



STRAUMMÅLING

NS 9425-2

LOKALITET OTTERHOLMEN

Radøy kommune





Resipientanalyse AS

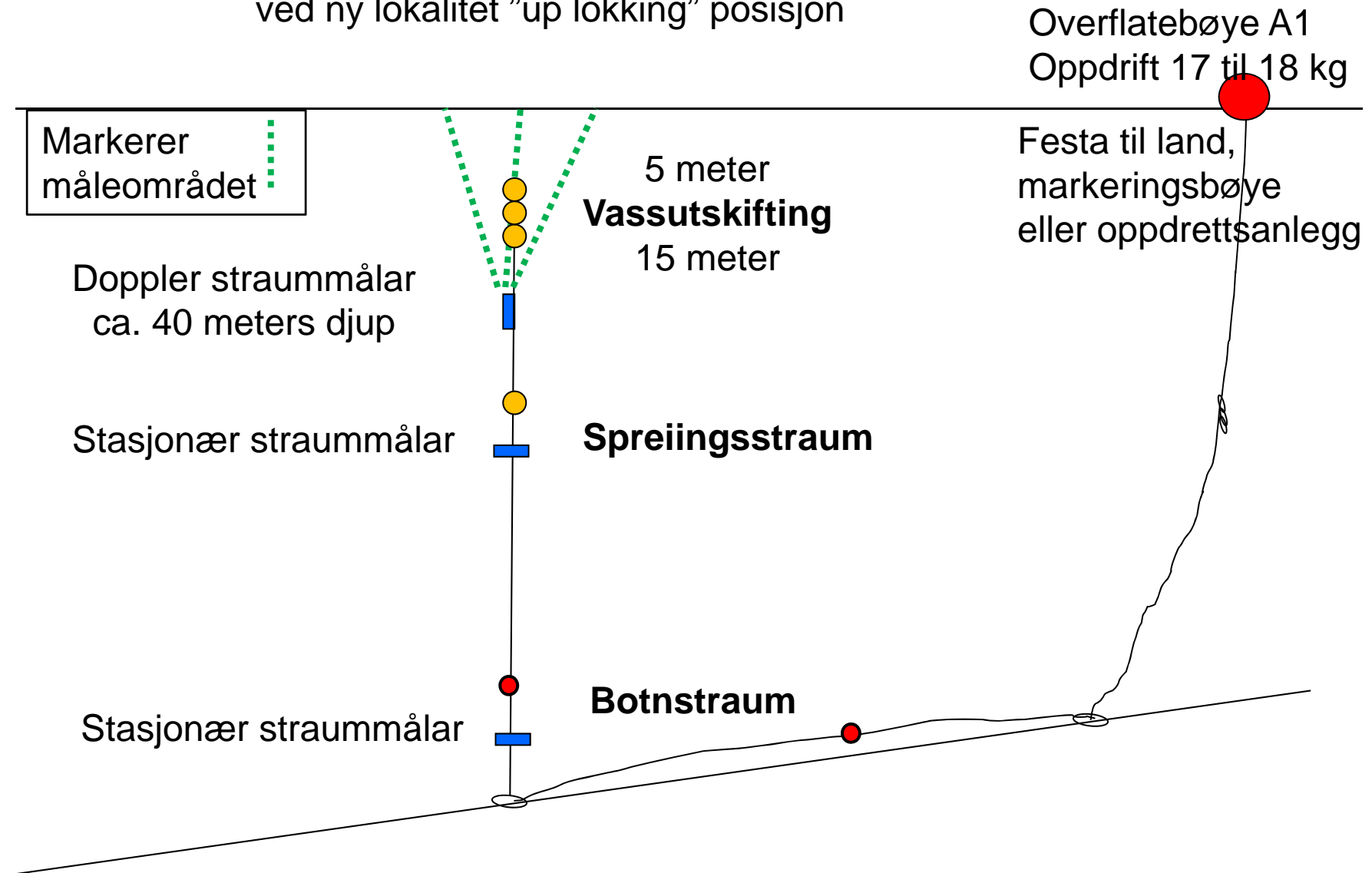
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<i>Lokalitetsnamn, lokalitetsnr.og biomasse tillatelse</i> Otterholmen		<i>Dato, rapport</i> 02 / 04 – 2012
<i>Kommune</i> Radøy kommune		<i>Dato, felt</i> Utsett: 9 / 02 – 2012 Opptak: 30 / 03 – 2012
<i>Oppdragsgjevar</i> Blom Fiskeoppdrett AS		<i>Rapport nr.</i> 722 – 2012
<i>Oppdragsart</i> Straummåling		<i>Rapportsider</i> 59
<i>Personell feltundersøking</i> Frode Berge-Haveland, Resipientanalyse AS Martin Blom, Blom Fiskeoppdrett AS		Høgste målte vasstraum: Ved 5 meters djup: 0,408 m/s MOT vest (270°). Ved 15 meters djup: 0,320 m/s MOT nord (0°).
Den gjennomsnittlege Vassutskiftingstraumen i måleperioden: 5 til 6 cm/s mellom 3 og 20 meters djup.	Den gjennomsnittlege Spreiingsstraumen i måleperioden: 2,2 cm/s 35 meters djup.	Den gjennomsnittlege Botnstraumen i måleperioden: 1,1 cm/s 60 meters djup.
<i>Samandrag</i> <p>Ein Nortek 400kHz Aquadopp profilerande strammålar blei sett ut på ca. 25 meters djup. Ein SD6000 propell strammålar stod på 35 meters djup og målte spreingsstraum og ein SD6000 propell strammålar stod på 60 meters djup. Der var ca. 65 meter djupt ved målepunktet. Doppler strammålar målte oppover i vassøyla. Straummåling i vassutskiftingslaget går MOT vest/nordvest og MOT aust/søraust. Spreiingsstraumen går i hovudsak MOT vest. Den gjennomsnittlege vassutskifting og spreingsstraum kan karakteriserast som middels sterk. Den gjennomsnittlege botnstraumen var svært svak.</p>		
<i>Fagansvarleg i Resipientanalyse</i> Frode Berge-Haveland Cand. Scient. Marin mikrobiolog Daglegleiar i Resipientanalyse		<i>Kvalitetsansvarleg i Resipientanalyse</i> Kjetil Aursland Cand. Scient. Mikrobiolog Kvalitetsleiar i Resipientanalyse

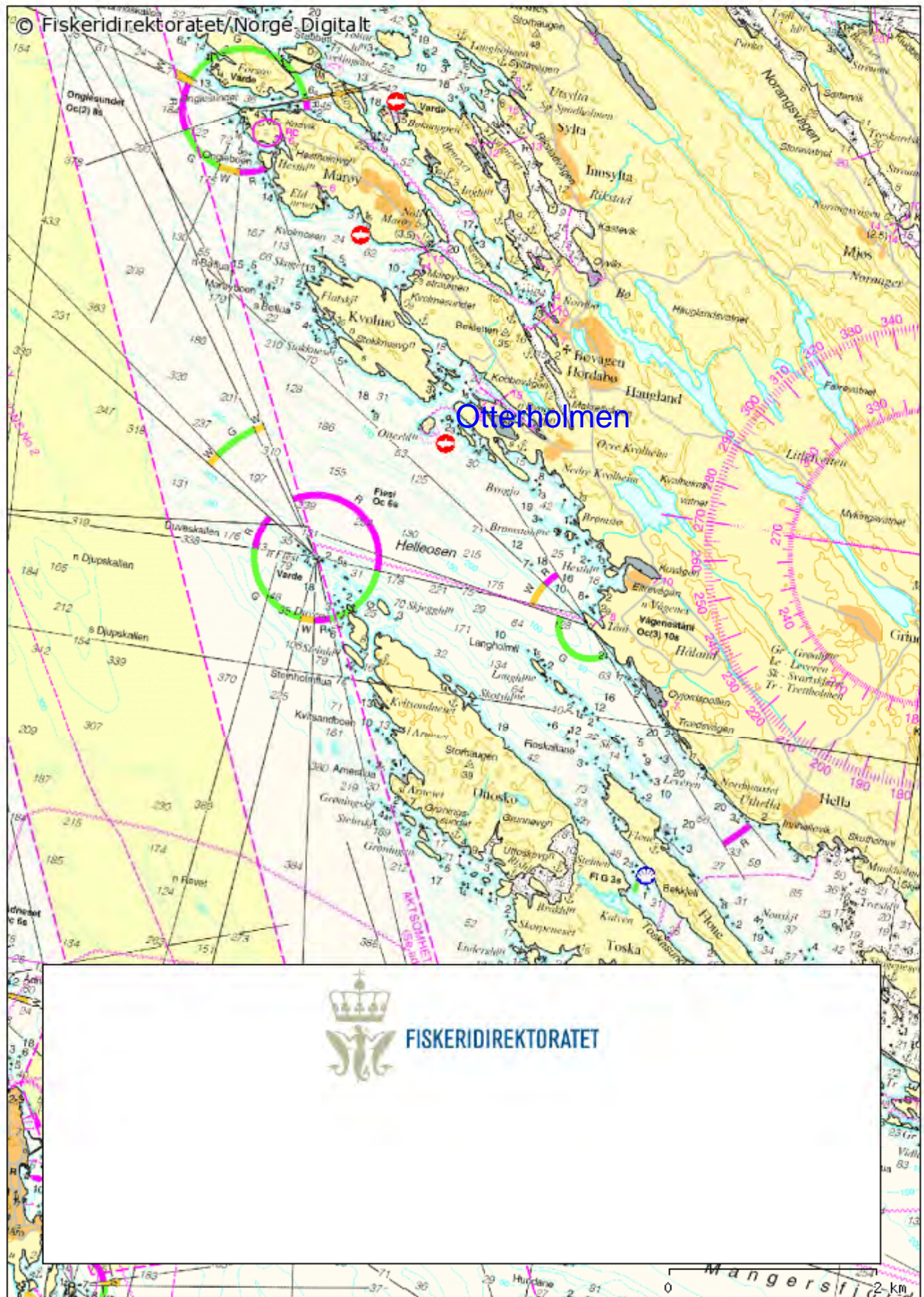
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Skisse for utsetting av straummålarar ved ny lokalitet "up lokking" posisjon



