45.1	59.8	72.8	80.9	86.3	92.2	99.7							
Max. FF	21.2	19.9	17.4	14.2	22.5	24.3	23.7	22.3	18.3	21.0	22.0	20.4							
Mean FF	7.3	8.8	6.2	5.1	5.7	8.0	9.3	7.9	7.5	6.8	6.9	8.2							
St.dev. FF	4.3	4.4	3.3	2.7	3.6	4.4	4.3	3.7	3.6	3.8	4.2	4.5							

DATA COVERAGE: 86.6%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
May 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<=	1.9	74	67	43	39	36	49	45	34	66	24	40	43	31	0.28	
2.0-	3.9	193	116	73	102	126	138	133	156	132	108	167	205	560	5.14	5.43
4.0-	5.9	255	155	81	76	116	223	202	177	147	108	158	326	1649	15.14	20.56
6.0-	7.9	367	289	79	56	96	184	181	155	154	108	84	196	2024	18.58	39.14
8.0-	9.9	283	460	66	48	85	167	209	198	146	77	68	135	1942	17.89	57.04
10.0-	11.9	180	379	40	21	66	126	188	168	67	52	44	40	1371	12.59	87.45
12.0-	13.9	126	244	14	12	49	95	109	90	24	23	30	24	840	7.71	95.16
14.0-	15.9	31	119	2	3	17	30	51	50	16	7	10	3	339	3.11	98.27
16.0-	17.9	2	54	3	1	3	22	27	9	3	3	7	4	138	1.27	99.54
18.0-	19.9	.	12	.	.	.	6	5	1	.	3	3	5	35	0.32	99.86
20.0-	21.9	.	.	.	.	.	4	1	2	.	2	4	.	13	0.12	99.98
22.0-	23.9	.	.	.	.	.	.	.	.	.	.	2	.	2	0.02100.00	
24.0-	25.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00100.00	
26.0-	27.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00100.00	
28.0-	29.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00100.00	
>=30.0		.	.	.	.	.	.	.	.	.	.	.	.	0	0.00100.00	
Sum		1511	1895	401	358	594	1044	1151	1040	755	515	617	981	10893		
Rel.fr.		13.9	17.4	3.7	3.3	5.5	9.6	10.6	9.5	6.9	4.7	5.7	9.0			
Cum.fr.		13.9	31.3	34.9	38.2	43.7	53.3	63.8	73.4	80.3	85.0	90.7	99.7			
Max. FF		16.9	19.0	16.8	16.6	17.7	21.8	20.3	21.0	16.4	20.7	22.3	19.5			
Mean FF		7.3	9.2	6.1	5.5	6.9	7.6	8.1	7.9	6.5	6.7	6.2	5.9			
St.dev. FF		3.3	3.7	3.4	3.3	3.7	3.9	3.9	3.8	3.3	3.5	3.9	2.9			

DATA COVERAGE: 91.5%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
June 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<= 1.9	80	42	47	29	20	35	51	55	69	69	39	77	583	58	0.63	7.00
2.0-	3.9	262	81	69	86	90	105	119	147	157	194	277	1724	1724	18.81	25.81
4.0-	5.9	393	171	48	28	82	103	145	186	169	251	319	2020	2020	22.05	47.86
6.0-	7.9	539	174	33	17	44	104	113	162	200	112	107	236	1841	20.09	67.95
8.0-	9.9	401	222	25	3	46	77	129	164	142	90	69	165	1533	16.73	84.68
10.0-	11.9	213	207	9	2	13	26	142	73	46	23	22	56	832	9.08	93.76
12.0-	13.9	85	113	4	4	15	97	56	20	14	12	4	424	4.63	98.38	
14.0-	15.9	20	34	1	1	5	13	12	2	9	3	4	103	1.12	99.51	
16.0-	17.9	4	18	1	1	1	3	10	1	3	1	1	39	0.43	99.93	
18.0-	19.9	1	1	1	1	1	5	1	1	1	1	1	5	0.05	99.99	
20.0-	21.9	1	1	1	1	1	1	1	1	1	1	1	1	0.01	100.00	
22.0-	23.9	1	1	1	1	1	1	1	1	1	1	1	0	0.00	100.00	
24.0-	25.9	1	1	1	1	1	1	1	1	1	1	1	0	0.00	100.00	
26.0-	27.9	1	1	1	1	1	1	1	1	1	1	1	0	0.00	100.00	
28.0-	29.9	1	1	1	1	1	1	1	1	1	1	1	0	0.00	100.00	
>=30.0		1	1	1	1	1	1	1	1	1	1	1	0	0.00	100.00	
Sum		1997	1118	249	148	295	477	761	797	812	616	697	1138	9163		
Rel.fr.		21.8	12.2	2.7	1.6	3.2	5.2	8.3	8.7	8.9	6.7	7.6	12.4			
Cum.fr.		21.8	34.0	36.7	38.3	41.5	46.8	55.1	63.8	72.6	79.3	86.9	99.4			
Max. FF		17.0	17.6	17.2	10.6	12.8	15.3	19.6	20.1	15.0	16.8	15.3	15.5			
Mean FF		7.0	8.1	4.6	3.6	5.3	6.1	7.8	7.0	6.0	5.7	5.2	5.5			
St.dev. FF		3.0	3.7	3.1	2.2	2.7	3.0	3.9	3.5	2.9	3.0	2.5	2.6			

DATA COVERAGE: 79.5%

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
July 1981- 1996

FF	DD	15.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
	<= 1.9	89	70	52	41	28	46	47	43	78	78	52	61	70	0.66	
2.0-	3.9	253	185	124	61	57	141	209	240	276	178	201	236	671	6.32	6.98
4.0-	5.9	274	140	106	37	86	190	244	286	379	279	243	277	2541	20.35	27.33
6.0-	7.9	268	134	74	35	65	180	293	382	326	181	150	236	2324	23.93	51.27
8.0-	9.9	169	90	34	24	35	156	260	263	157	125	105	147	1565	14.74	87.90
10.0-	11.9	58	45	26	9	26	68	220	141	55	46	53	72	819	7.71	95.61
12.0-	13.9	23	31	8	2	15	42	100	57	11	29	18	10	346	3.26	98.87
14.0-	15.9	9	26	1	.	3	14	13	19	3	2	2	4	96	0.90	99.77
16.0-	17.9	.	.	.	.	4	1	1	4	1	.	.	.	11	0.10	99.88
18.0-	19.9	.	.	.	.	1	1	2	2	.	.	.	.	6	0.06	99.93
20.0-	21.9	.	.	.	.	1	.	2	1	.	.	.	.	4	0.04	99.97
22.0-	23.9	.	.	.	.	.	.	2	1	.	.	.	.	3	0.03	100.00
24.0-	25.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
26.0-	27.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
28.0-	29.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
	>=30.0	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
Sum		1143	721	425	209	321	839	1393	1439	1286	904	824	1043	10617		
Rel.fr.		10.8	6.8	4.0	2.0	3.0	7.9	13.1	13.6	12.1	8.5	7.8	9.8			
Cum.fr.		10.8	17.6	21.6	23.5	26.6	34.5	47.6	61.1	73.2	81.8	89.5	99.3			
Max. FF		15.8	15.7	14.2	12.6	20.8	18.4	23.2	23.4	17.5	14.3	14.7	15.7			
Mean FF		5.8	6.0	5.1	4.7	6.3	6.7	7.4	6.9	5.6	5.8	5.6	5.8			
St.dev. FF		2.9	3.5	2.9	3.0	3.5	3.2	3.4	3.1	2.6	2.8	2.8	2.7			

DATA COVERAGE: 89.2%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
August 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
		15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0			
		74	64	73	53	37	46	50	55	61	81	43	60	40	0.37	
2.0-	3.9	128	76	113	88	83	92	156	213	265	224	210	177	697	6.44	6.81
4.0-	5.9	192	127	110	45	96	182	280	274	354	276	243	259	1825	16.87	23.68
6.0-	7.9	260	152	71	31	77	191	226	315	375	237	163	239	2438	22.53	46.21
8.0-	9.9	176	142	37	27	72	174	215	251	272	132	94	161	2337	21.60	67.81
10.0-	11.9	136	82	21	8	22	139	244	147	98	45	24	66	1753	16.20	84.01
12.0-	13.9	39	17	11	12	15	68	161	73	27	25	3	21	472	4.36	97.91
14.0-	15.9	22	19	.	3	3	30	39	29	11	2	.	9	167	1.54	99.45
16.0-	17.9	5	10	.	.	1	11	3	10	.	.	.	.	40	0.37	99.82
18.0-	19.9	1	.	.	.	.	3	5	4	1	.	.	.	14	0.13	99.95
20.0-	21.9	.	.	.	.	.	2	.	3	.	.	.	.	5	0.05	100.00
22.0-	23.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
24.0-	25.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
26.0-	27.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
28.0-	29.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
	>=30.0													0	0.00	100.00
Sum		1033	689	436	267	406	938	1379	1374	1464	1022	780	992	10820		
Rel.fr.		9.5	6.4	4.0	2.5	3.8	8.7	12.7	12.7	13.5	9.4	7.2	9.2			
Cum.fr.		9.5	15.9	19.9	22.4	26.2	34.8	47.6	60.3	73.8	83.3	90.5	99.6			
Max. FF		18.0	16.7	13.9	15.6	17.2	20.3	18.9	21.0	18.3	14.6	12.9	15.7			
Mean FF		7.0	7.0	4.9	4.7	6.0	7.7	7.9	7.1	6.3	5.7	5.3	6.1			
St.dev. FF		3.3	3.5	3.0	3.5	3.2	3.6	3.6	3.4	2.8	2.8	2.4	2.9			

DATA COVERAGE: 90.9%

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
September 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
		15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0			
	<= 1.9	70	24	29	41	33	31	21	19	46	46	30	58	50	0.47	
	2.0- 3.9	196	97	87	91	70	102	111	130	153	102	145	158	448	4.20	4.67
	4.0- 5.9	240	162	75	108	147	142	160	166	183	152	167	246	1442	13.52	18.19
	6.0- 7.9	219	134	60	60	125	169	213	172	221	179	142	218	1948	18.27	36.46
	8.0- 9.9	181	108	40	33	86	193	249	194	176	153	130	148	1912	17.93	54.38
	10.0- 11.9	134	87	7	20	98	151	205	201	156	122	86	99	1691	15.86	70.24
	12.0- 13.9	70	47	5	10	48	92	181	137	94	99	55	61	1366	12.81	83.05
	14.0- 15.9	32	20	5	7	28	60	134	81	53	61	31	23	899	8.43	91.48
	16.0- 17.9	13	7	.	.	6	31	50	44	20	19	8	6	535	5.02	96.49
	18.0- 19.9	12	4	.	.	1	11	28	22	10	3	13	1	204	1.91	98.41
	20.0- 21.9	9	3	.	.	.	11	4	13	2	.	5	1	105	0.98	99.39
	22.0- 23.9	.	.	.	.	.	3	5	4	2	.	1	.	48	0.45	99.84
	24.0- 25.9	.	.	.	.	.	.	2	.	.	.	.	.	15	0.14	99.98
	26.0- 27.9	.	.	.	.	.	.	.	.	.	.	.	.	2	0.02	100.00
	28.0- 29.9	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
	>=30.0	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
Sum		1176	693	308	370	642	996	1363	1183	1116	936	813	1019	10665		
Rel.fr.		11.0	6.5	2.9	3.5	6.0	9.3	12.8	11.1	10.5	8.8	7.6	9.6			
Cum.fr.		11.0	17.5	20.4	23.9	29.9	39.2	52.0	63.1	73.6	82.4	90.0	99.5			
Max. FF		21.4	21.1	15.0	15.3	18.0	22.8	24.6	23.9	23.1	19.3	22.5	21.6			
Mean FF		7.2	7.4	5.3	5.4	7.5	8.8	9.6	9.2	7.9	8.1	7.4	6.8			
St.dev. FF		4.0	3.7	3.0	3.1	3.7	4.2	4.2	4.3	4.0	4.0	4.1	3.4			

