

Wind Resource Assessment for Emmonak, Alaska

Sponsored by:
US DOE Tribal Energy Program
www.eere.energy.gov/tribalenergy

Met Tower Location:

N 62.7767
W 164.5260

Contact:

Tony Jiminez
National Wind Technology Center
National Renewable Energy Laboratory
1617 Cole Blvd. (MS3811)
Golden, CO 80401

Tony_Jimenez@nrel.gov

phone: 303-384-7027
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Project: **YKHC**
 Description: Data from file(s)
 Y:\5000\shared\Anemometer_Loan_Programs\WPA.NA.Loans\YKHC - Emmonak - AK\Wind Data\YKHC-Emmonak 030225.csv
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Meteo data report, height: 20.0 m

Name of meteo object: YKHC - Emmonak

Data from: 03/31/2003 9:50 AM Data to: 02/03/2004 3:00 PM Observations: 44528 Observations per day: 144 Recovery rate: 100%

day	03/03	04/03	05/03	06/03	07/03	08/03	09/03	10/03	11/03	12/03	01/04	02/04
1		144	144	(133)	144	144	(133)	144	144	(142)	144	144
2		144	(142)	144	(130)	144	144	(141)	144	144	144	144
3		144	144	144	144	144	144	144	144	144	144	(91)
4		144	144	144	144	(119)	144	144	144	144	144	
5		144	144	(142)	144	144	144	144	144	144	144	
6		144	144	(141)	144	144	144	144	144	(142)	144	
7		144	(140)	(135)	(143)	(138)	(131)	144	144	144	144	
8		144	(141)	144	(134)	(129)	144	144	144	144	144	
9		144	(98)	(138)	144	(131)	(131)	144	144	144	144	
10		144	144	(143)	(142)	(140)	144	144	144	144	144	
11		144	144	144	(134)	(140)	144	144	144	(141)	144	
12		144	(124)	144	144	(141)	144	144	(141)	(71)	(143)	
13		144	144	144	144	(139)	(134)	144	(142)	(13)	(137)	
14		144	144	144	144	144	144	144	(125)	(72)	(0)	
15		(136)	(137)	144	(141)	144	144	144	144	144	(0)	
16		(56)	(136)	144	(142)	144	144	144	(138)	144	(0)	
17		(143)	(143)	(143)	144	144	144	144	144	144	(23)	
18		144	(138)	144	144	144	144	144	144	144	(0)	
19		144	144	(143)	(143)	(137)	144	144	144	(137)	(106)	
20		144	(139)	144	144	144	(134)	144	144	(129)	144	
21		(143)	(137)	(134)	144	144	(137)	144	144	144	144	
22		144	144	(119)	144	144	144	144	(143)	144	144	
23		144	144	144	144	144	144	144	144	144	144	
24		144	144	(141)	(124)	144	144	144	144	(97)	144	
25		144	144	(143)	(133)	144	144	144	(139)	(112)	144	
26		144	144	144	144	(142)	(139)	(142)	(137)	144	144	
27		144	144	(135)	144	144	144	144	(143)	144	144	
28		144	144	144	144	(142)	144	144	144	144	144	
29		144	144	144	(143)	144	(141)	144	144	144	144	
30		144	144	(137)	144	144	144	144	(132)	144	144	
31	(85)		144		(126)	144		144		144	144	
%	100	(98)	(98)	(98)	(98)	(98)	(98)	(100)	(99)	(91)	(83)	(100)

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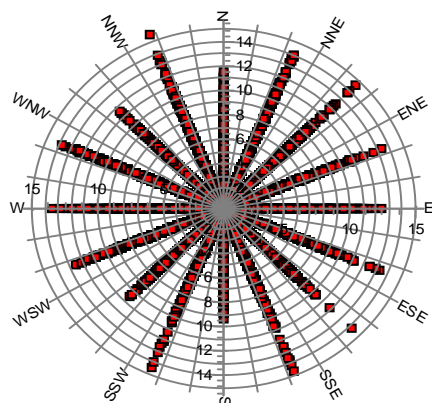
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 +1 303-384-7027

Calculated:

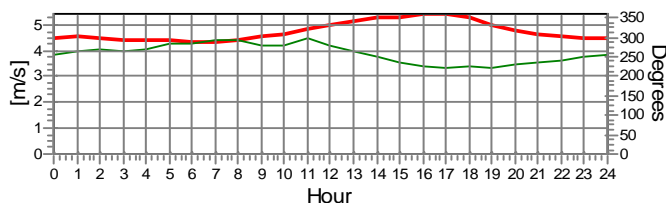
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Meteo data report, height: 20.0 m

Name of meteo object: YKHC - Emmonak



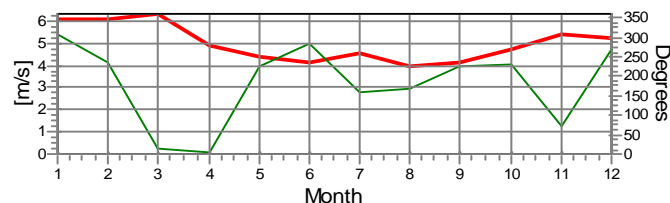
Wind speed [m/s]



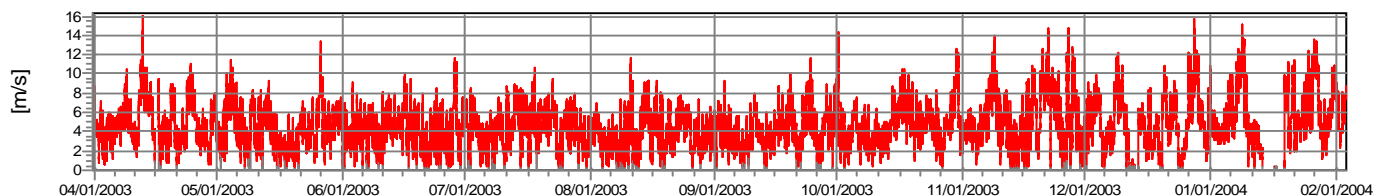
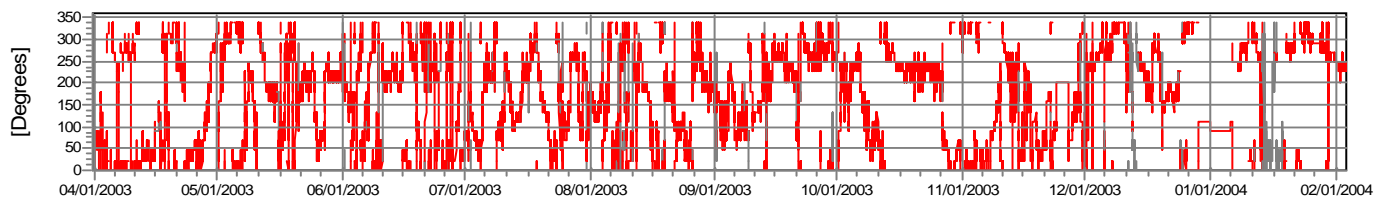
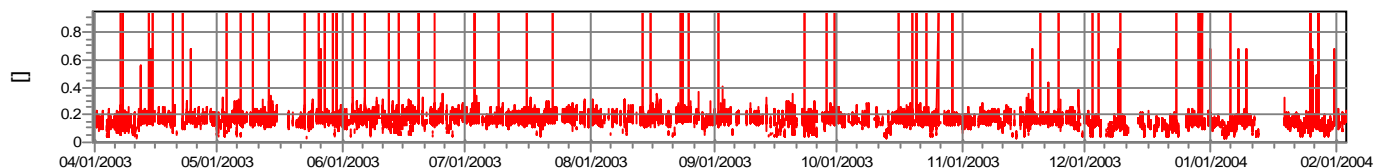
— Wind speed. Height: 20.0 m — Wind direction. Height: 20.0 m

Monthly mean values of wind speed in m/s

Month	2003	2004	mean	mean of months
Jan		6.0	6.0	6.0
Feb		6.1	6.1	6.1
Mar	6.3		6.3	6.3
Apr	4.9		4.9	4.9
May	4.4		4.4	4.4
Jun	4.2		4.2	4.2
Jul	4.5		4.5	4.5
Aug	3.9		3.9	3.9
Sep	4.2		4.2	4.2
Oct	4.7		4.7	4.7
Nov	5.4		5.4	5.4
Dec	5.3		5.3	5.3
mean, all data	4.6	6.1	4.8	
mean of months	4.8	6.1		5.0