27.04.2010

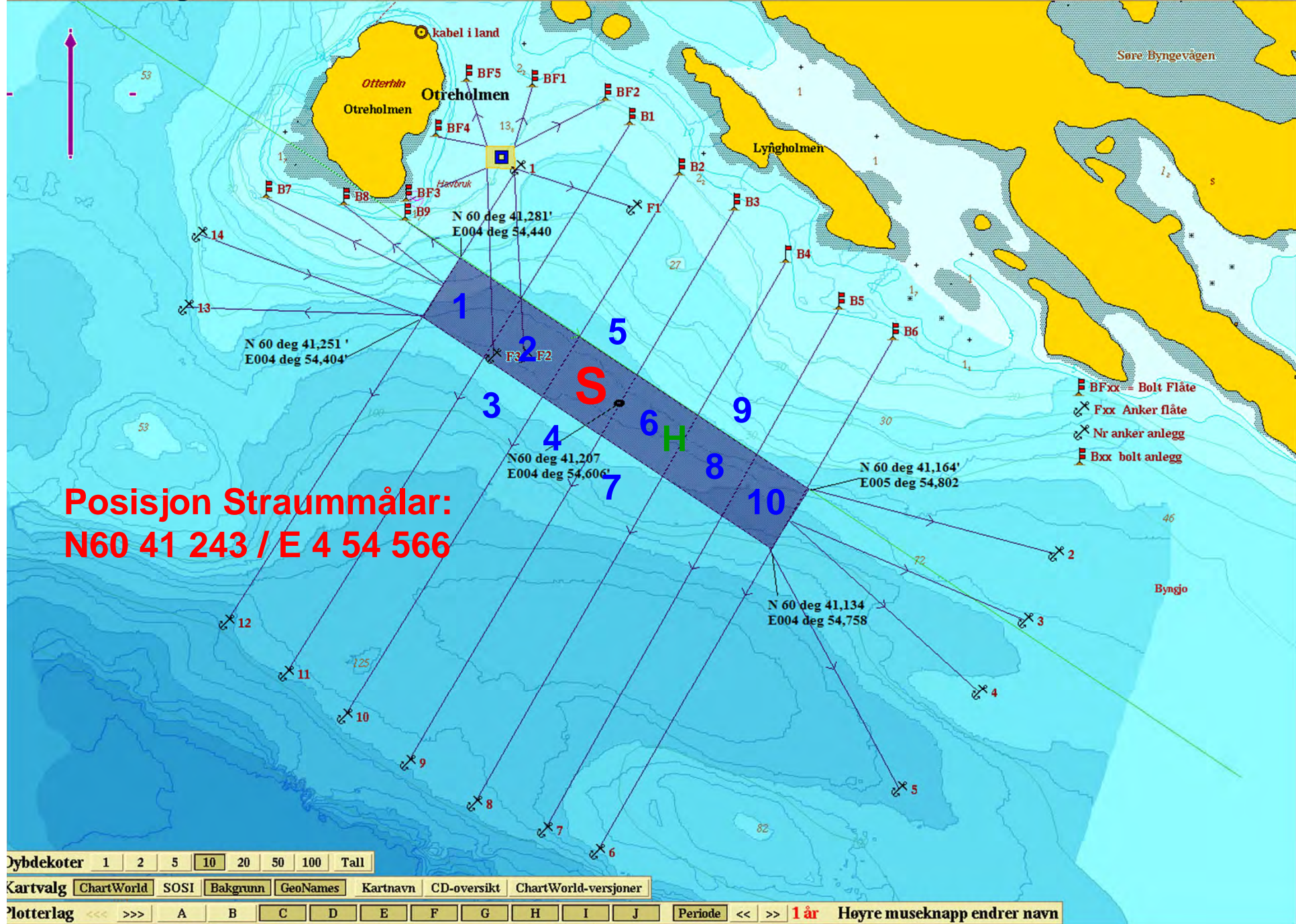


Målestokk: 1:50 000

31.03.2012



Målestokk: 10 000



Straummåling Otterholmen

Vassutskifting

31.03.2012

Resipientanalyse AS

Frode Berge-Haveland

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Summary

Details

Instrument

Head Id	AQP 5209
Board Id	AQD 9592
Frequency	400000

Configuration

Start	09.02.2012 14:00
End	30.03.2012 10:50
Data records	7182
Longitude	4° 54,57'E
Latitude	60° 41,24'N
Orientation	DOWN
Cells	30
Cell size(m)	2
Blanking distance(m)	0,99
Average interval(sec)	60
Measurement interval(sec)	600

Quality

Low Pressure Threshold	0
HighTilt Threshold	30
Expected Orientation	UP
Amplitude Spike Threshold	70
Velocity Spike Threshold	5
SNR Threshold	3

Post processing

Selected Start	09.02.2012 14:00
Selected End	30.03.2012 09:00
Compass Offset	0
Pressure Offset	0
Selected Records	7171
Reference	Water Surface
Top Depth(m)	3
Top invalid data	1227
Middle Depth(m)	5
Middle invalid data	2
Bottom Depth(m)	10
Bottom invalid data	2

Statistics

Top [3,0m]

Mean current [m/s]	0.10
Max current [m/s]	0.46
Min current [m/s]	0.00
Measurements [#]	5944
Std.dev [m/s]	0.07
Significant max velocity [m/s]	0.18
Significant min velocity [m/s]	0.04
10 year return current [m/s]	0.759
50 year return current [m/s]	0.851
Most significant directions [°]	330.00, 345.00, 315.00, 300.00
Most significant speeds [m/s]	0.10, 0.05, 0.15, 0.20
Most flow	25875.28m ³ by 315-330°.
Least flow	3670.83m ³ by 225-240°.

Middle [5,0m]

Mean current [m/s]	0.06
Max current [m/s]	0.41
Min current [m/s]	0.00
Measurements [#]	7169
Std.dev [m/s]	0.04
Significant max velocity [m/s]	0.11
Significant min velocity [m/s]	0.02
10 year return current [m/s]	0.673
50 year return current [m/s]	0.755
Most significant directions [°]	300.00, 285.00, 315.00, 270.00
Most significant speeds [m/s]	0.05, 0.10, 0.15, 0.20
Most flow	28272.53m ³ by 285-300°.
Least flow	4399.72m ³ by 15-30°.

Bottom [10,0m]

Mean current [m/s]	0.05
Max current [m/s]	0.30
Min current [m/s]	0.00
Measurements [#]	7169
Std.dev [m/s]	0.03
Significant max velocity [m/s]	0.09
Significant min velocity [m/s]	0.02
10 year return current [m/s]	0.501
50 year return current [m/s]	0.562
Most significant directions [°]	285.00, 300.00, 315.00, 135.00
Most significant speeds [m/s]	0.05, 0.10, 0.15, 0.20
Most flow	21036.01m ³ by 285-300°.
Least flow	3413.09m ³ by 15-30°.

Direction with return period

Top [3,0m]

Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,105	0,410	0,173	0,676	0,195	0,758
45	0,100	0,335	0,164	0,553	0,184	0,620
90	0,101	0,366	0,166	0,604	0,187	0,677
135	0,112	0,428	0,185	0,706	0,208	0,792
180	0,100	0,354	0,164	0,584	0,184	0,655
225	0,064	0,295	0,105	0,486	0,118	0,545
270	0,088	0,359	0,146	0,593	0,164	0,665
315	0,113	0,460	0,187	0,759	0,210	0,851

Middle [5,0m]