DATA COVERAGE: 92.6%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
October 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel.	Cum.
		15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0	fr.	fr.	
<= 1.9	51	21	22	29	27	17	28	16	36	27	26	36	30	0.27		
2.0- 3.9	163	68	88	55	59	42	64	86	139	88	78	100	336	3.00	3.27	
4.0- 5.9	143	103	62	54	90	115	148	163	164	113	106	154	1030	9.20	12.47	
6.0- 7.9	169	110	67	41	58	120	184	187	210	174	165	145	1415	12.64	25.11	
8.0- 9.9	205	95	54	46	67	145	227	229	245	174	143	109	1630	14.56	39.67	
10.0- 11.9	258	75	52	22	56	161	269	245	253	141	108	66	1739	15.54	55.21	
12.0- 13.9	172	89	18	8	23	102	267	249	176	116	52	63	1706	15.24	70.45	
14.0- 15.9	35	120	13	9	14	100	214	203	117	63	36	28	1335	11.93	82.37	
16.0- 17.9	23	69	1	3	3	81	204	101	46	25	21	19	952	8.50	90.88	
18.0- 19.9	16	35	.	2	3	36	96	51	13	5	8	8	596	5.32	96.20	
20.0- 21.9	3	15	.	2	2	25	24	20	5	5	4	2	273	2.44	98.64	
22.0- 23.9	5	1	.	.	.	5	2	11	4	2	.	.	107	0.96	99.60	
24.0- 25.9	.	.	.	.	.	.	1	10	.	.	.	.	31	0.28	99.87
26.0- 27.9	.	.	.	.	.	.	.	2	.	.	.	.	12	0.11	99.98
28.0- 29.9	.	.	.	.	.	.	.	.	.	.	.	.	2	0.02	100.00
>=30.0	.	.	.	.	.	.	.	.	.	.	.	.	0	0.00	100.00
Sum	1243	801	377	271	402	949	1728	1573	1408	933	747	732	11194	0	0.00	
Rel.fr.	11.1	7.2	3.4	2.4	3.6	8.5	15.4	14.1	12.6	8.3	6.7	6.5				
Cum.fr.	11.1	18.3	21.6	24.0	27.6	36.1	51.6	65.6	78.2	86.5	93.2	99.7				
Max. FF	23.4	23.4	16.3	21.6	20.7	23.4	25.6	27.6	23.1	22.8	20.7	24.5				
Mean FF	8.6	10.4	6.8	6.5	7.3	10.6	11.4	10.8	9.2	8.8	8.3	7.6				
St.dev. FF	4.1	5.0	3.6	4.0	3.9	4.7	4.6	4.6	4.1	4.0	3.9	4.1				

DATA COVERAGE: 94.0%

Frequency table of wind direction(DD) degrees
and wind speed(FF) m/s
November 1981- 1996

FF	DD																Sum	Rel. fr.	Cum. fr.
	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0	15	18	21	252			
<= 1.9	45	27	26	23	14	14	13	16	21	21	18	14	21	252	2.60	2.75			
2.0-	142	62	51	54	49	64	99	82	95	108	108	106	67	979	10.10	12.85			
4.0-	188	90	85	65	92	127	115	108	120	117	117	109	135	1351	13.93	26.78			
6.0-	195	121	83	52	55	88	155	155	113	112	112	100	129	1358	14.01	40.79			
8.0-	191	150	55	20	56	85	184	198	147	137	137	100	152	1475	15.21	56.00			
10.0-	11.9	190	107	25	30	89	162	162	140	101	101	78	106	1207	12.45	68.45			
12.0-	13.9	171	102	25	11	89	227	154	89	85	68	106	1146	11.82	80.27				
14.0-	15.9	48	86	6	2	12	85	194	41	54	27	53	760	7.84	88.11				
16.0-	17.9	38	37	3	1	10	57	182	31	53	24	24	552	5.69	93.80				
18.0-	19.9	15	30	2	2	48	139	68	16	12	4	8	344	3.55	97.35				
20.0-	21.9	8	10	2	8	35	53	25	15	9	1	6	172	1.77	99.12				
22.0-	23.9	4	4	4	5	13	10	4	3	3	6	1	50	0.52	99.64				
24.0-	25.9	5	6	4	1	1	1	4	4	1	2	3	23	0.24	99.88				
26.0-	27.9	4	3	4	4	4	4	4	4	1	1	1	12	0.12	100.00				
28.0-	29.9	4	3	4	4	4	4	4	4	4	4	4	4	0.00	100.00				
>=30.0	1244	835	363	245	353	794	1538	1216	835	807	640	811	9696	0	0.00				
Sum	12.8	8.6	3.7	2.5	3.6	8.2	15.9	12.5	8.6	8.3	6.6	6.6	8.4						
Rel.fr.	12.8	21.4	25.2	27.7	31.4	39.5	55.4	67.9	76.6	84.9	91.5	99.8							
Cum.fr.	27.8	27.0	21.3	17.1	24.5	23.9	27.3	23.1	24.4	24.5	26.2	25.9							
Max. FF	8.8	10.0	6.9	5.8	7.8	10.7	12.0	10.8	9.1	9.1	8.3	9.0							
Mean FF	4.5	4.9	3.7	3.3	4.7	5.5	5.1	4.7	4.6	4.6	4.5	4.2							
St.dev. FF																			

DATA COVERAGE: 84.2%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
December 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
<= 1.9	54	19	16	22	12	16	17	14	32	16	7	30	255	39	0.38	
2.0-	3.9	168	96	65	102	62	68	72	130	105	108	112	1148	255	2.48	2.86
4.0-	5.9	235	92	95	104	106	80	68	165	135	130	174	1494	1148	11.15	14.01
6.0-	7.9	191	96	76	65	35	68	100	191	163	110	118	1345	1494	14.51	28.52
8.0-	9.9	229	124	61	53	26	55	111	225	190	105	115	146	1345	13.06	41.58
10.0-	11.9	237	102	45	36	24	80	171	189	154	114	99	141	1392	13.52	69.09
12.0-	13.9	127	65	35	29	87	193	247	147	122	124	101	1282	12.45	81.54	
14.0-	15.9	47	86	13	1	24	75	166	168	70	96	74	66	886	8.61	90.14
16.0-	17.9	16	55	8	2	17	58	113	86	43	41	47	43	529	5.14	95.28
18.0-	19.9	3	11	2	3	6	29	65	32	21	17	14	18	221	2.15	97.43
20.0-	21.9	6	11	2	2	2	36	57	18	10	10	3	11	168	1.63	99.06
22.0-	23.9	5	1	1	1	1	6	27	5	2	5	4	4	56	0.54	99.60
24.0-	25.9	3	2	1	1	1	2	11	5	1	4	1	4	32	0.31	99.91
26.0-	27.9	1	1	1	1	1	3	1	1	1	2	1	2	8	0.08	99.99
28.0-	29.9	1	1	1	1	1	1	1	1	1	1	1	1	1	0.01	100.00
>=30.0														0	0.00	100.00
Sum		1321	760	418	396	343	664	1160	1362	1127	882	840	984	10296		
Rel.fr.		12.8	7.4	4.1	3.8	3.3	6.4	11.3	13.2	10.9	8.6	8.2	9.6			
Cum.fr.		12.8	20.2	24.3	28.1	31.4	37.9	49.2	62.4	73.3	81.9	90.1	99.6			
Max. FF		25.8	24.2	21.1	23.3	20.7	29.2	26.1	25.6	23.5	27.6	24.7	26.5			
Mean FF		8.1	9.5	7.5	6.0	7.7	11.0	12.3	10.7	8.9	9.6	9.2	9.0			
St.dev. FF		4.0	4.8	3.9	3.4	4.7	5.7	5.2	4.4	4.4	4.9	4.5	4.7			

DATA COVERAGE: 86.5%

Frequency table of wind direction (DD) degrees
and wind speed (FF) m/s
Jan.-Dec. 1981- 1996

FF	DD	345.0	15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	Sum	Rel. fr.	Cum. fr.
		15.0	45.0	75.0	105.0	135.0	165.0	195.0	225.0	255.0	285.0	315.0	345.0			
		670	452	441	376	316	355	362	358	536	462	331	470	533	0.43	
<=	1.9	1902	1140	1028	992	892	1023	1291	1561	1760	1418	1550	1660	16217	13.07	4.56
2.0-	3.9	2463	1537	1064	878	1131	1599	1914	2009	2198	1826	1865	2324	20808	16.76	34.39
4.0-	5.9	2754	1762	883	594	772	1527	2198	2479	2395	1739	1425	1989	20517	16.53	50.92
8.0-	9.9	2351	1823	613	372	623	1495	2575	2686	2279	1585	1228	1656	19286	15.54	66.46
10.0-	11.9	1820	1417	390	196	484	1219	2594	2105	1636	1136	840	1100	14937	12.03	78.49
12.0-	13.9	1155	987	177	95	316	1019	2247	1789	1103	927	580	722	11117	8.96	87.45
14.0-	15.9	473	686	72	44	148	812	1715	1245	640	577	325	410	7147	5.76	93.21
16.0-	17.9	214	329	29	10	75	517	1284	740	331	337	191	218	4275	3.44	96.65
18.0-	19.9	120	138	5	8	40	297	721	381	178	160	89	108	2245	1.81	98.46
20.0-	21.9	57	47	4	4	21	189	381	212	94	78	31	41	1159	0.93	99.39
22.0-	23.9	20	9	.	1	11	81	164	104	44	30	18	17	499	0.40	99.80
24.0-	25.9	8	10	.	.	1	12	57	41	12	13	4	11	169	0.14	99.93
26.0-	27.9	5	5	.	.	.	4	16	5	6	5	1	2	49	0.04	99.97
28.0-	29.9	.	2	.	.	.	1	8	8	4	2	.	1	26	0.02	99.99
>=	30.0	.	1	.	.	.	.	.	1	6	.	.	2	10	0.01	100.00
Sum		14012	10345	4706	3570	4830	10150	17527	15724	13222	10295	8478	10731	124123		
Rel.fr.		11.3	8.3	3.8	2.9	3.9	8.2	14.1	12.7	10.7	8.3	6.8	8.6			
Cum.fr.		11.3	19.6	23.4	26.3	30.2	38.4	52.5	65.1	75.8	84.1	90.9	99.6			
Max. FF		27.8	30.0	21.3	23.3	24.5	29.2	29.8	30.4	31.5	29.7	26.2	31.0			
Mean FF		7.7	8.5	6.1	5.5	7.0	9.3	10.5	9.5	8.2	8.2	7.4	7.5			
St.dev. FF		4.0	4.3	3.5	3.3	4.1	4.9	5.0	4.7	4.3	4.5	4.1	4.1			