— Wind speed. Height: 20.0 m — Wind direction. Height: 20.0 m

Wind speed**Wind direction****Turbulence intensity
V>4.0 m/s**

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Meteo data report, height: 20.0 m

Name of meteo object: YKHC - Emmonak

Frequency

Wind speed m/s	Sum	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0.00 - 0.49	256	18	17	14	24	5	11	11	15	10	18	17	26	28	22	12	8
0.50 - 1.49	1,973	128	156	117	141	107	125	87	92	130	189	124	120	114	139	111	93
1.50 - 2.49	4,307	297	306	179	341	244	228	158	182	262	405	369	373	271	316	219	157
2.50 - 3.49	7,068	476	516	402	464	405	295	360	295	502	625	706	450	505	414	368	285
3.50 - 4.49	8,070	410	620	496	379	503	285	379	379	503	566	1,005	717	652	502	334	340
4.50 - 5.49	7,041	393	469	421	351	560	325	327	337	331	471	877	755	616	367	163	278
5.50 - 6.49	5,226	309	270	238	268	322	286	208	248	251	388	780	492	456	354	137	219
6.50 - 7.49	3,518	183	173	183	216	121	172	143	179	182	255	441	301	399	247	101	222
7.50 - 8.49	2,171	116	173	149	138	107	149	82	83	105	115	179	205	205	142	52	171
8.50 - 9.49	1,393	56	155	127	82	108	100	42	41	26	37	75	97	137	102	56	152
9.50 - 10.49	786	26	99	65	46	71	48	23	29	1	13	22	36	72	91	42	102
10.50 - 11.49	535	24	49	37	31	29	14	3	26	0	8	1	41	49	98	25	100
11.50 - 12.49	240	1	24	21	11	7	11	1	12	0	9	0	21	13	73	5	31
12.50 - 13.49	128	2	18	7	3	1	10	1	17	0	8	0	2	10	35	0	14
13.50 - 14.49	64	0	20	6	0	0	1	1	10	0	7	0	0	2	8	0	9
14.50 - 15.49	14	0	2	2	0	0	0	0	2	0	3	0	0	0	1	0	4
15.50 - 16.49	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1
Sum	42,793	2,439	3,067	2,466	2,495	2,590	2,060	1,826	1,947	2,303	3,117	4,596	3,636	3,529	2,911	1,625	2,186

Turbulence

Wind speed	Sum	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
0.00 - 0.49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.50 - 1.49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.50 - 2.49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2.50 - 3.49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3.50 - 4.49	0.149	0.154	0.152	0.177	0.182	0.160	0.177	0.181	0.164	0.140	0.127	0.144	0.145	0.135	0.130	0.113	0.129
4.50 - 5.49	0.157	0.149	0.159	0.178	0.180	0.162	0.176	0.180	0.152	0.151	0.148	0.157	0.151	0.152	0.134	0.125	0.146
5.50 - 6.49	0.173	0.167	0.186	0.188	0.193	0.183	0.188	0.174	0.153	0.158	0.157	0.176	0.178	0.175	0.159	0.148	0.163
6.50 - 7.49	0.163	0.167	0.183	0.180	0.175	0.183	0.172	0.172	0.132	0.150	0.144	0.165	0.177	0.168	0.149	0.132	0.158
7.50 - 8.49	0.163	0.165	0.179	0.179	0.171	0.179	0.164	0.163	0.128	0.149	0.151	0.171	0.172	0.169	0.154	0.118	0.148
8.50 - 9.49	0.168	0.176	0.190	0.179	0.172	0.176	0.178	0.167	0.123	0.152	0.151	0.183	0.167	0.169	0.149	0.123	0.158
9.50 - 10.49	0.164	0.169	0.186	0.181	0.174	0.188	0.171	0.166	0.129	0.157	0.162	0.164	0.172	0.156	0.142	0.124	0.157
10.50 - 11.49	0.165	0.160	0.204	0.181	0.184	0.187	0.183	0.166	0.139		0.189	0.175	0.177	0.164	0.140	0.137	0.159
11.50 - 12.49	0.160	0.178	0.179	0.179	0.174	0.182	0.187	0.154	0.147		0.194		0.167	0.163	0.141	0.123	0.153
12.50 - 13.49	0.162	0.155	0.179	0.176	0.182	0.186	0.189	0.163	0.141		0.192		0.165	0.140	0.152		0.158
13.50 - 14.49	0.169		0.176	0.172			0.193	0.169	0.172		0.183			0.150	0.143		0.160
14.50 - 15.49	0.164		0.187	0.145					0.130		0.192				0.171		0.156
15.50 - 16.49	0.158			0.173													0.127
Sum	0.161	0.160	0.172	0.180	0.181	0.171	0.177	0.176	0.148	0.150	0.147	0.163	0.162	0.159	0.145	0.128	0.152