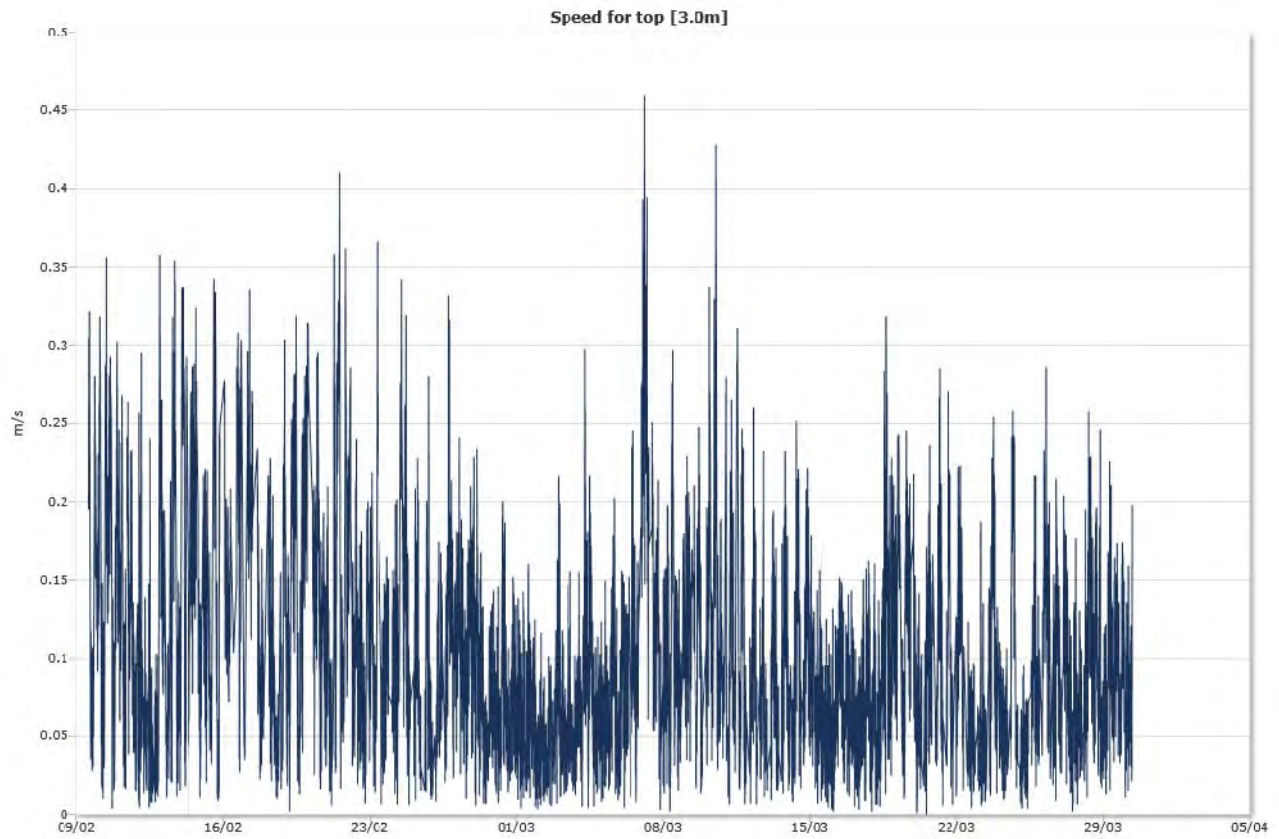
Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,045	0,168	0,075	0,278	0,084	0,311
45	0,047	0,190	0,078	0,313	0,088	0,351
90	0,065	0,229	0,107	0,379	0,120	0,425
135	0,065	0,240	0,108	0,395	0,121	0,443
180	0,053	0,249	0,088	0,410	0,098	0,460
225	0,048	0,149	0,079	0,246	0,088	0,276
270	0,070	0,408	0,116	0,673	0,130	0,755
315	0,071	0,334	0,116	0,551	0,131	0,618

Bottom [10,0m]

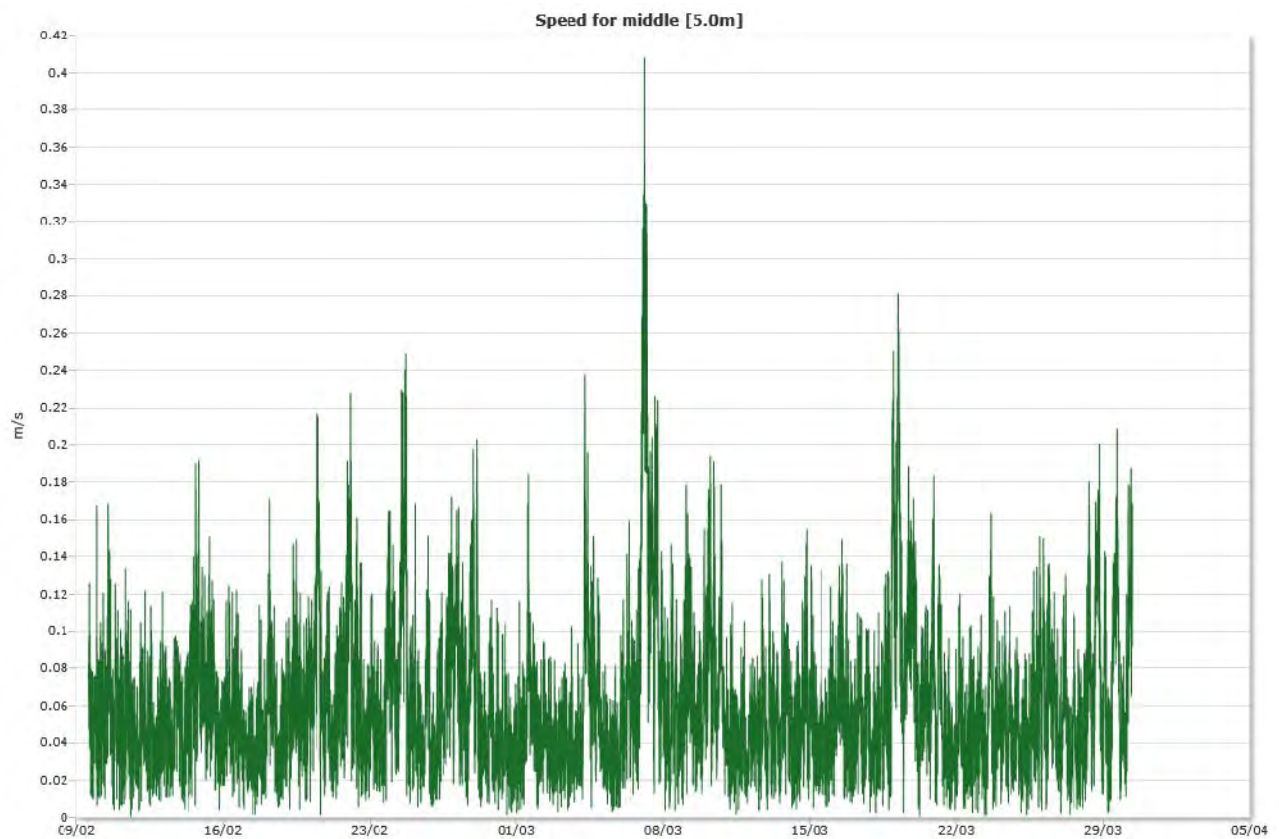
Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,042	0,157	0,070	0,259	0,078	0,290
45	0,043	0,168	0,072	0,277	0,080	0,311
90	0,055	0,259	0,091	0,427	0,103	0,479
135	0,063	0,262	0,104	0,432	0,117	0,485
180	0,049	0,182	0,082	0,301	0,091	0,337
225	0,045	0,169	0,075	0,278	0,084	0,312
270	0,059	0,210	0,097	0,347	0,108	0,389
315	0,060	0,304	0,099	0,501	0,111	0,562

Time series

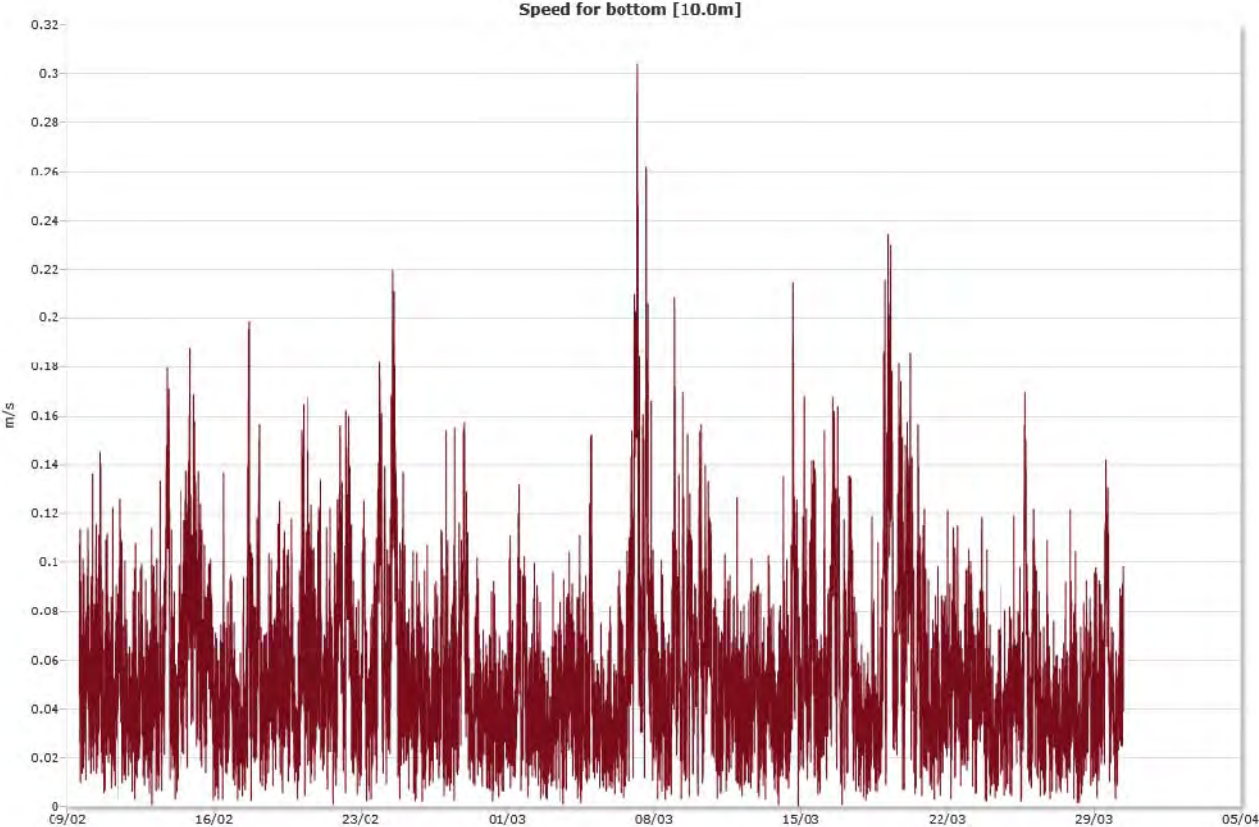
Top [3,0m]



Middle [5,0m]