DATA COVERAGE: 88.5*

STATISTICS

	Mean FF	St.dev. FF	Maximum FF	DD	date
January	10.6	5.3	31.4	246.0	01.01.1992 04 UT
February	9.7	4.9	31.5	229.3	19.02.1990 23 UT
March	9.8	5.1	30.0	36.5	03.03.1988 11 UT
April	7.7	4.2	24.3	143.6	10.04.1989 18 UT
May	7.4	3.8	22.3	295.0	21.05.1991 22 UT
June	6.4	3.3	20.1	204.1	09.06.1986 21 UT
July	6.1	3.1	23.4	195.9	25.07.1988 19 UT
August	6.6	3.3	21.0	204.7	21.08.1987 03 UT
September	7.9	4.1	24.6	193.2	21.09.1982 04 UT
October	9.5	4.6	27.6	210.8	30.10.1983 06 UT
November	9.6	4.9	27.8	9.8	05.11.1985 20 UT
December	9.5	4.9	29.2	150.1	19.12.1982 12 UT

4.3 Frequency tables wave height/wave period (H_s/T_z)

Environmental data has been measured in the Gullfaks area since 1978. From 1978 until November 1989 the measurements were performed at the platform Statfjord A. The logging of environmental data was operational from 1981. For the period 1978-1980 3 hourly data is available. Below we have based the computations on the combined series from Statfjord A and Gullfaks C covering the period 1981-1996. In doing so hourly values of the parameters have been extracted from the period covered by Gullfaks C.

The reason for this is the change in storing frequency from December 1992. Until November 1992 only hourly values are available both from Statfjord A and Gullfaks C. From December 1992 measurements exist each 20 minute. Without reduction to hourly values the period after December 1992 would have been given too much weight.

The data coverage of the wave measurements are varying. In the end of the period covered by Statfjord A (1988-1990) one of the tape units of the data acquiring system was out of order most of the time. This resulted in a data coverage near 0 % for wave height for these years. The data coverage on a yearly basis is shown in figure 4.3 as the number of observations.

Statistical parameters based on the yearly frequency distributions of significant wave height are given in figure 4.4. The parameters are not defined for the years 1989 and 1990. The values for 1988 are also questionable.

In the frequency tables there are very low values of T_z (2 seconds and below). Time series of T_z for the two buoys located at Statfjord A has been plotted (not presented here). T_z from buoy A are mostly above T_z from buoy B with exceptions for periods in July 1983, September 1985 and December 1986 where T_z from buoy A seem to be erroneous and giving to low values. It is the data from buoy A which is used together with the data from Gullfaks C and the mentioned periods are responsible for most of the low T_z values occurring in the frequency tables. These low T_z values should be neglected.

STATFJORD A / GULLFAKS C

Number of measurements of Wave height

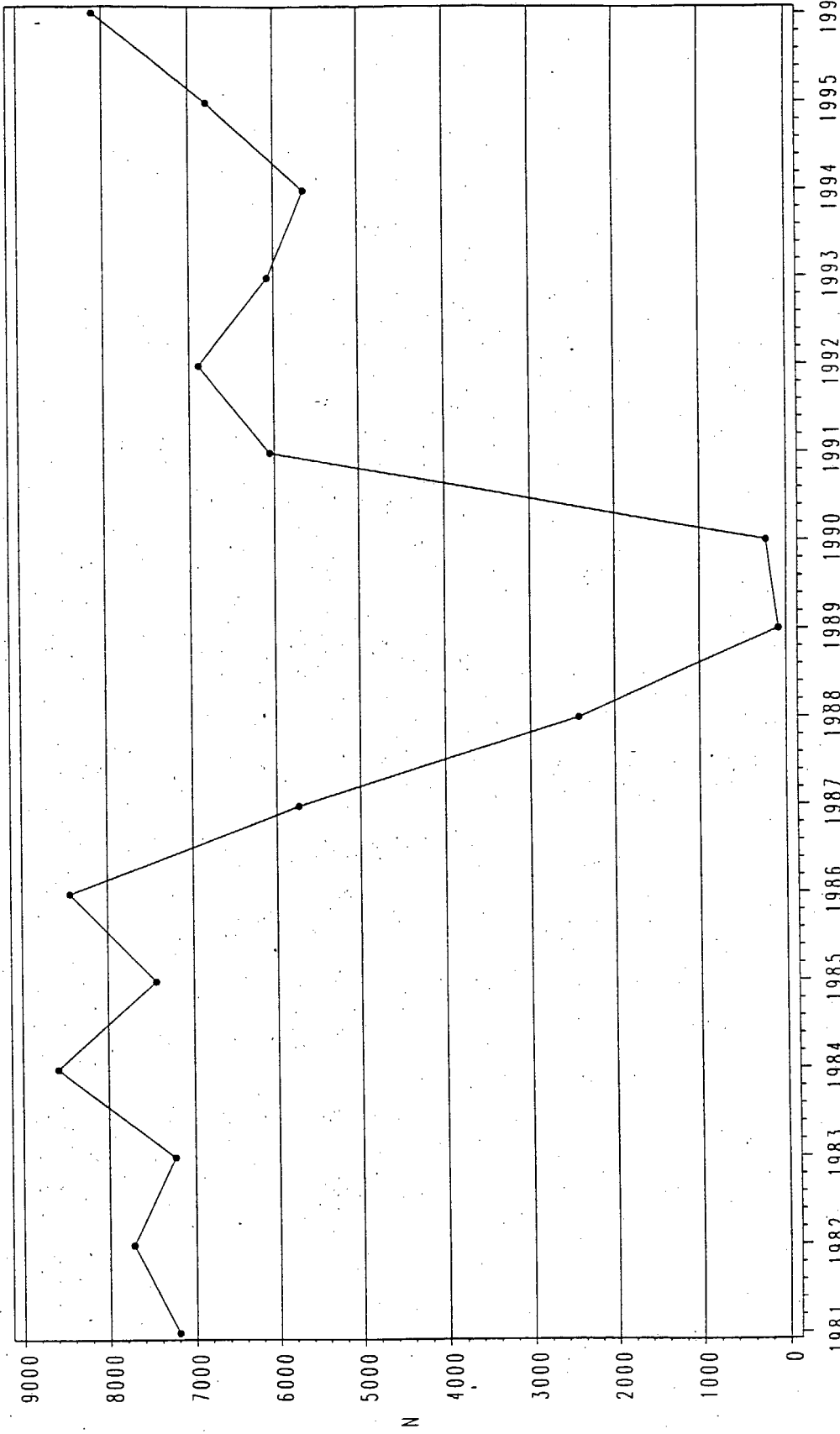


Figure 4.3 Data coverage for significant wave height given as number of observations each year. 8760/8784 observations/year represents 100 % coverage.

STATFJORD A /GULLFAKS C

Statistical parameters based on significant wave height

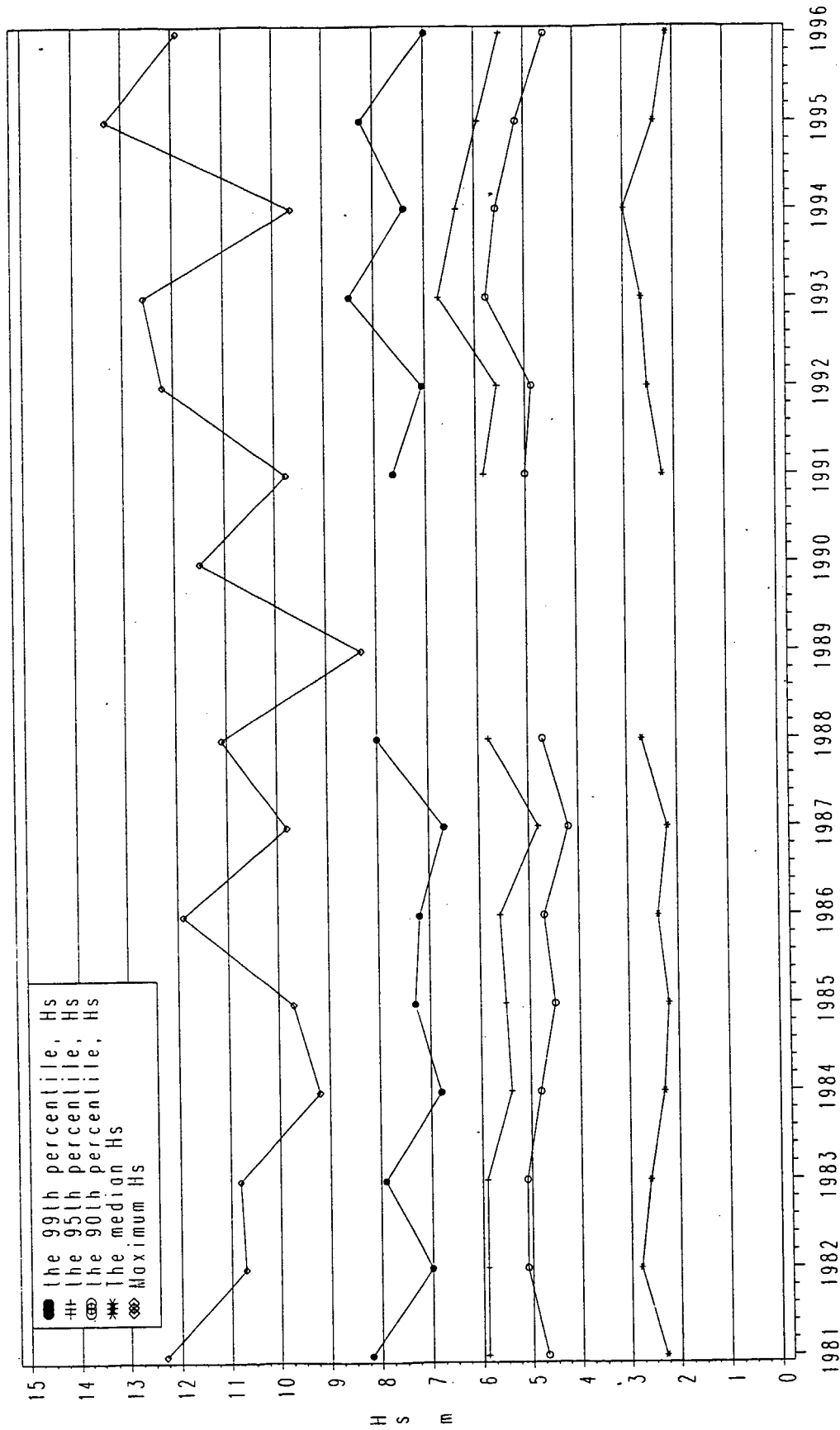


Figure 4.4 Statistical parameters based on the yearly frequency distribution of significant wave heights (Statfjord A/Gullfaks C).