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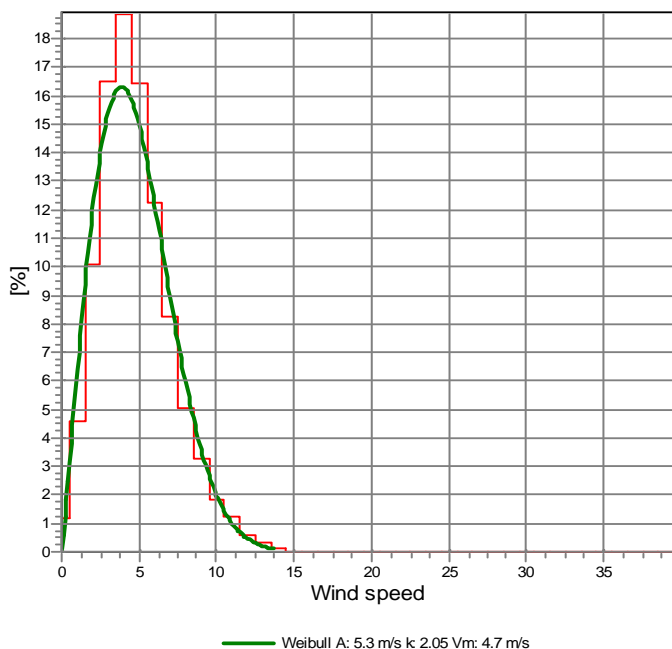
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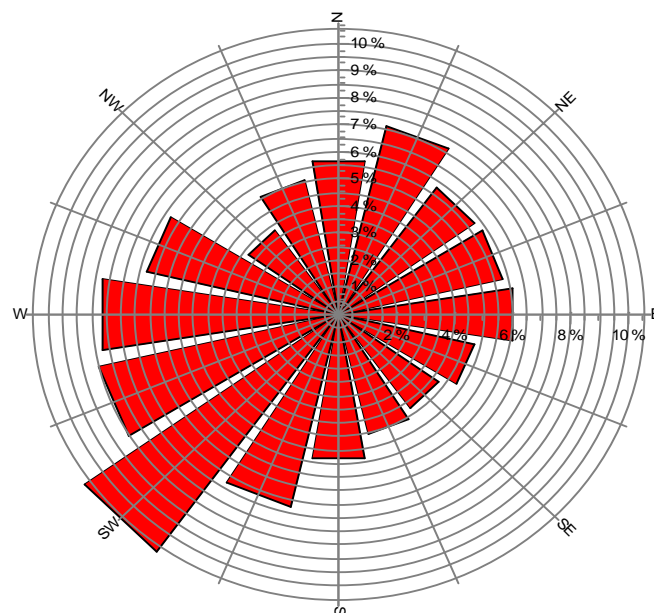
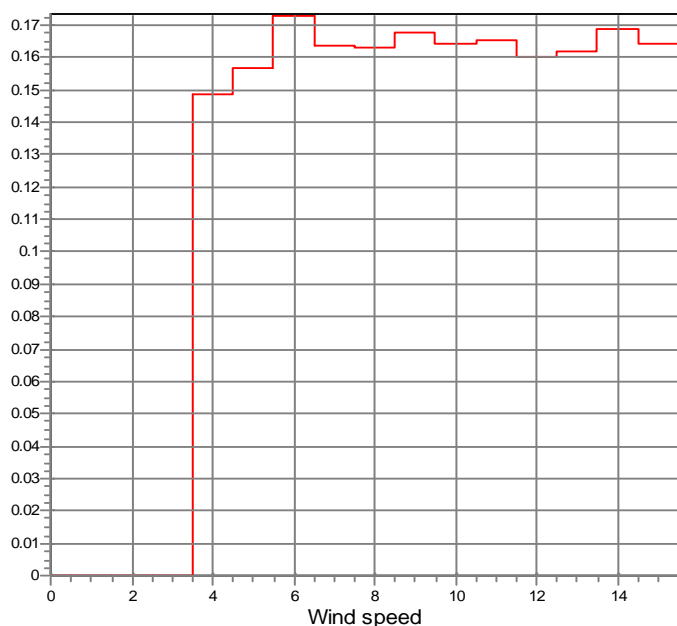
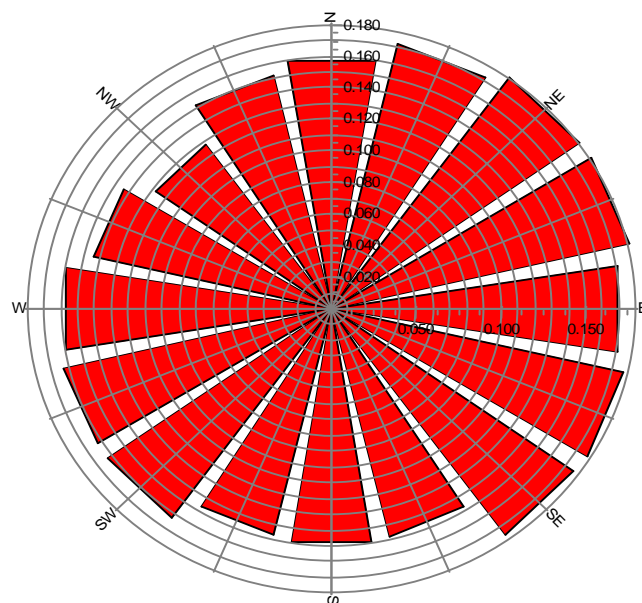
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Name of meteo object: YKHC - Emmonak