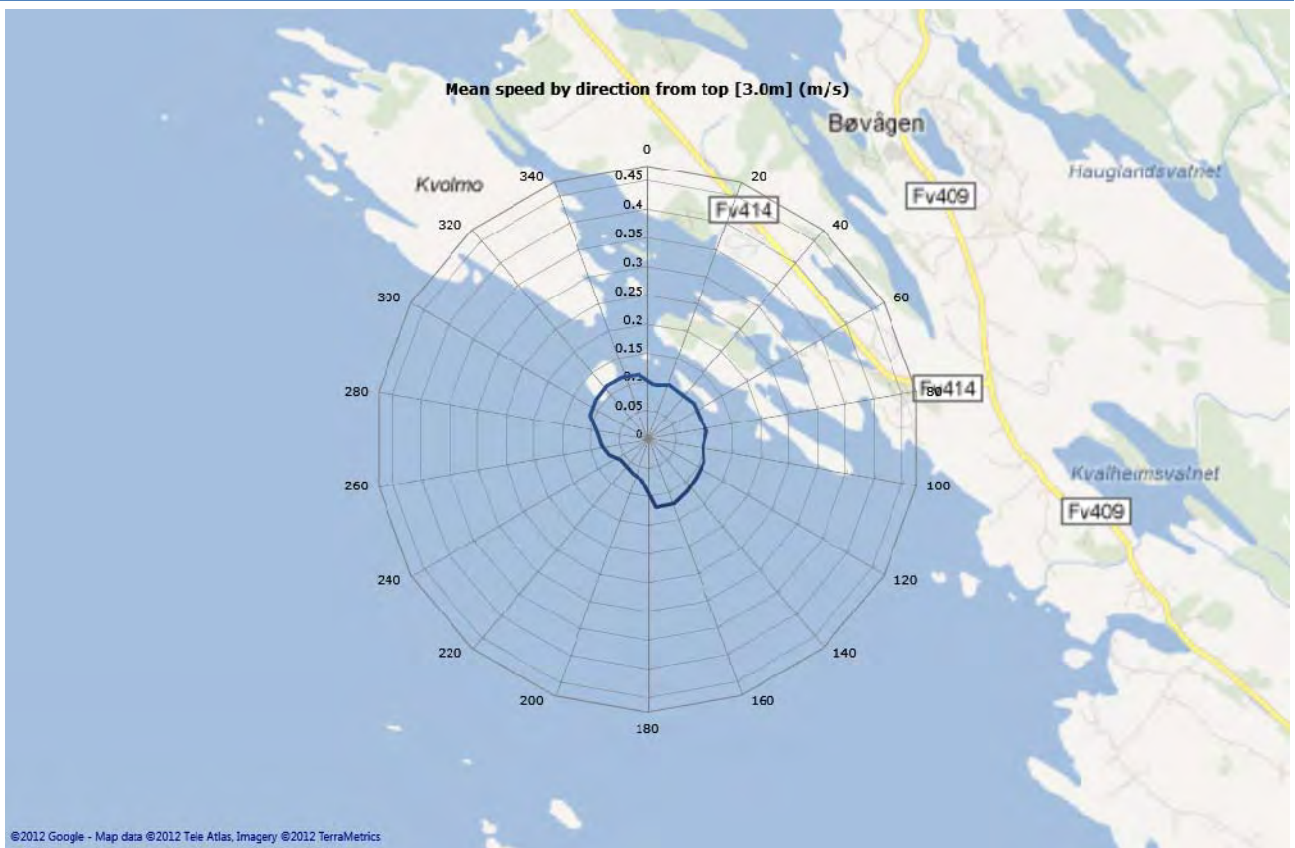


Bottom [10,0m]

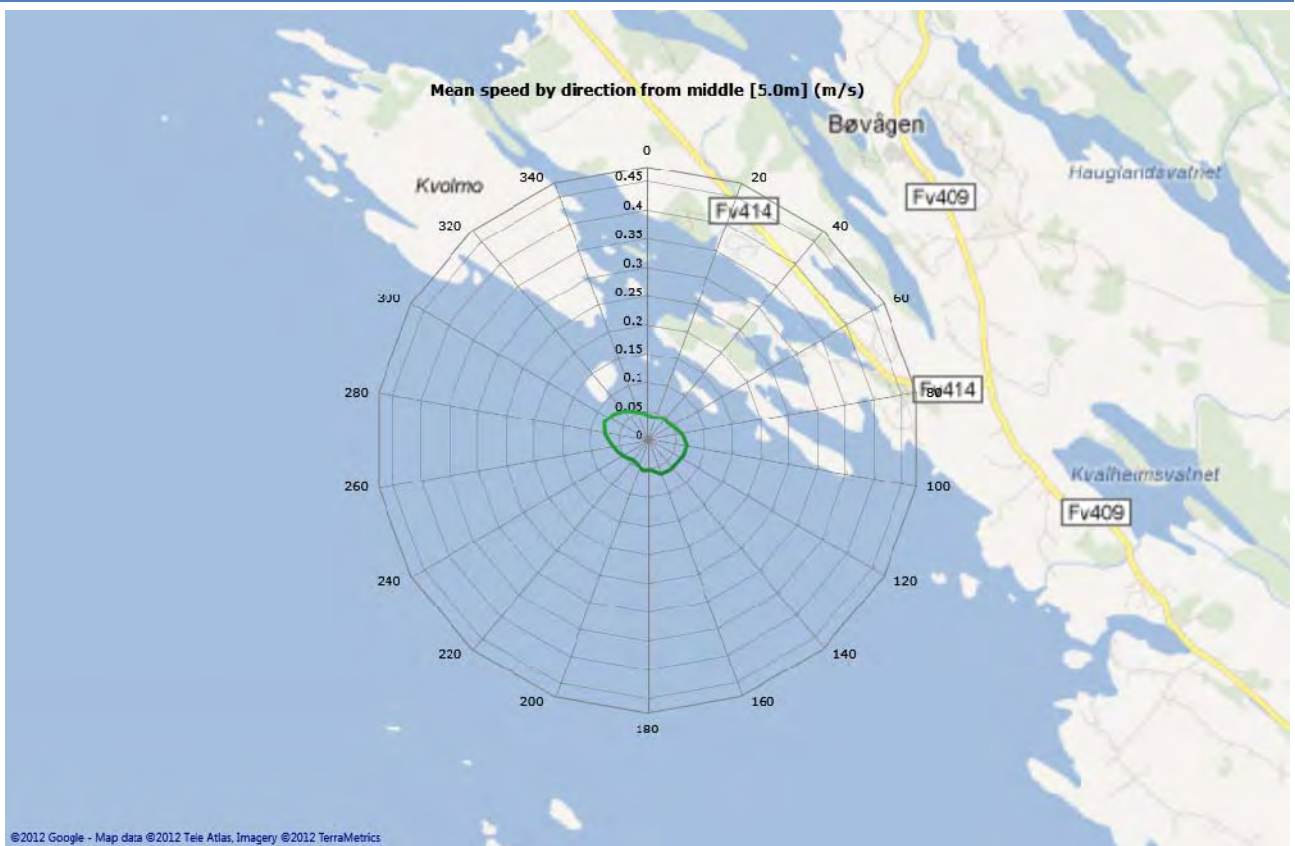


Mean speed - roseplot

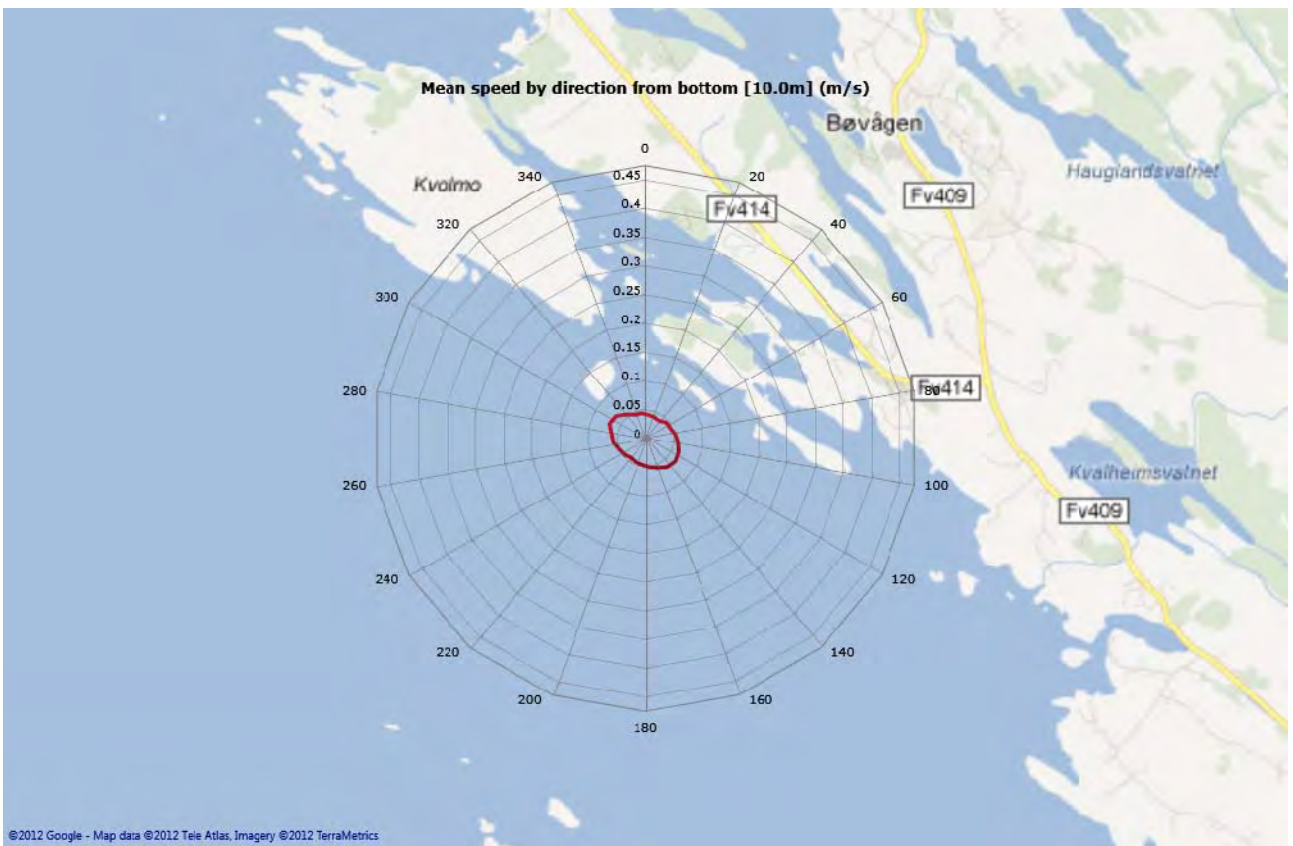
Top [3,0m]