Frequency table of wave period (TZ) s
and wave height (HS) m
February 1981- 1996

HS	TZ														Sum	Rel. fr.	Cum. fr.				
	<= 0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0				>= 14.0			
<= 0.4	0	0.00	0.00	
0.5- 0.9	2	15	4	.	.	.	.	.	.	.	.	.	.	.	21	0.26	0.26
1.0- 1.4	6	75	126	110	46	19	.	.	.	.	.	.	.	.	382	4.65	4.91
1.5- 1.9	7	138	297	230	114	16	16	4	2	.	.	.	.	.	824	10.03	14.94
2.0- 2.4	109	382	276	158	24	10	2	.	.	.	.	.	.	961	11.70	26.63
2.5- 2.9	41	474	363	198	63	6	.	.	.	.	.	.	.	1145	13.94	40.57
3.0- 3.4	4	350	455	194	78	12	.	.	.	.	.	.	.	1093	13.30	53.88
3.5- 3.9	1	171	539	214	66	4	.	.	.	.	.	.	.	995	12.11	65.99
4.0- 4.4	66	464	206	32	13	1	.	.	.	.	.	.	782	9.52	75.51
4.5- 4.9	22	325	254	41	10	3	.	.	.	.	.	.	655	7.97	83.48
5.0- 5.4	2	187	231	38	11	5	.	.	.	.	.	.	474	5.77	89.25
5.5- 5.9	1	96	208	32	7	3	.	.	.	.	.	.	347	4.22	93.48
6.0- 6.4	44	157	46	12	1	.	.	.	.	.	.	260	3.16	96.64
6.5- 6.9	17	61	48	5	1	.	.	.	.	.	.	132	1.61	98.25
7.0- 7.4	10	32	22	3	.	.	.	.	.	.	.	67	0.82	99.06
7.5- 7.9	3	10	17	8	.	.	.	.	.	.	.	38	0.46	99.53
8.0- 8.4	1	1	5	5	.	.	.	.	.	.	.	12	0.15	99.67
8.5- 8.9	14	1	.	.	.	.	.	.	15	0.18	99.85
9.0- 9.4	5	1	.	.	.	.	.	.	6	0.07	99.93
9.5- 9.9	1	.	.	.	.	.	.	1	0.01	99.94
10.0- 10.4	1	.	.	.	.	.	.	4	0.05	99.99
10.5- 10.9	0	0.00	99.99
11.0- 11.4	1	.	.	.	.	.	.	1	0.01	100.00
11.5- 11.9	0	0.00	100.00
12.0- 12.4	0	0.00	100.00
12.5- 12.9	0	0.00	100.00
13.0- 13.4	0	0.00	100.00
13.5- 13.9	0	0.00	100.00
>=14.0	0	0.00	100.00
Sum	0	0	0	0	15	383	1895	3120	2084	547	143	26	2	0	0	0	0	8215			
Rel.fr.	0.0	0.0	0.0	0.0	0.2	4.7	23.1	38.0	25.4	6.7	1.7	0.3	0.0	0.0	0.0	0.0	0.0				
Cum.fr.	0.0	0.0	0.0	0.0	0.2	4.8	27.9	65.9	91.3	97.9	99.7	100.0	100.0	100.0	100.0	100.0	100.0				
Max. Hs	1.8	3.9	5.5	7.9	8.0	8.4	10.0	11.1	1.9	.	.	.	.	.
Mean Hs	1.4	1.8	2.6	3.5	4.2	4.4	5.2	5.6	1.8	.	.	.	.	.
St.dev. Hs	0.3	0.5	0.8	1.2	1.5	1.8	2.4	2.8	0.1	.	.	.	.	.

DATA COVERAGE: 75.7%

Frequency table of wave period (TZ) s
and wave height (HS) m
March 1981- 1996

HS	TZ																Sum	Rel. fr.	Cum. fr.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=				
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4					1											2	0.02	0.02	
0.5- 0.9					1	32	14	10	2							66	0.76	0.78	
1.0- 1.4					7	113	228	136	20	15	1					520	5.97	6.75	
1.5- 1.9				1	5	129	332	267	123	20	4					881	10.11	16.86	
2.0- 2.4						107	455	414	157	43	4					1180	13.54	30.40	
2.5- 2.9						58	516	399	164	69	3					1209	13.87	44.27	
3.0- 3.4						3	376	471	253	76	8					1187	13.62	57.89	
3.5- 3.9							183	537	187	51	1					959	11.00	68.89	
4.0- 4.4							88	474	185	30	2					779	8.94	77.83	
4.5- 4.9							34	287	196	34	5					556	6.38	84.21	
5.0- 5.4							7	158	219	34	6					424	4.87	89.08	
5.5- 5.9								91	200	38	5					334	3.83	92.91	
6.0- 6.4								35	138	57	3					233	2.67	95.58	
6.5- 6.9								11	83	51	1					146	1.68	97.26	
7.0- 7.4								4	29	55	3					91	1.04	98.30	
7.5- 7.9								1	16	33						50	0.57	98.88	
8.0- 8.4									5	18	11					34	0.39	99.27	
8.5- 8.9								1	7	14	3					25	0.29	99.55	
9.0- 9.4										7	7					14	0.16	99.71	
9.5- 9.9									2		1	2				5	0.06	99.77	
10.0- 10.4											1	4				5	0.06	99.83	
10.5- 10.9											6	3	1			10	0.11	99.94	
11.0- 11.4																2	0.02	99.97	
11.5- 11.9																3	0.03	100.00	
12.0- 12.4																0	0.00	100.00	
12.5- 12.9																0	0.00	100.00	
13.0- 13.4																0	0.00	100.00	
13.5- 13.9																0	0.00	100.00	
>=14.0																0	0.00	100.00	
Sum	0	0	0	1	14	442	2234	3296	1986	659	80	3	0	0	0	8715			
Rel.fr.	0.0	0.0	0.0	0.0	0.2	5.1	25.6	37.8	22.8	7.6	0.9	0.0	0.0	0.0	0.0				
Cum.fr.	0.0	0.0	0.0	0.0	0.2	5.2	30.9	68.7	91.5	99.0	100.0	100.0	100.0	100.0	100.0				
Max. Hs				1.8	1.8	3.3	5.4	8.5	9.7	10.9	11.9	10.7							
Mean Hs				1.8	1.3	1.8	2.5	3.4	4.2	4.9	6.4	10.0							
St.dev. Hs				0.0	0.4	0.6	0.8	1.2	1.5	2.2	3.0	0.6							

DATA COVERAGE: 73.2%

Frequency table of wave period(Tz) s
and wave height(HS) m
April 1981- 1996

HS	Tz																Sum	Rel.	Cum.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=	fr.	fr.		
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4	1	2	1	.	.	.	.	.	.	.	.	4	0.05	0.05	
0.5- 0.9	20	109	86	44	25	8	5	2	.	.	.	299	3.65	3.70	
1.0- 1.4	18	303	375	212	127	58	35	19	13	.	.	1160	14.17	17.87	
1.5- 1.9	3	481	693	357	81	14	21	14	7	.	.	1671	20.42	38.29	
2.0- 2.4	.	.	1	.	1	292	648	450	96	26	11	.	.	.	.	1525	18.63	56.92
2.5- 2.9	3	1	2	1	2	72	520	353	146	28	6	.	.	.	.	1134	13.85	70.78
3.0- 3.4	.	2	1	1	3	3	406	364	91	32	2	.	.	.	.	905	11.06	81.83
3.5- 3.9	.	5	4	.	.	.	172	313	76	37	.	.	.	.	.	607	7.42	89.25
4.0- 4.4	.	1	1	1	.	.	53	193	61	18	3	.	.	.	.	331	4.04	93.29
4.5- 4.9	.	.	1	.	1	.	13	93	87	7	.	.	.	.	.	202	2.47	95.76
5.0- 5.4	1	.	2	33	66	6	1	.	.	.	.	109	1.33	97.09	
5.5- 5.9	.	.	1	.	.	.	.	16	46	13	1	.	.	.	.	77	0.94	98.03
6.0- 6.4	5	27	28	.	.	.	.	.	60	0.73	98.77	
6.5- 6.9	3	11	28	4	.	.	.	.	46	0.56	99.33	
7.0- 7.4	1	6	23	8	.	.	.	.	38	0.46	99.79	
7.5- 7.9	1	1	7	1	2	.	.	.	12	0.15	99.94	
8.0- 8.4	2	2	.	.	.	.	4	0.05	99.99	
8.5- 8.9	1	.	.	.	.	1	0.01	100.00	
9.0- 9.4	0	0.00	100.00	
9.5- 9.9	0	0.00	100.00	
10.0- 10.4	0	0.00	100.00	
10.5- 10.9	0	0.00	100.00	
11.0- 11.4	0	0.00	100.00	
11.5- 11.9	0	0.00	100.00	
12.0- 12.4	0	0.00	100.00	
12.5- 12.9	0	0.00	100.00	
13.0- 13.4	0	0.00	100.00	
13.5- 13.9	0	0.00	100.00	
>=14.0	0	0.00	100.00	
Sum	3	9	11	3	50	1262	2969	2438	947	335	101	37	20	0	0	8185			
Rel.fr.	0.0	0.1	0.1	0.0	0.6	15.4	36.3	29.8	11.6	4.1	1.2	0.5	0.2	0.0	0.0				
Cum.fr.	0.0	0.1	0.3	0.3	0.9	16.3	52.6	82.4	94.0	98.1	99.3	99.8	100.0	100.0	100.0				
Max. Hs	2.9	4.0	5.9	4.0	5.1	3.1	5.3	7.5	7.7	8.1	8.6	7.8	1.8	.	.				
Mean Hs	2.8	3.6	3.7	3.3	1.3	1.7	2.3	2.8	3.2	3.8	2.7	1.7	1.3	.	.				
St.dev. Hs	0.1	0.3	1.0	0.6	1.0	0.5	0.8	1.1	1.6	2.1	2.2	1.5	0.3	.	.				