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Turbulence
V>4.0 m/sTurbulence
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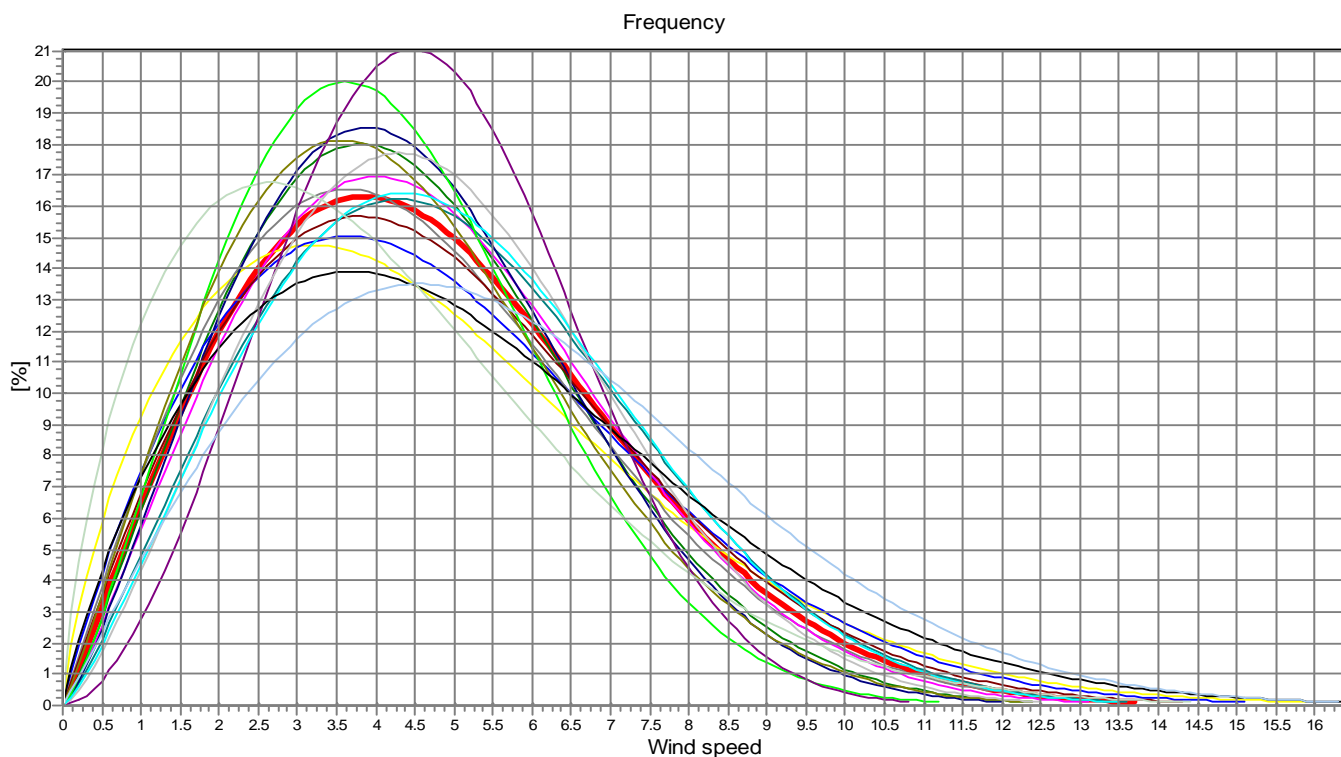
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Weibull Data