Middle [5,0m]

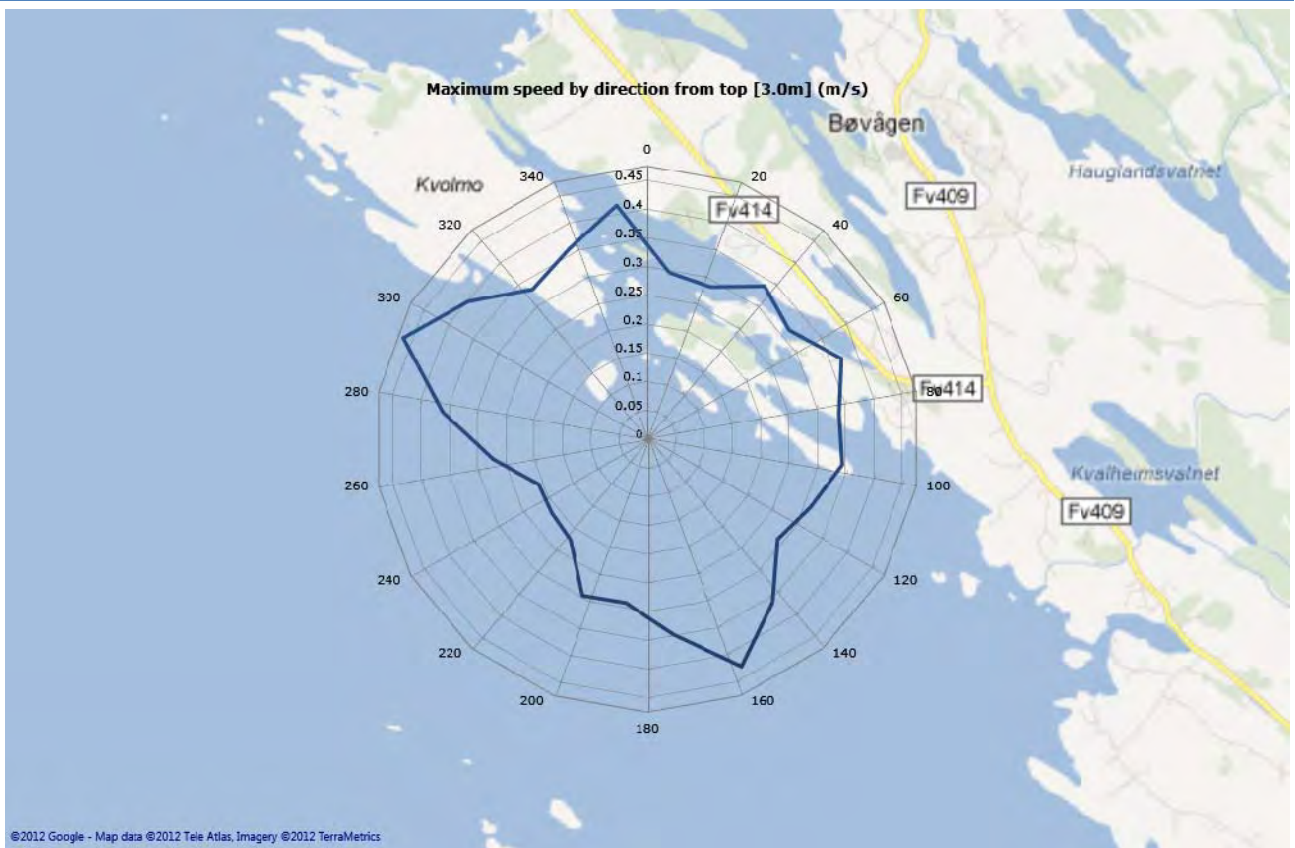


Bottom [10,0m]