DATA COVERAGE: 71.1%

Frequency table of wave period(TZ) s
and wave height(HS) m
May 1981- 1996

HS	TZ																Sum	Rel. fr.	Cum. fr.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=				
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4	
0.5- 0.9	34	326	202	65	24	18	.	.	.	.	1	3	0.04	0.04	
1.0- 1.4	77	821	519	343	140	78	50	5	1	.	.	670	9.03	9.07	
1.5- 1.9	28	801	702	279	48	23	2	1	.	.	.	2034	27.41	36.48	
2.0- 2.4	.	.	.	1	.	375	675	152	13	7	.	.	.	.	.	1884	25.39	61.87
2.5- 2.9	82	489	128	7	.	.	.	.	.	.	1223	16.48	78.36	
3.0- 3.4	2	211	152	12	.	.	.	.	.	.	706	9.51	87.87	
3.5- 3.9	102	134	13	1	.	.	.	.	.	377	5.08	92.95	
4.0- 4.4	23	98	8	2	.	.	.	.	.	250	3.37	96.32	
4.5- 4.9	1	44	21	.	.	.	.	.	.	131	1.77	98.09	
5.0- 5.4	17	23	2	.	.	.	.	.	66	0.89	98.98	
5.5- 5.9	2	7	3	.	.	.	.	.	42	0.57	99.54	
6.0- 6.4	3	5	.	.	.	.	.	12	0.16	99.70	
6.5- 6.9	2	3	.	.	.	.	.	8	0.11	99.81	
7.0- 7.4	1	6	.	.	.	.	.	5	0.07	99.88	
7.5- 7.9	2	.	.	.	.	.	7	0.09	99.97	
8.0- 8.4	2	0.03	100.00	
8.5- 8.9	0	0.00	100.00	
9.0- 9.4	0	0.00	100.00	
9.5- 9.9	0	0.00	100.00	
10.0- 10.4	0	0.00	100.00	
10.5- 10.9	0	0.00	100.00	
11.0- 11.4	0	0.00	100.00	
11.5- 11.9	0	0.00	100.00	
12.0- 12.4	0	0.00	100.00	
12.5- 12.9	0	0.00	100.00	
13.0- 13.4	0	0.00	100.00	
13.5- 13.9	0	0.00	100.00	
>=14.0	0	0.00	100.00	
Sum	0	0	0	1	139	2410	2924	1414	322	150	52	6	1	0	1	7420			
Rel.fr.	0.0	0.0	0.0	0.0	1.9	32.5	39.4	19.1	4.3	2.0	0.7	0.1	0.0	0.0	0.0				
Cum.fr.	0.0	0.0	0.0	0.0	1.9	34.4	73.8	92.8	97.2	99.2	99.9	100.0	100.0	100.0	100.0				
Max. Hs	.	.	.	2.0	1.8	3.0	4.6	5.6	7.0	7.7	1.6	1.7	1.2	.	0.7				
Mean Hs	.	.	.	2.0	1.2	1.5	2.0	2.3	2.3	2.1	1.2	1.4	1.2	.	0.7				
St.dev. Hs	.	.	.	0.0	0.3	0.5	0.7	1.1	1.6	1.9	0.1	0.2	0.0	.	0.0				

DATA COVERAGE: 62.3*

Frequency table of wave period(Tz) s
and wave height(HS) m
June 1981- 1996

Hs	Tz																Sum	Rel.	Cum.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=	fr.	fr.	fr.	
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4																0	0.00	0.00	
0.5- 0.9					35	259	160	104	56	11	4					629	10.08	10.08	
1.0- 1.4				3	71	864	706	286	113	37	14					2094	33.56	43.64	
1.5- 1.9				4	34	774	548	181	61	8	12					1622	25.99	69.63	
2.0- 2.4						293	448	118	24	9	2	1				895	14.34	83.97	
2.5- 2.9						57	336	68	3							464	7.44	91.41	
3.0- 3.4						1	206	101	12							320	5.13	96.54	
3.5- 3.9							51	92	8							151	2.42	98.96	
4.0- 4.4							12	24	3							39	0.62	99.58	
4.5- 4.9								10	2							12	0.19	99.78	
5.0- 5.4								10	1							11	0.18	99.95	
5.5- 5.9								1	2							3	0.05	100.00	
6.0- 6.4																0	0.00	100.00	
6.5- 6.9																0	0.00	100.00	
7.0- 7.4																0	0.00	100.00	
7.5- 7.9																0	0.00	100.00	
8.0- 8.4																0	0.00	100.00	
8.5- 8.9																0	0.00	100.00	
9.0- 9.4																0	0.00	100.00	
9.5- 9.9																0	0.00	100.00	
10.0- 10.4																0	0.00	100.00	
10.5- 10.9																0	0.00	100.00	
11.0- 11.4																0	0.00	100.00	
11.5- 11.9																0	0.00	100.00	
12.0- 12.4																0	0.00	100.00	
12.5- 12.9																0	0.00	100.00	
13.0- 13.4																0	0.00	100.00	
13.5- 13.9																0	0.00	100.00	
>=14.0																0	0.00	100.00	
Sum	0	0	0	7	140	2248	2467	995	285	65	32	1	0	0	0	6240			
Rel.fr.	0.0	0.0	0.0	0.1	2.2	36.0	39.5	15.9	4.6	1.0	0.5	0.0	0.0	0.0	0.0	100.0			
Cum.fr.	0.0	0.0	0.0	0.1	2.4	38.4	77.9	93.9	98.4	99.5	100.0	100.0	100.0	100.0	100.0	100.0			
Max. Hs				1.7	1.9	3.0	4.4	5.8	5.8	2.2	2.3	2.0							
Mean Hs				1.5	1.2	1.5	1.9	2.1	1.5	1.3	1.4	2.0							
St.dev. Hs				0.2	0.3	0.4	0.8	1.1	0.9	0.4	0.4	0.0							

DATA COVERAGE: 54.2%

Frequency table of wave period(Tz) s
and wave height(Hs) m
July 1981- 1996

Hs	Tz	<= 0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>= 14.0	Sum	Rel. fr.	Cum. fr.
<= 0.4																	5	0.07	0.07
0.5-	0.9		1	3	73	445	176	125	53	35	7						920	13.79	13.86
1.0-	1.4		10	5	127	1281	655	311	169	45	6						2609	39.10	52.96
1.5-	1.9		10	3	39	890	567	201	62								1772	26.55	79.51
2.0-	2.4	6	7		5	264	370	71	13	1							737	11.04	90.56
2.5-	2.9		11	4		2	52	221	56	4	8						358	5.36	95.92
3.0-	3.4		12				4	70	66	2							154	2.31	98.23
3.5-	3.9		24	2			1	16	26	6							75	1.12	99.36
4.0-	4.4		8					1	12	6							27	0.40	99.76
4.5-	4.9								5	11							16	0.24	100.00
5.0-	5.4																0	0.00	100.00
5.5-	5.9																0	0.00	100.00
6.0-	6.4																0	0.00	100.00
6.5-	6.9																0	0.00	100.00
7.0-	7.4																0	0.00	100.00
7.5-	7.9																0	0.00	100.00
8.0-	8.4																0	0.00	100.00
8.5-	8.9																0	0.00	100.00
9.0-	9.4																0	0.00	100.00
9.5-	9.9																0	0.00	100.00
10.0-	10.4																0	0.00	100.00
10.5-	10.9																0	0.00	100.00
11.0-	11.4																0	0.00	100.00
11.5-	11.9																0	0.00	100.00
12.0-	12.4																0	0.00	100.00
12.5-	12.9																0	0.00	100.00
13.0-	13.4																0	0.00	100.00
13.5-	13.9																0	0.00	100.00
>=14.0																	0	0.00	100.00
Sum		0	61	34	11	248	2940	2076	873	326	89	13	0	1	0	1	6673		
Rel.fr.		0.0	0.9	0.5	0.2	3.7	44.1	31.1	13.1	4.9	1.3	0.2	0.0	0.0	0.0	0.0			
Cum.fr.		0.0	0.9	1.4	1.6	5.3	49.4	80.5	93.6	98.4	99.8	100.0	100.0	100.0	100.0	100.0			
Max. Hs			4.2	3.9	1.5	2.6	3.7	4.0	4.6	4.9	2.9	1.1		0.6					
Mean Hs			3.3	1.9	1.1	1.2	1.4	1.7	1.7	1.5	1.1	0.9		0.6					
St.dev. Hs			0.6	0.7	0.3	0.4	0.4	0.6	0.8	0.9	0.5	0.1		0.0					

DATA COVERAGE: 56.1%

Frequency table of wave period(TZ) s
and wave height(HS) m
August 1981- 1996

HS	TZ										Sum	Rel. fr.	Cum. fr.					
	<= 0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0				10.0	11.0	12.0	13.0	>= 14.0
<= 0.4	10				11	8	1									30	0.42	0.42
0.5- 0.9					82	390	172	70	50	7						771	10.67	11.08
1.0- 1.4		27	59	140	159	805	541	279	108	7	5	3				2133	29.51	40.60
1.5- 1.9		3	8	8	42	754	890	225	60	16	5					2011	27.83	68.42
2.0- 2.4				1	20	378	589	221	28	7	11	1				1256	17.38	85.80
2.5- 2.9						46	445	127	14	4						636	8.80	94.60
3.0- 3.4		1				4	154	58	1	2						220	3.04	97.65
3.5- 3.9							25	44	6							75	1.04	98.69
4.0- 4.4							2	52	5							59	0.82	99.50
4.5- 4.9								27	5	1						33	0.46	99.96
5.0- 5.4								2	1							3	0.04	100.00
5.5- 5.9																0	0.00	100.00
6.0- 6.4																0	0.00	100.00
6.5- 6.9																0	0.00	100.00
7.0- 7.4																0	0.00	100.00
7.5- 7.9																0	0.00	100.00
8.0- 8.4																0	0.00	100.00
8.5- 8.9																0	0.00	100.00
9.0- 9.4																0	0.00	100.00
9.5- 9.9																0	0.00	100.00
10.0- 10.4																0	0.00	100.00
10.5- 10.9																0	0.00	100.00
11.0- 11.4																0	0.00	100.00
11.5- 11.9																0	0.00	100.00
12.0- 12.4																0	0.00	100.00
12.5- 12.9																0	0.00	100.00
13.0- 13.4																0	0.00	100.00
13.5- 13.9																0	0.00	100.00
>=14.0																0	0.00	100.00
Sum	10	31	67	149	314	2385	2819	1105	278	44	21	4	0	0	0	7227		
Rel.fr.	0.1	0.4	0.9	2.1	4.3	33.0	39.0	15.3	3.8	0.6	0.3	0.1	0.0	0.0	0.0			
Cum.fr.	0.1	0.6	1.5	3.6	7.9	40.9	79.9	95.2	99.0	99.7	99.9	100.0	100.0	100.0	100.0			
Max. Hs	0.0	3.1	1.7	2.1	2.4	3.3	4.4	5.1	5.0	4.8	2.3	2.4						
Mean Hs	0.0	1.3	1.2	1.2	1.2	1.5	1.9	2.1	1.6	1.8	1.8	1.4						
St.dev. Hs	0.0	0.3	0.2	0.2	0.4	0.5	0.6	1.0	0.9	0.8	0.4	0.7						

DATA COVERAGE: 60.7%

EMS-GULLFAKS C
Annual Synthesis/Analysis 1996

Frequency table of wave period (TZ) s
and wave height (HS) m
September 1981- 1996