k-parameter correction: 0.0080/m

Sector	A- parameter [m/s]	Mean wind speed [m/s]	k- parameter	Frequency	Frequency [%]	Wind shear
0-N	5.05	4.47	2.179	5.70	5.7	0.00
1-NNE	5.31	4.74	1.713	7.17	7.2	0.00
2-NE	5.47	4.85	1.871	5.76	5.8	0.00
3-ENE	5.16	4.57	1.984	5.83	5.8	0.00
4-E	5.33	4.72	2.164	6.05	6.1	0.00
5-ESE	5.64	5.00	2.201	4.81	4.8	0.00
6-SE	5.03	4.46	2.253	4.27	4.3	0.00
7-SSE	5.43	4.81	1.975	4.55	4.5	0.00
8-S	4.68	4.15	2.265	5.38	5.4	0.00
9-SSW	4.87	4.31	2.088	7.28	7.3	0.00
10-SW	5.24	4.67	2.783	10.74	10.7	0.00
11-WSW	5.44	4.82	2.352	8.50	8.5	0.00
12-W	5.66	5.01	2.244	8.25	8.2	0.00
13-WNW	5.79	5.15	1.803	6.80	6.8	0.00
14-NW	4.61	4.12	1.654	3.80	3.8	0.00
15-NNW	6.39	5.66	2.022	5.11	5.1	0.00
mean	5.34	4.73	2.051	100.00	100.0	0.00



Total A: 5.3 m/s k 2.05 Vm: 4.7 m/s N A: 5.1 m/s k 2.18 Vm: 4.5 m/s NNE A: 5.3 m/s k 1.71 Vm: 4.7 m/s NE A: 5.5 m/s k 1.87 Vm: 4.9 m/s
 ENE A: 5.2 m/s k 1.98 Vm: 4.6 m/s E A: 5.3 m/s k 2.16 Vm: 4.7 m/s ESE A: 5.6 m/s k 2.20 Vm: 5.0 m/s SE A: 5.0 m/s k 2.25 Vm: 4.5 m/s
 SSE A: 5.4 m/s k 1.98 Vm: 4.8 m/s S A: 4.7 m/s k 2.26 Vm: 4.1 m/s SSW A: 4.9 m/s k 2.09 Vm: 4.3 m/s SW A: 5.2 m/s k 2.78 Vm: 4.7 m/s
 WSW A: 5.4 m/s k 2.35 Vm: 4.8 m/s W A: 5.7 m/s k 2.24 Vm: 5.0 m/s WNW A: 5.8 m/s k 1.80 Vm: 5.2 m/s NW A: 4.6 m/s k 1.65 Vm: 4.1 m/s
 NNW A: 6.4 m/s k 2.02 Vm: 5.7 m/s