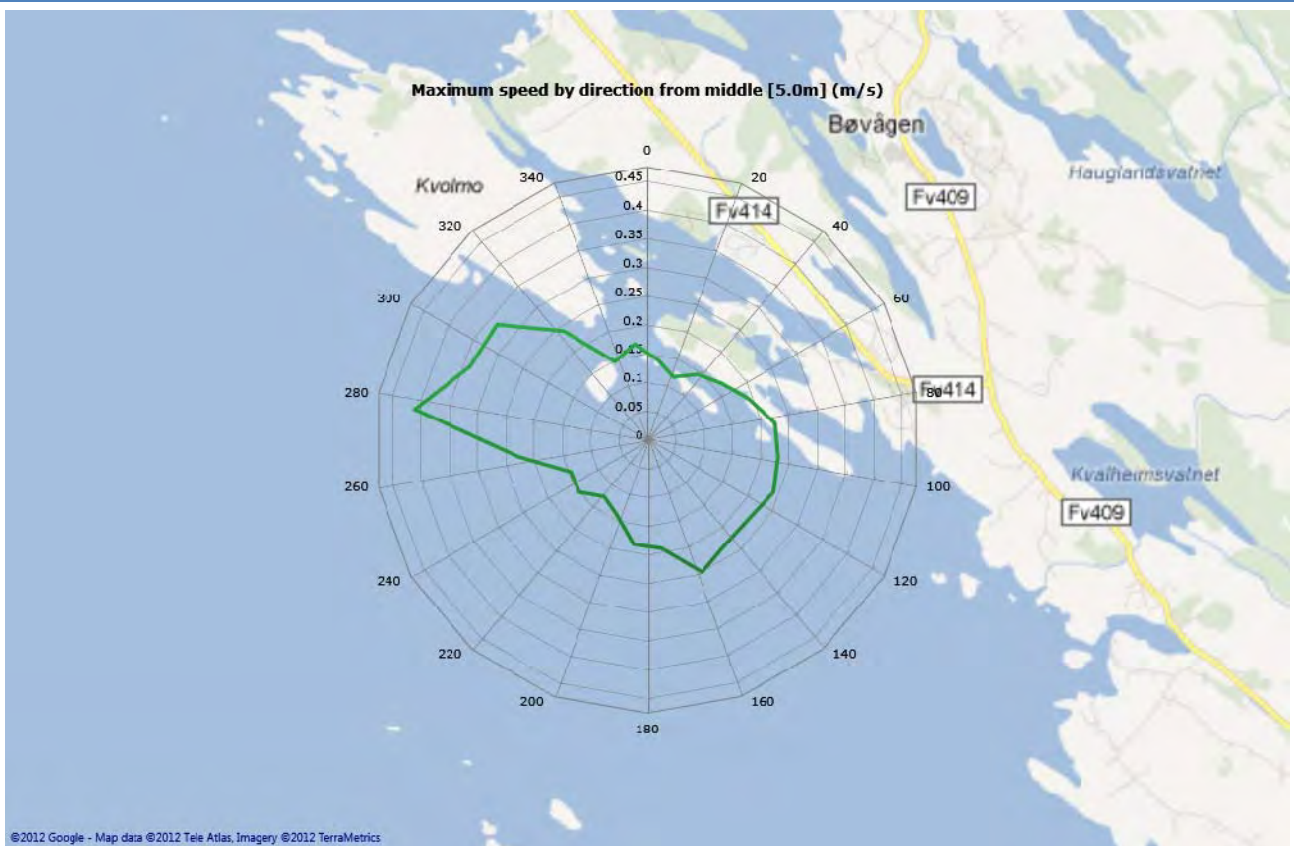


Max speed - roseplot

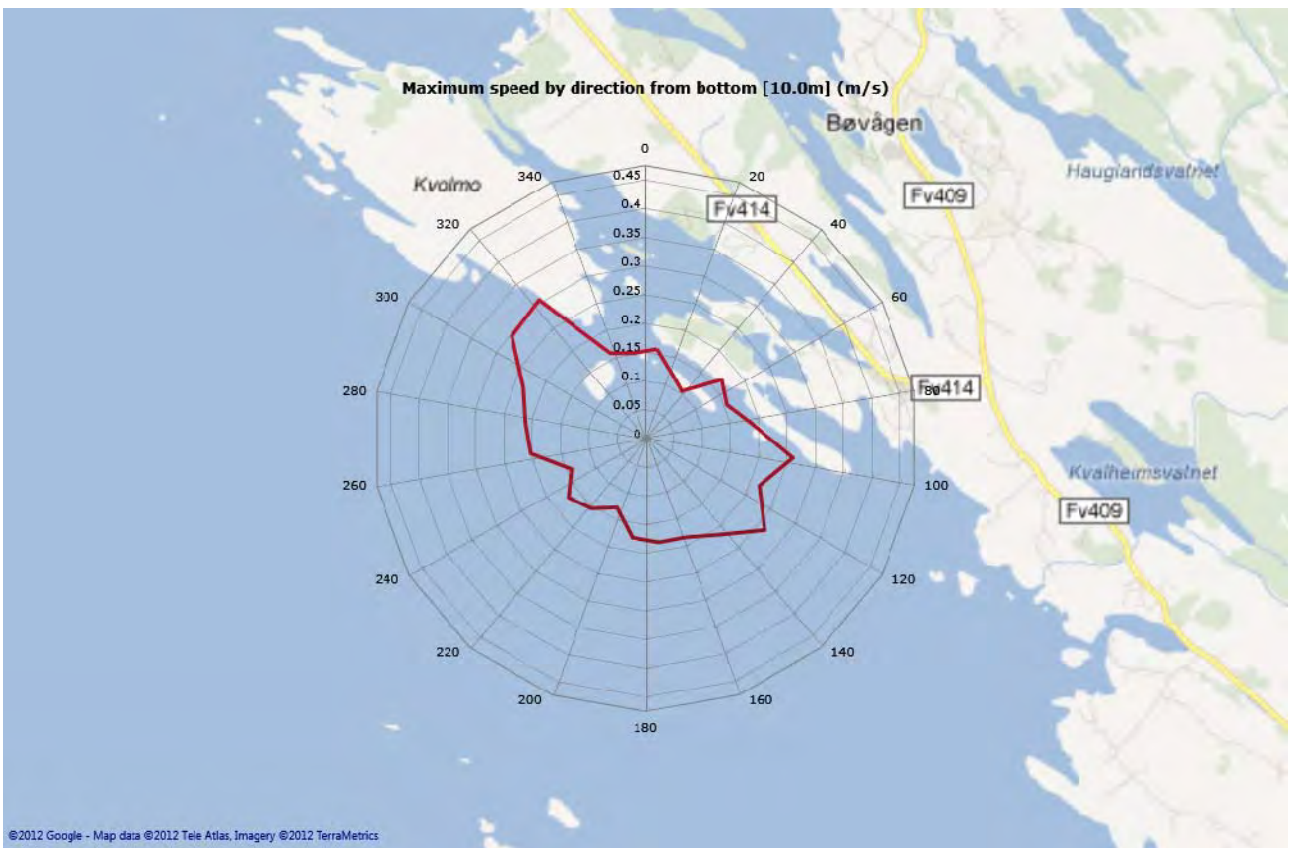
Top [3,0m]



Middle [5,0m]

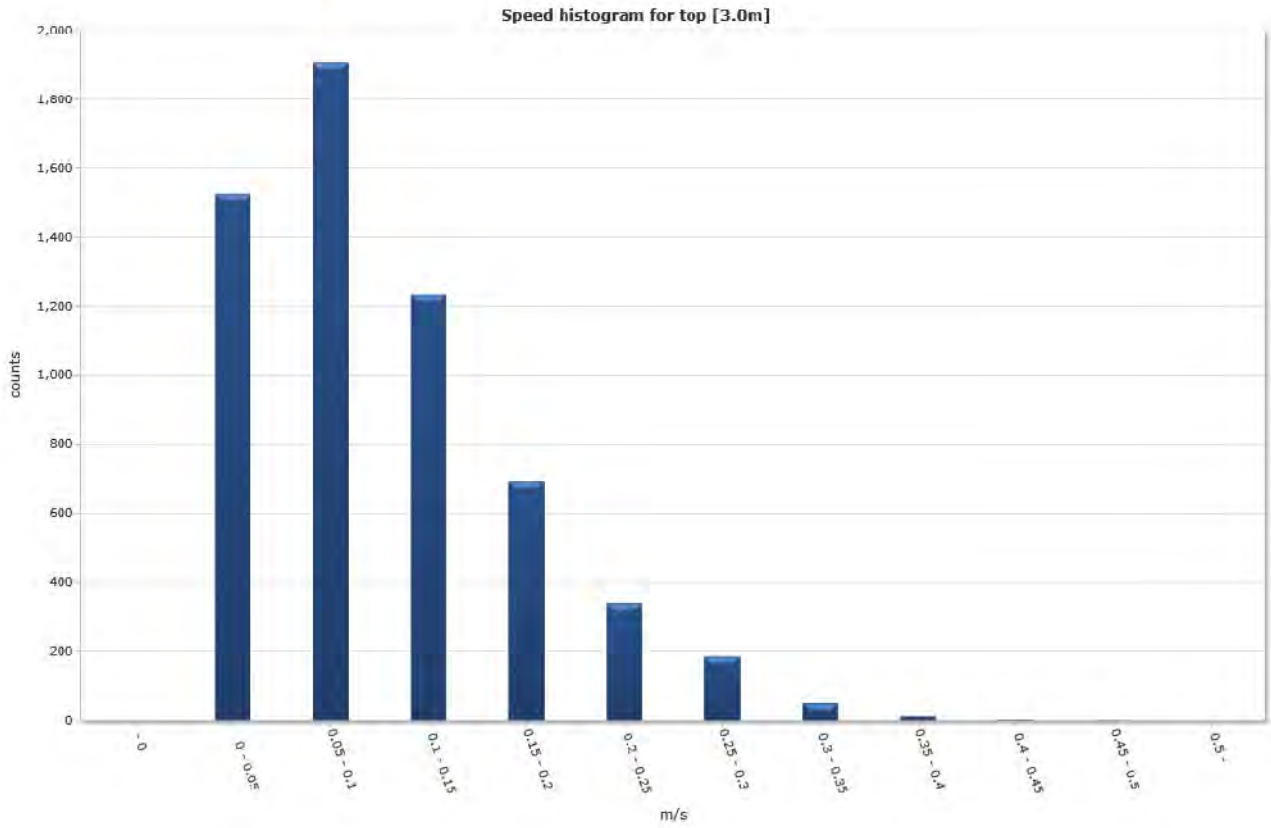


Bottom [10,0m]