Hs	Tz														Sum	Rel. fr.	Cum. fr.	
	<= 0.9	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0				>= 14.0
0.5- 0.9	4	4	4	4	4	1	6	4								9	0.11	0.11
1.0- 1.4			3	1	28	502	497	174	49	4						445	5.63	5.75
1.5- 1.9		3	4	8	11	509	607	278	78	11	4	2				1258	15.92	21.67
2.0- 2.4			1			300	802	347	98	28	1	4	2	1		1515	19.17	40.84
2.5- 2.9							62	641	278	60	20	2	3	2	4	1584	20.05	60.89
3.0- 3.4						3	349	279	39	10	2	1	1			1072	13.57	74.46
3.5- 3.9							147	321	74	15	1					684	8.66	83.12
4.0- 4.4							48	234	79	17	2					558	7.06	90.18
4.5- 4.9							7	98	55	21						380	4.81	94.99
5.0- 5.4								31	41	9	2					181	2.29	97.28
5.5- 5.9								18	25	6	3		1			83	1.05	98.33
6.0- 6.4								10	22	6	4					54	0.68	99.01
6.5- 6.9								1	16	5		1				42	0.53	99.54
7.0- 7.4									5	4						23	0.29	99.84
7.5- 7.9									5	3	1					9	0.11	99.95
8.0- 8.4																4	0.05	100.00
8.5- 8.9																0	0.00	100.00
9.0- 9.4																0	0.00	100.00
9.5- 9.9																0	0.00	100.00
10.0- 10.4																0	0.00	100.00
10.5- 10.9																0	0.00	100.00
11.0- 11.4																0	0.00	100.00
11.5- 11.9																0	0.00	100.00
12.0- 12.4																0	0.00	100.00
12.5- 12.9																0	0.00	100.00
13.0- 13.4																0	0.00	100.00
13.5- 13.9																0	0.00	100.00
>=14.0																0	0.00	100.00
Sum	0	3	8	14	85	1683	3185	2075	645	159	22	11	6	5	0	7901		
Rel.fr.	0.0	0.0	0.1	0.2	1.1	21.3	40.3	26.3	8.2	2.0	0.3	0.1	0.1	0.1	0.0			
Cum.fr.	0.0	0.0	0.1	0.3	1.4	22.7	63.0	89.3	97.4	99.4	99.7	99.9	99.9	100.0	100.0			
Max. Hs		1.8	2.1	1.7	1.9	3.0	5.9	6.5	7.4	7.8	7.5	6.8	5.7	2.9				
Mean Hs		1.7	1.5	1.3	1.0	1.5	2.2	2.9	3.4	3.8	4.2	2.8	3.1	2.7				
St.dev. Hs		0.1	0.3	0.4	0.4	0.5	0.8	1.1	1.5	1.6	1.8	1.4	1.3	0.2				

DATA COVERAGE: 68.6%

Frequency table of wave period(TZ) s
and wave height(HS) m
October 1981- 1996

HS	TZ														Sum	Rel. fr.	Cum. fr.	
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=			
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0			
<= 0.4	1	0.01	0.01
0.5- 0.9	.	.	.	2	46	3	10	2	.	.	.	.	.	.	.	105	1.25	1.26
1.0- 1.4	.	.	.	5	155	314	67	12	.	1	.	.	.	.	.	554	6.60	7.87
1.5- 1.9	.	.	.	1	169	418	263	38	.	5	2	.	.	.	.	897	10.69	18.56
2.0- 2.4	.	.	.	2	170	548	387	109	44	3	.	.	.	.	.	1263	15.06	33.62
2.5- 2.9	55	557	442	151	65	10	.	.	.	.	.	1280	15.26	48.88
3.0- 3.4	.	.	.	1	9	463	463	205	54	9	1	.	.	.	.	1205	14.37	63.25
3.5- 3.9	.	.	.	2	.	256	433	181	57	3	.	.	.	.	.	932	11.11	74.36
4.0- 4.4	.	.	.	2	.	86	402	162	56	6	.	.	.	.	.	714	8.51	82.87
4.5- 4.9	16	217	200	54	9	.	.	.	.	.	.	496	5.91	88.78
5.0- 5.4	1	111	232	40	5	.	.	.	.	.	.	389	4.64	93.42
5.5- 5.9	63	164	45	7	.	.	.	.	.	.	279	3.33	96.75
6.0- 6.4	2	19	81	29	4	.	.	.	.	.	.	135	1.61	98.35
6.5- 6.9	2	4	42	16	3	.	.	.	.	.	.	67	0.80	99.15
7.0- 7.4	11	6	2	.	.	.	.	.	.	19	0.23	99.38
7.5- 7.9	2	1	5	1	.	.	.	.	9	0.11	99.49
8.0- 8.4	1	1	6	.	.	.	.	.	8	0.10	99.58
8.5- 8.9	2	12	1	.	.	.	.	15	0.18	99.76
9.0- 9.4	9	.	.	.	.	.	9	0.11	99.87
9.5- 9.9	6	.	.	.	.	.	10	0.12	99.99
10.0- 10.4	0	0.00	99.99
10.5- 10.9	1	.	.	.	1	0.01	100.00
11.0- 11.4	0	0.00	100.00
11.5- 11.9	0	0.00	100.00
12.0- 12.4	0	0.00	100.00
12.5- 12.9	0	0.00	100.00
13.0- 13.4	0	0.00	100.00
13.5- 13.9	0	0.00	100.00
>=14.0	0	0.00	100.00
Sum	0	0	0	1	15	605	2705	2874	1601	477	102	8	0	0	0	8388		
Rel.fr.	0.0	0.0	0.0	0.0	0.2	7.2	32.2	34.3	19.1	5.7	1.2	0.1	0.0	0.0	0.0			
Cum.fr.	0.0	0.0	0.0	0.0	0.2	7.4	39.7	73.9	93.0	98.7	99.9	100.0	100.0	100.0	100.0			
Max. Hs	.	.	.	1.7	4.3	6.8	5.2	6.9	8.0	8.9	9.8	10.8	.	.	.			
Mean Hs	.	.	.	1.7	2.2	1.8	2.5	3.3	4.2	4.2	5.9	8.6	.	.	.			
St.dev. Hs	.	.	.	0.0	1.3	0.7	0.8	1.1	1.3	1.4	2.5	2.4	.	.	.			

DATA COVERAGE: 70.5%

Frequency table of wave period(TZ) s
and wave height(HS) m
November 1981- 1996

HS	TZ																Sum	Rel. fr.	Cum. fr.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=				
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4																2	0.03	0.03	
0.5- 0.9						2	30	2	1							35	0.45	0.47	
1.0- 1.4					9	81	128	59	4							281	3.58	4.05	
1.5- 1.9					3	105	349	238	90	24	8					817	10.40	14.45	
2.0- 2.4					1	113	422	292	150	31	1					1010	12.86	27.31	
2.5- 2.9						34	495	463	134	30	1					1157	14.73	42.05	
3.0- 3.4						4	331	443	181	30	5					994	12.66	54.71	
3.5- 3.9							214	472	143	22						851	10.84	65.54	
4.0- 4.4							71	428	148	24	2					673	8.57	74.11	
4.5- 4.9							25	305	224	31	11					596	7.59	81.70	
5.0- 5.4							7	161	216	35	12	2				433	5.51	87.22	
5.5- 5.9								81	159	32	8	3				283	3.60	90.82	
6.0- 6.4								45	130	57	5	6				243	3.09	93.91	
6.5- 6.9								7	81	76	4	4	1			173	2.20	96.12	
7.0- 7.4						1	1	3	41	61	12	2				121	1.54	97.66	
7.5- 7.9									20	37	13	1				71	0.90	98.56	
8.0- 8.4									14	20	16	2				52	0.66	99.22	
8.5- 8.9									4	15	15	4				38	0.48	99.71	
9.0- 9.4										4	6	1				11	0.14	99.85	
9.5- 9.9										3	4	1				8	0.10	99.95	
10.0- 10.4											3					3	0.04	99.99	
10.5- 10.9												1				1	0.01	100.00	
11.0- 11.4																0	0.00	100.00	
11.5- 11.9																0	0.00	100.00	
12.0- 12.4																0	0.00	100.00	
12.5- 12.9																0	0.00	100.00	
13.0- 13.4																0	0.00	100.00	
13.5- 13.9																0	0.00	100.00	
>=14.0																0	0.00	100.00	
Sum	0	0	0	0	13	342	2073	2999	1740	532	126	27	1	0	0	7853			
Rel.fr.	0.0	0.0	0.0	0.0	0.2	4.4	26.4	38.2	22.2	6.8	1.6	0.3	0.0	0.0	0.0				
Cum.fr.	0.0	0.0	0.0	0.0	0.2	4.5	30.9	69.1	91.3	98.0	99.6	100.0	100.0	100.0	100.0				
Max. Hs					2.0	7.0	7.4	7.2	8.8	9.6	10.3	10.7	6.7						
Mean Hs					1.4	1.9	2.6	3.5	4.4	5.5	6.6	7.2	6.7						
St.dev. Hs					0.2	0.6	0.8	1.1	1.6	2.0	2.2	1.5	0.0						

DATA COVERAGE: 68.2%

Frequency table of wave period(Tz) s
and wave height(Hs) m
December 1981- 1996

Hs	Tz																	Sum	Rel. fr.	Cum. fr.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=					
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0					
<= 0.4	1	.	.	.	.	.	.	.	.	.	1	0.01	0.01		
0.5-	20	10	2	.	.	.	.	.	.	.	32	0.38	0.40		
1.0-	3	21	151	123	13	13	4	1	.	.	.	329	3.95	4.34		
1.5-	57	308	235	142	26	.	.	.	.	.	768	9.21	13.55		
2.0-	72	290	328	175	47	8	.	.	.	.	920	11.03	24.59		
2.5-	.	3	.	.	.	23	395	440	267	62	7	.	.	.	.	1197	14.36	38.94
3.0-	.	1	2	.	.	3	369	414	225	67	4	.	.	.	.	1085	13.01	51.95
3.5-	.	.	1	3	.	.	228	524	236	89	5	.	.	.	.	1086	13.02	64.98
4.0-	.	.	.	1	1	1	97	505	254	52	13	2	.	.	.	926	11.11	76.09		
4.5-	1	26	355	198	63	14	4	.	.	1	662	7.94	84.02		
5.0-	6	193	214	51	5	1	.	.	.	470	5.64	89.66		
5.5-	2	71	144	67	7	1	.	.	.	292	3.50	93.16		
6.0-	26	122	68	6	.	.	.	.	222	2.66	95.83		
6.5-	8	73	45	5	.	.	.	.	131	1.57	97.40		
7.0-	1	42	30	8	.	.	.	.	81	0.97	98.37		
7.5-	11	32	10	.	.	.	.	53	0.64	99.00		
8.0-	6	18	14	.	.	.	.	38	0.46	99.46		
8.5-	4	7	13	.	.	.	.	24	0.29	99.75		
9.0-	7	3	.	.	.	.	10	0.12	99.87		
9.5-	1	1	.	.	.	.	2	0.02	99.89		
10.0-	4	.	.	.	.	4	0.05	99.94		
10.5-	2	.	.	.	.	2	0.02	99.96		
11.0-	1	1	.	.	.	2	0.02	99.99		
11.5-	1	.	.	.	1	0.01	100.00		
12.0-	0	0.00	100.00		
12.5-	0	0.00	100.00		
13.0-	0	0.00	100.00		
13.5-	0	0.00	100.00		
>=14.0	0	0.00	100.00		
Sum	0	4	3	4	4	199	1882	3225	2126	745	134	11	0	0	1	8338				
Rel.fr.	0.0	0.0	0.0	0.0	0.0	2.4	22.6	38.7	25.5	8.9	1.6	0.1	0.0	0.0	0.0					
Cum.fr.	0.0	0.0	0.1	0.1	0.2	2.6	25.1	63.8	89.3	98.2	99.9	100.0	100.0	100.0	100.0					
Max. Hs	.	3.1	3.8	4.0	4.1	4.8	5.6	7.3	8.9	9.5	11.4	11.5	.	.	4.7					
Mean Hs	.	2.8	3.5	3.7	2.0	1.9	2.7	3.5	4.0	4.7	6.0	5.6	.	.	4.7					
St.dev. Hs	.	0.2	0.3	0.2	1.4	0.6	0.9	1.1	1.5	1.9	2.5	3.0	.	.	0.0					