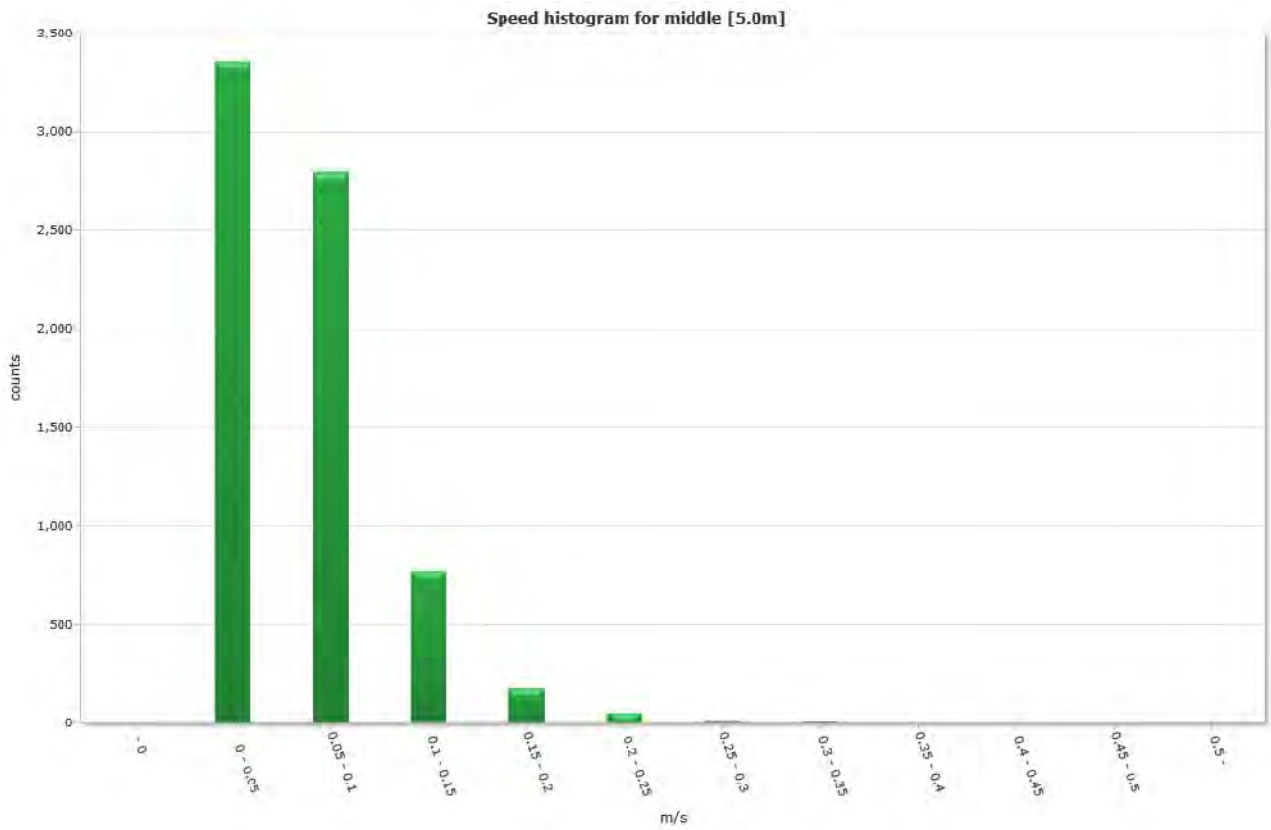


Speed histogram

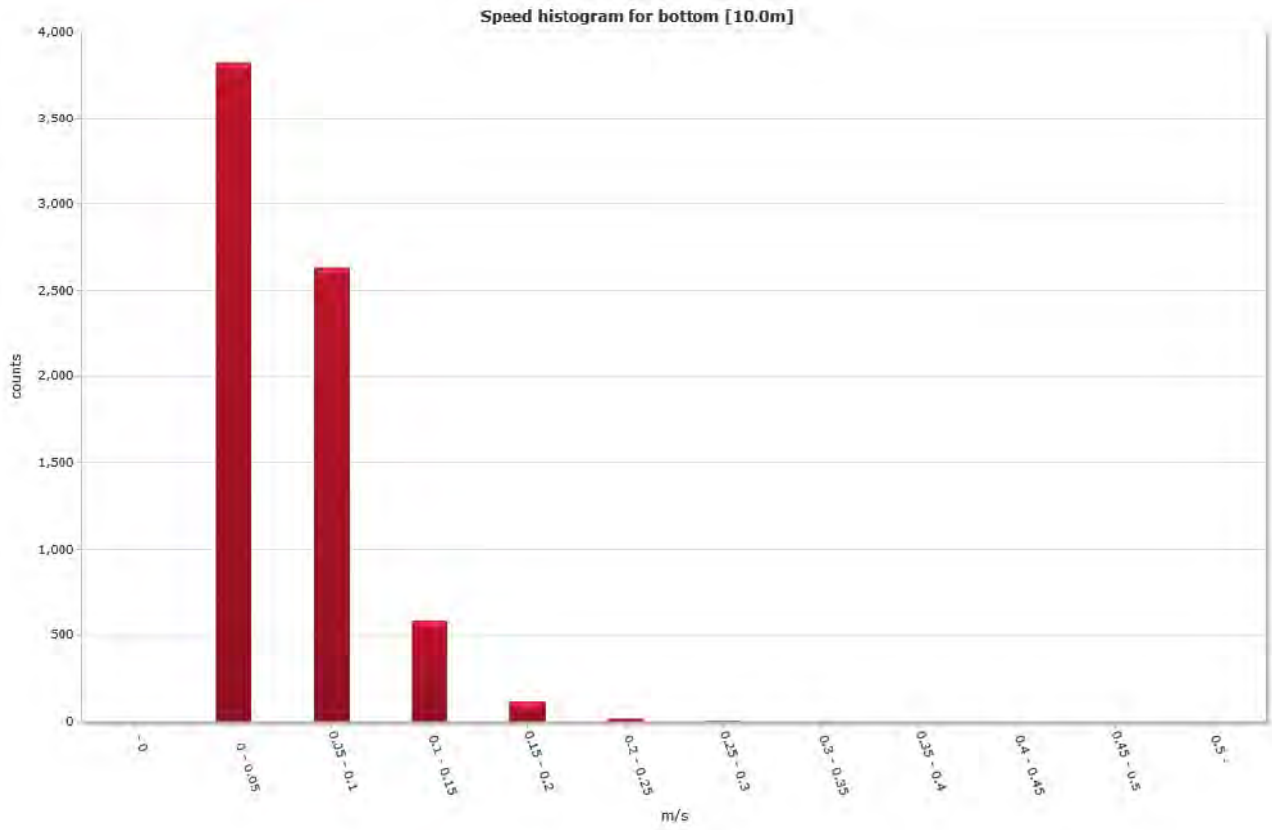
Top [3,0m]



Middle [5,0m]

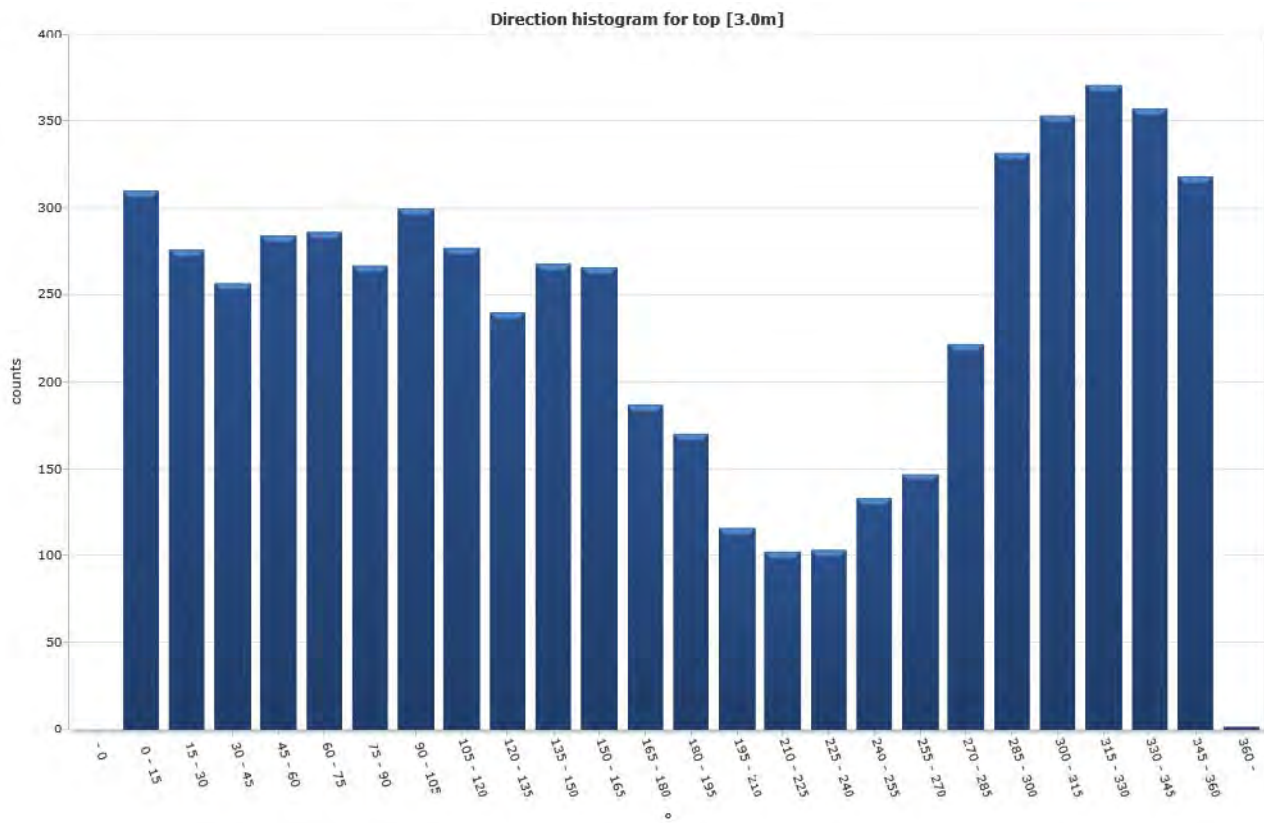


Bottom [10,0m]