DATA COVERAGE: 70.0%

Frequency table of wave period(Tz) s
and wave height(Hs) m
Jan.-Dec. 1981- 1996

Hs	Tz																Sum	Rel.	Cum.
	<=	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	>=	fr.	fr.	fr.	
	0.9	1.9	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.0				
<= 0.4	10			1	19	23	4	1								58	0.06	0.06	
0.5- 0.9		27	72	149	292	1965	992	432	225	88	16	2	1		2	4023	4.31	4.37	
1.0- 1.4		6	22	25	174	5091	4352	2185	832	292	120	30	14			13675	14.64	19.01	
1.5- 1.9		6	6	9	29	4861	5941	2908	955	181	78	21	9			15181	16.26	35.27	
2.0- 2.4		3	15	6	4	2571	6030	3333	1148	295	58	9	2	1		13493	14.45	49.72	
2.5- 2.9		16	3	1	4	605	5520	3402	1293	372	41	8	3	4		11277	12.08	61.80	
3.0- 3.4		29	7	3	3	44	3541	3622	1400	416	53	2	1			9103	9.75	71.55	
3.5- 3.9		9	1	2	3	2	1716	3803	1346	419	18					7346	7.87	79.41	
4.0- 4.4			1		3	1	622	3332	1337	317	52	3				5679	6.08	85.50	
4.5- 4.9					1	1	169	2119	1520	322	54	7			1	4195	4.49	89.99	
5.0- 5.4					1	1	30	1174	1477	292	54	9				3038	3.25	93.24	
5.5- 5.9			1				4	572	1196	322	45	9	1			2150	2.30	95.54	
6.0- 6.4						2		230	886	389	41	10	2			1560	1.67	97.21	
6.5- 6.9						2		65	510	378	41	6	1	1		992	1.06	98.28	
7.0- 7.4						1	1	21	247	299	47	2				618	0.66	98.94	
7.5- 7.9								8	98	187	53	4				350	0.37	99.31	
8.0- 8.4								1	41	111	73	3				229	0.25	99.56	
8.5- 8.9								1	16	66	82	10				175	0.19	99.75	
9.0- 9.4									1	33	53	9				96	0.10	99.85	
9.5- 9.9									2	9	25	15				51	0.05	99.90	
10.0- 10.4										4	18	6				28	0.03	99.93	
10.5- 10.9											10	5	1			28	0.03	99.96	
11.0- 11.4										1	15	3				19	0.02	99.98	
11.5- 11.9										1	4	2				7	0.01	99.99	
12.0- 12.4											3		1			4	0.00100.00		
12.5- 12.9											3					3	0.00100.00		
13.0- 13.4												1				1	0.00100.00		
13.5- 13.9																0	0.00100.00		
>=14.0																0	0.00100.00		
Sum	13	108	123	191	1041	15170	28922	27209	14530	4804	1047	176	36	6	3	93379			
Rel.fr.	0.0	0.1	0.1	0.2	1.1	16.2	31.0	29.1	15.6	5.1	1.1	0.2	0.0	0.0	0.0				
Cum.fr.	0.0	0.1	0.3	0.5	1.6	17.8	48.8	77.9	93.5	98.6	99.8	100.0	100.0	100.0	100.0				
Max. Hs	2.9	4.2	5.9	4.0	5.1	7.0	7.4	8.5	9.7	11.4	12.6	13.3	12.3	6.6	4.7				
Mean Hs	0.7	2.7	1.7	1.3	1.2	1.5	2.3	3.1	4.0	4.6	5.4	5.3	2.6	3.3	2.0				
St.dev. Hs	1.2	1.0	0.9	0.5	0.5	0.5	0.8	1.2	1.7	2.1	3.0	3.5	2.7	1.6	2.3				

DATA COVERAGE: 66.6%

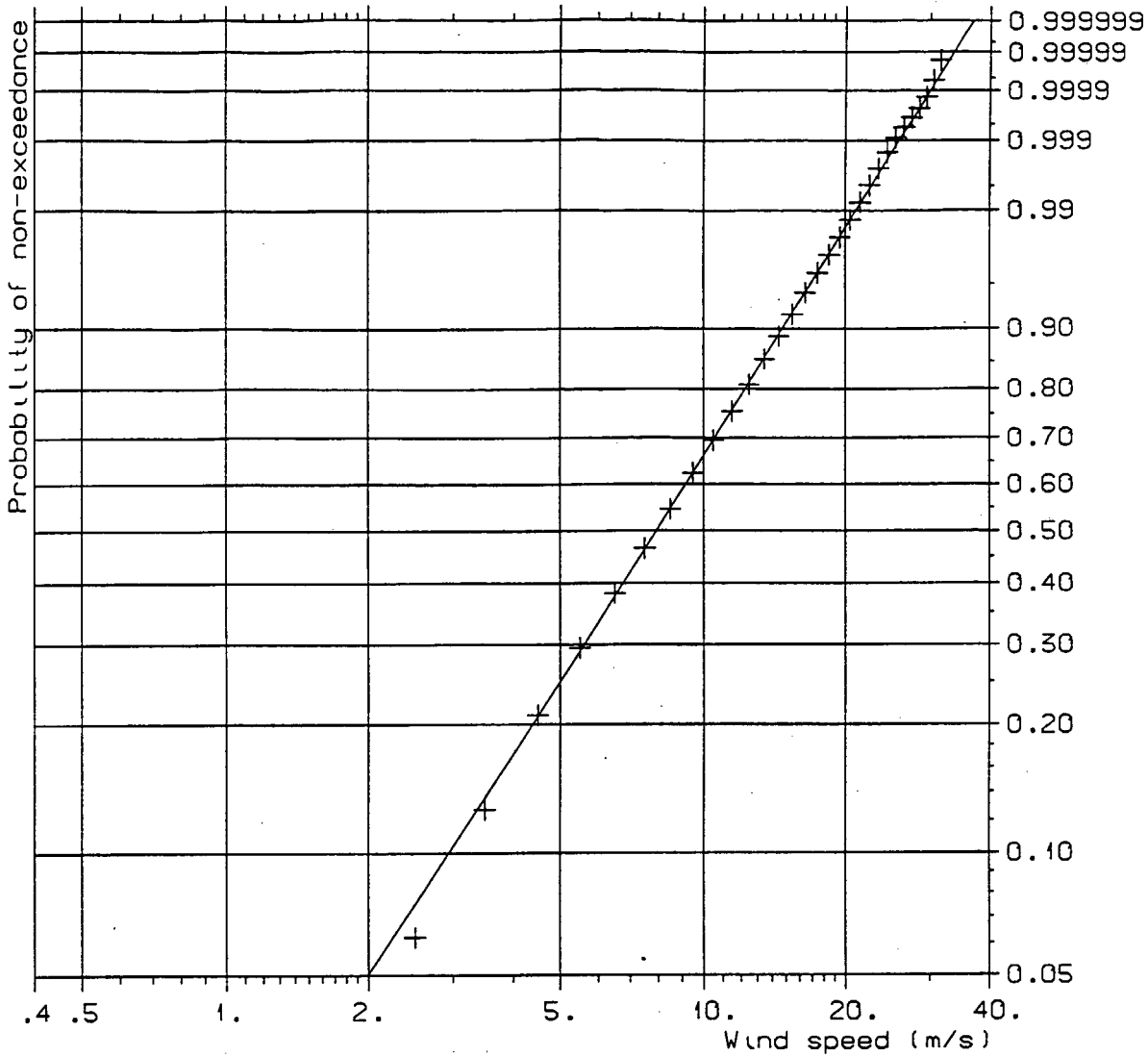
STATISTICS

	Mean Hs	St.dev. Hs	Maximum Hs	Tz	date
January	4.0	1.8	13.3	11.0	31.01.1995 11 UT
February	3.5	1.5	11.1	11.5	29.02.1988 01 UT
March	3.4	1.6	11.9	10.8	12.03.1996 11 UT
April	2.5	1.2	8.6	10.5	30.04.1981 20 UT
May	1.9	0.9	7.7	9.8	21.05.1991 23 UT
June	1.7	0.8	5.8	7.8	01.06.1996 11 UT
July	1.5	0.6	4.9	8.5	19.07.1983 06 UT
August	1.7	0.7	5.1	7.7	25.08.1982 13 UT
September	2.4	1.1	7.8	9.4	26.09.1995 04 UT
October	3.2	1.4	10.8	11.7	30.10.1983 19 UT
November	3.6	1.6	10.7	11.0	24.11.1981 14 UT
December	3.5	1.5	11.5	11.0	12.12.1990 08 UT

	Mean Tz	St.dev. Tz	Maximum Tz	Hs	date
January	7.7	1.1	13.0	6.6	14.01.1986 08 UT
February	7.5	1.0	12.2	1.9	17.02.1982 22 UT
March	7.4	1.0	11.0	9.8	02.03.1987 04 UT
April	6.9	1.2	12.7	1.7	07.04.1986 05 UT
May	6.4	1.0	21.5	0.7	30.05.1987 10 UT
June	6.3	0.9	11.0	2.0	15.06.1986 22 UT
July	6.1	1.1	14.7	0.6	18.07.1984 00 UT
August	6.1	1.1	11.7	1.1	27.08.1984 12 UT
September	6.7	1.0	13.0	2.7	30.09.1987 02 UT
October	7.3	1.0	11.7	10.8	30.10.1983 19 UT
November	7.5	1.0	12.0	6.7	17.11.1982 02 UT
December	7.6	1.0	14.2	4.7	26.12.1985 20 UT

5. Computation of 10-100 year estimates

5.1 10-100 year estimates of the wind speed based on the 10 m level



MODEL DISTRIBUTION:

WEIBULL parameters:

Shape	1.965
Scale	9.747
Location	-0.156

Estimated using:
Method of Moments

ESTIMATED EXTREMES:

"RETURN" PERIOD	VALUE
- years -	- m/s -
1.0	27.9
5.0	30.6
25.	33.2
100.	35.2

Duration of exceedance:
3.0 hours

OBSERVED DISTRIBUTION:

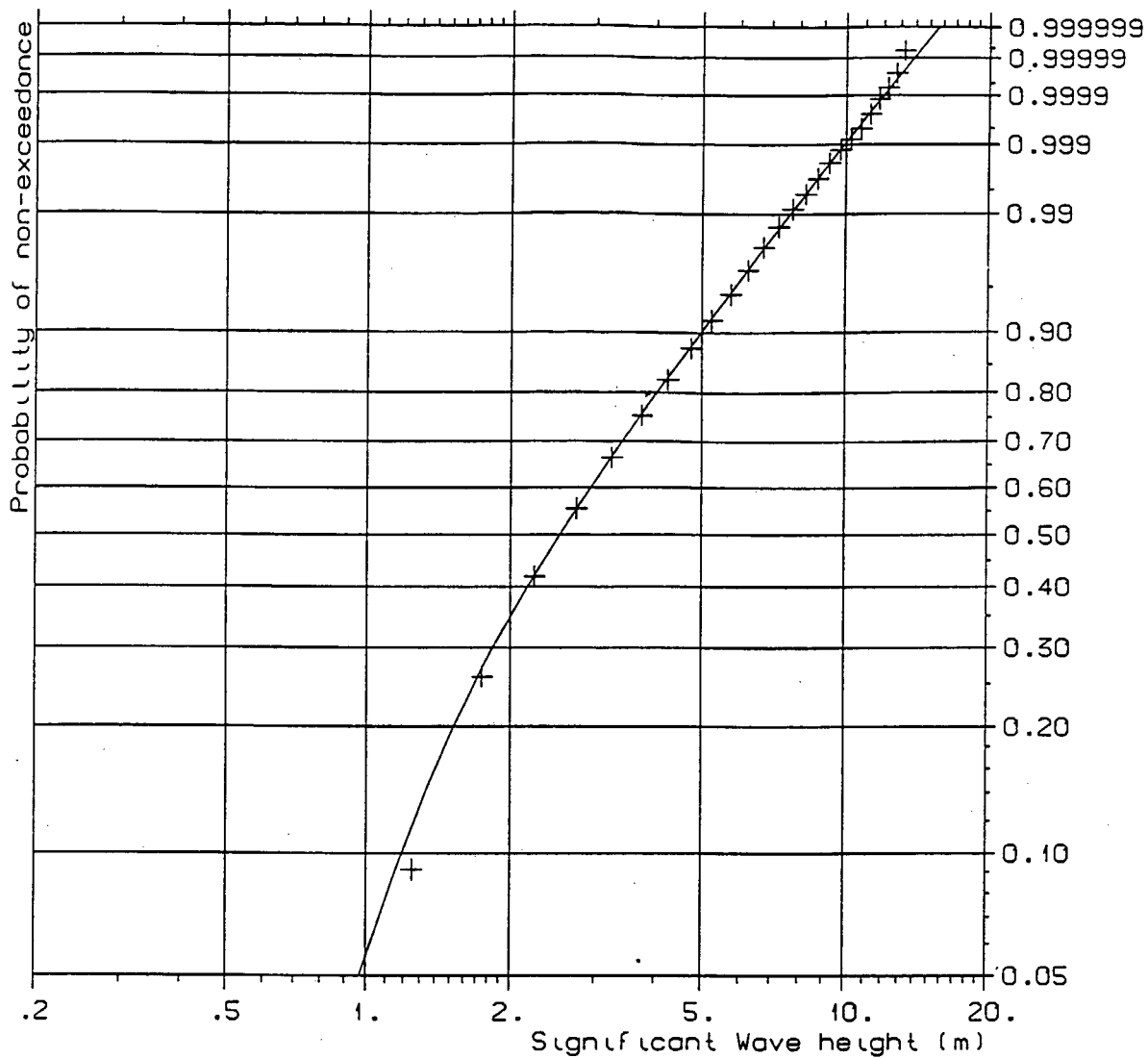
Mean value	8.48
Std. deviation	4.59
Skewness	0.66

GENERAL INFORMATION:

No. of data	: 123590
No. of indep. data:	3433

STATFJORD A/GULLFAKS C 1984-1996	FIGURE
Wind speed measured in top of derrick reduced to 10 m a.m.s.l.	5.1

5.2 10-100 year estimates of significant wave height based on data from buoy located at Statfjord A (until dec 1991) and MIROS wave radar on Gullfaks C

MODEL DISTRIBUTION:

WEIBULL parameters:

Shape 1.441
Scale 2.424
Location 0.659

Estimated using:
Method of Moments

ESTIMATED EXTREMES:

"RETURN" PERIOD	VALUE
- years -	- m -
1.0	10.9
5.0	12.3
25.	13.6
100.	14.7

Duration of exceedance:
3.0 hours

OBSERVED DISTRIBUTION:

Mean value 2.86
Std. deviation 1.55
Skewness 1.14

GENERAL INFORMATION:

No. of data : 93379
No. of indep. data: 2594

STATFJORD A/GULLFAKS C 1981-1996
Significant Wave height measured
by buoy (-> 1990) and wave radar

FIGURE

5.2

6. References

- Kvalitetskontroll rapport naturdata, januar 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, februar 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, mars 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, april 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, mai 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, juni 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, juli 1996, Miros a/s
- Kvalitetskontroll rapport naturdata, august 1996, Miros a/s
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- Myklebust, Rasmus K.: Utplassert teneste på Treasure Saga blokk 30/6 januar og februar 1996.DNMI, Vervarslinga på Vestlandet, Rapportnr:VpV001/96.

Appendix A

Complete set of parameters available in the format DF022.

Block		Parameter	Observasjons	Middl	Enhet	Merknad
-Navn	-Par	-nr -kode Navn	sted	tid		
WR1-031	01	07 VARn				
WR1-031	02	08 Hm0			m*m	Ref. to Point Spectrum
WR1-031	03	09 Tp1			m	
WR1-031	04	10 SDp1			s	of Point Spectrum
WR1-031	05	11 Dp1			m*m/Hz	of Point Spectrum
WR1-031	06	12 Dm1			deg	
WR1-031	07	13 SPR1			deg	
WR1-031	08	14 H2			deg	Around the Mean
WR1-031	09	15 Tp2			m	
WR1-031	10	16 SDp2			s	
WR1-031	11	17 Dp2			m*m/Hz	
WR1-031	12	18 Dm2			deg	
WR1-031	13	19 SPR2			deg	
WR1-031	14	20 Dpt			deg	Around the Mean
WR1-031	15	21 Dmt			deg	
WR1-031	16	22 SPRt			deg	
WR1-031	17	23 Tz			deg	Around the Mean
WR1-031	18	24 Tav			s	
WR1-031	19	25 CM			s	
WR1-031	20	26 CD			m/s	Str|m
WR1-031	21	27 CE			deg	Str|m
WR1-031	22	28 CN			m/s	Str|m
WR1-031	23	29 SPRc			m/s	Str|m
WR1-031	24	30 Hmax			m/s	Str|m
WR1-031	25	31 Ts			m	
WR1-031	26	32 Tmax			m	
WR1-031	27	33 HTmax			s	
WR1-031	28	34 THmax			m	
WR1-031	29	35			s	
WR1-031	30	36				
ST1-002	01	38 Tew1				
ST2-002	01	40 Tew2			deg	
WL1-002	01	42 Hw1			deg	
WL2-002	01	44 Hw2			m	
WIA-015	01	46 DifWsa			m	
WIA-015	02	47 DifWsa			m/s	
WIA-015	03	48 Mwmla			deg	
WIA-015	04	49 Mwala			m/s	
WIA-015	05	50 Mwpla			m/s	
WIA-015	06	51 Dwm1a			m/s	
WIA-015	07	52 Dwa1a			deg	
WIA-015	08	53 Dwp1a			deg	
WIA-015	09	54 Mwm2a			deg	
WIA-015	10	55 Mwa2a	10 m		m/s	
WIA-015	11	56 Mwp2a	10 m		m/s	
WIA-015	12	57 Dwm2a	10 m		m/s	
WIA-015	13	58 Dwa2a			deg	
WIA-015	14	59 Dwp2a			deg	
WIB-015	01	61 DifWsa			deg	
WIB-015	02	62 DifWsa			m/s	
WIB-015	03	63 Mwmlb			deg	
WIB-015	04	64 Mwalb			m/s	
WIB-015	05	65 Mwplb			m/s	
WIB-015	06	66 Dwm1b			deg	
WIB-015	07	67 Dwalb			deg	
WIB-015	08	68 Dwp1b			deg	
WIB-015	09	69 Mwm2b	10 m		deg	
WIB-015	10	70 Mwa2b	10 m		m/s	
WIB-015	11	71 Mwp2b	10 m		m/s	
WIB-015	12	72 Dwm2b			deg	
WIB-015	13	73 Dwa2b			deg	
WIB-015	14	74 Dwp2b			deg	
TH1-009	01	76 Teal	70 m		1 min	deg
TH1-009	02	77 Ted1	70 m		1 min	deg
TH1-009	03	78 Hua1	70 m		1 min	%RH
TH1-009	04	79 Pa11	70 m		1 min	hPa
TH1-009	05	80 Pa21	70 m		1 min	hPa
TH1-009	06	81 Pa31	80 m		1 min	hPa QNH
TH1-009	07	82 Pa41	00 m		1 min	hPa QFE
TH1-009	08	83 Pa51	00 m		1 min	hPa QFF
TH2-009	01	85 Tea2	70 m		1 min	deg
TH2-009	02	86 Ted2	70 m		1 min	deg
TH2-009	03	87 Hua2	70 m		1 min	%RH
TH2-009	04	88 Pa12	70 m		1 min	hPa
TH2-009	05	89 Pa22	80 m		1 min	hPa QNH
TH2-009	06	90 Pa32	00 m		1 min	hPa QFE
TH2-009	07	91 Pa42	00 m		1 min	hPa QFF
TH2-009	08	92 Pa52	00 m		1 min	hPa
CL1-005	01	94 Hc11			1 min	hPa
CL1-005	02	95 Hc21			m	
CL1-005	03	96 Hc31			m	
CL1-005	04	97 Hv11			m	
V11-002	01	99 Lv11			m	
PT1-002	01	101 Hr11			m	
MR1-005	01	103 Mwpp31			mm	
MR1-005	02	104 Uwpp31			m/s	
MR1-005	03	105 Mwpp31			h:m	
MR1-005	04	106 Uwpp31			m/s	
MR2-005	01	108 Mwpp61			h:m	
MR2-005	02	109 Uwpp61			m/s	
MR2-005	03	110 Mwpp61			h:m	
MR2-005	04	111 Uwpp61			m/s	
WS1-248	01	154			h:m	
WS1-248	02	155			deg	
WS1-248	03	156			deg	
WS1-248	04	157			m*m/Hz	
WS1-248	248	401			m*m/Hz	
CV1-007	01	403			m*m/Hz	
CV1-007	02	404			m*m/Hz	
CV1-007	03	405			m*s	
CV1-007	04	406			m*s	
CV1-007	05	407			m*s	
CV1-007	06	408			m*s	