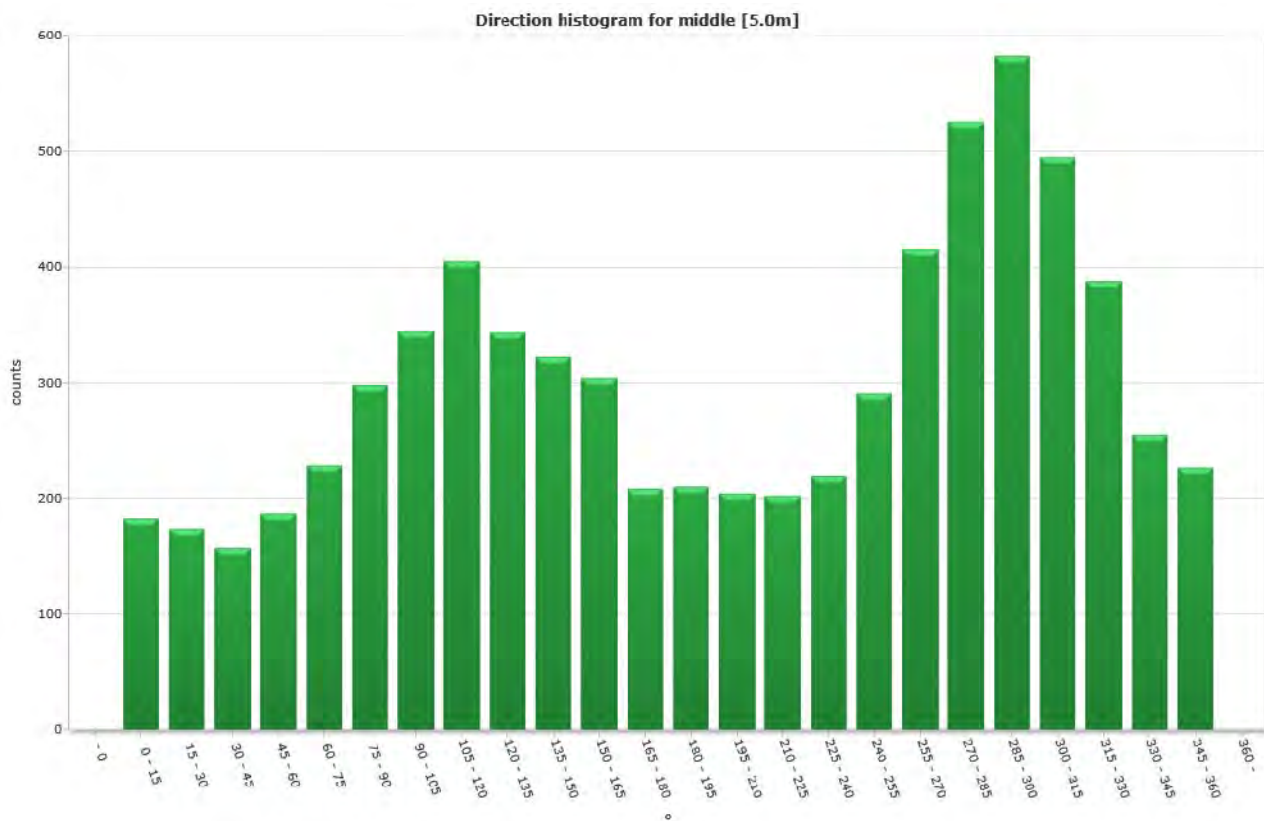


Direction histogram

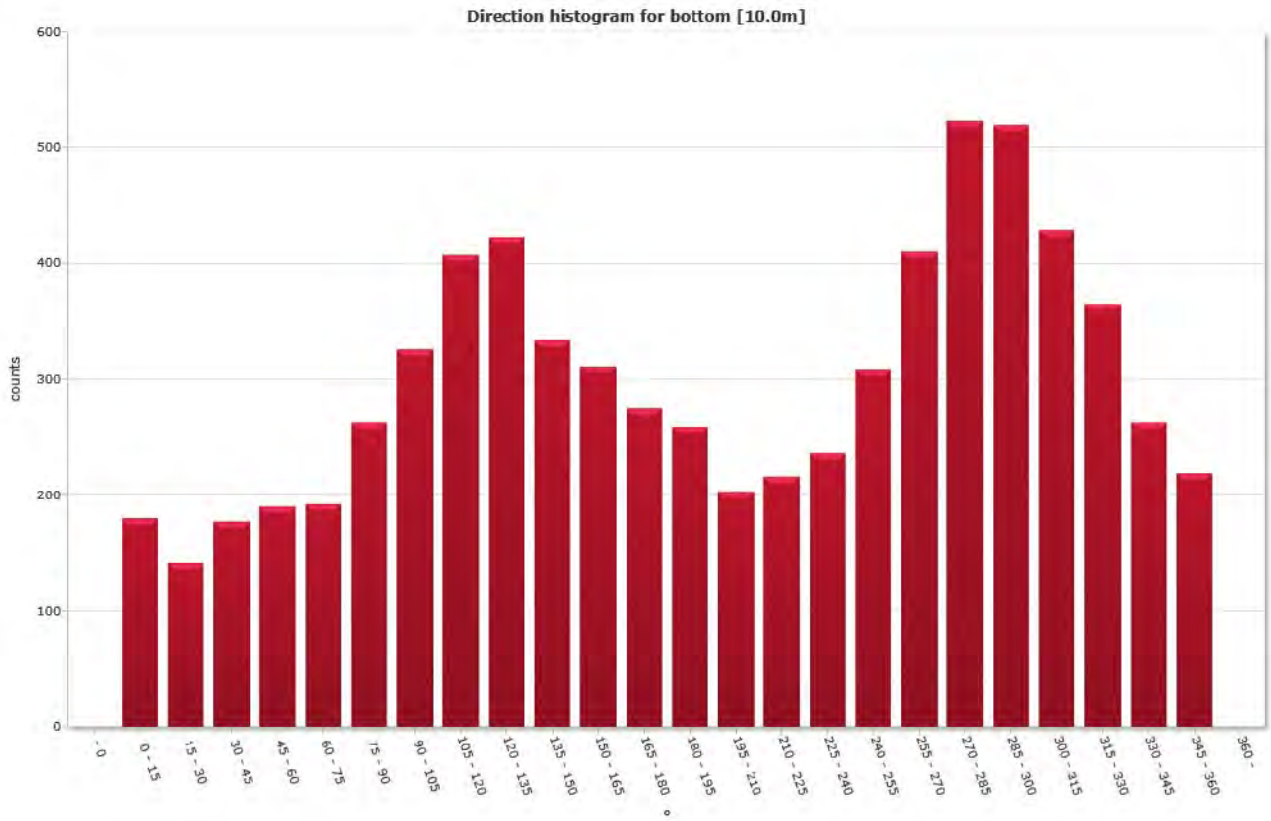
Top [3,0m]



Middle [5,0m]



Bottom [10,0m]



Direction/Speed histogram

Top [3,0m]

		Direction/speed matrix for top [3.0m]																									
°	m/s	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	%	Sum
	0.0																										
	0.05	86	62	69	70	65	51	78	67	46	63	58	40	73	52	46	48	53	49	70	84	80	70	74	70	25.6	1524
	0.10	104	89	89	87	100	97	104	80	76	88	76	54	59	47	45	40	43	54	77	103	106	105	99	84	32.1	1906
	0.15	64	63	49	67	66	67	62	65	59	43	46	35	19	12	9	13	27	30	46	65	78	88	81	78	20.7	1232
	0.20	35	46	30	38	39	23	33	36	38	24	35	20	12	4	1	1	7	10	16	40	39	66	51	47	11.6	691
	0.25	14	11	14	13	9	17	13	17	14	32	22	22	6	0	1	1	3	2	8	21	28	18	28	23	5.7	337
	0.30	7	5	5	8	6	10	9	10	7	12	19	12	1	1	0	0	0	2	3	9	15	16	18	11	3.1	186
	0.35	0	0	1	1	0	2	1	2	0	1	8	1	0	0	0	0	0	0	1	5	5	8	5	3	0.8	50
	0.40	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	1	4	2	0	1	1	0.2	13
	0.45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0	2
	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0	1
	%	5.2	4.6	4.3	4.8	4.8	4.5	5.0	4.7	4.0	4.5	4.5	3.1	2.9	2.0	1.7	1.7	2.2	2.5	3.7	5.6	5.9	6.2	6.0	5.4	100.0	100.0
	Sum	310	276	257	284	266	267	300	277	240	268	266	187	170	116	102	103	133	147	222	332	353	371	357	318	100.0	5942

Middle [5,0m]

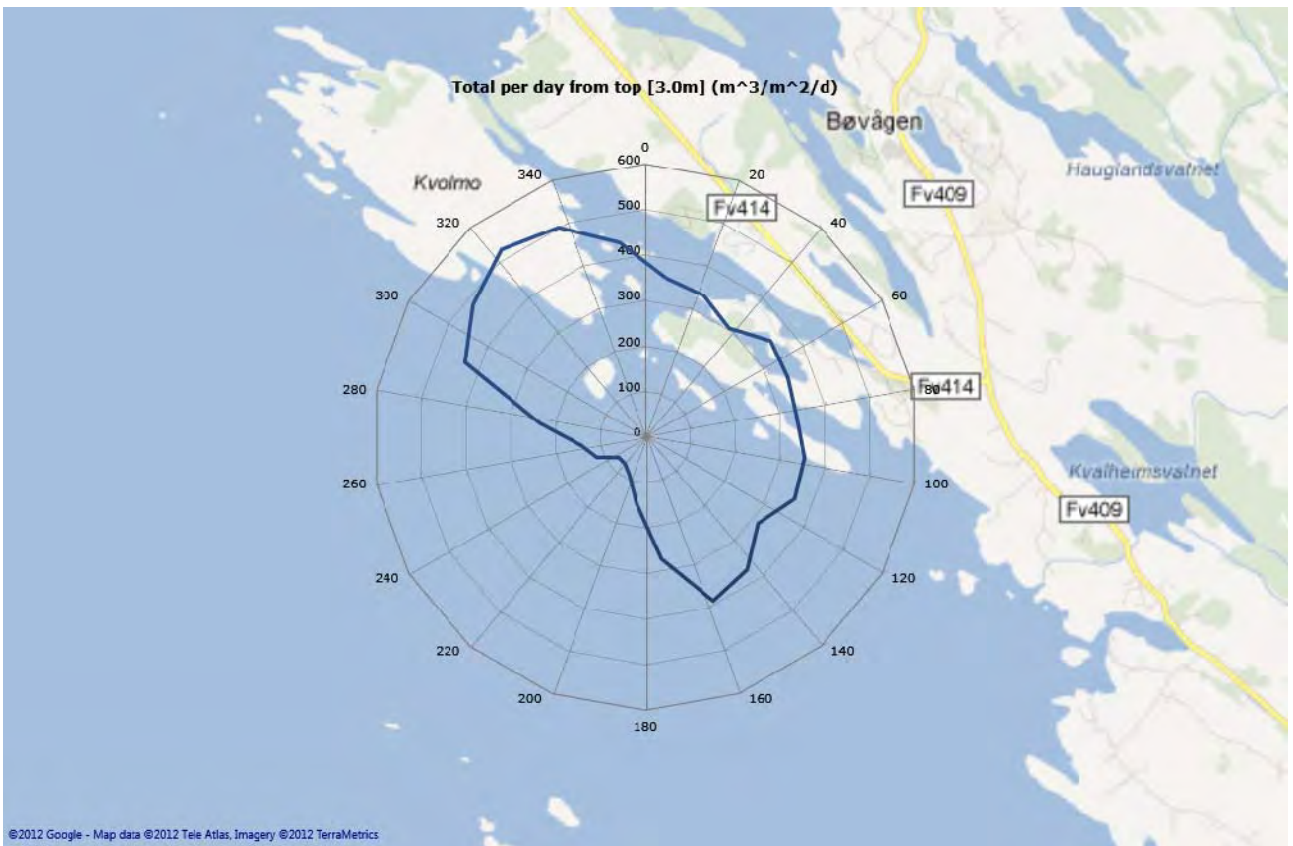
		Direction/speed matrix for middle [5.0m]																									
°	m/s	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	%	Sum
	0.0																										
	0.05	122	120	100	114	124	142	132	145	142	135	137	116	113	131	138	122	153	181	176	201	180	160	130	141	46.8	3355
	0.10	56	50	47	68	82	110	150	186	142	126	122	73	81	64	57	90	114	172	235	222	202	164	107	73	39.0	2793
	0.15	5	4	10	3	19	35	46	58	49	47	33	18	13	9	7	7	24	49	78	98	76	55	18	10	10.8	771
	0.20	0	0	0	2	4	10	13	13	10	11	9	1	3	0	0	0	0	10	25	31	22	7	0	3	2.4	174
	0.25	0	0	0	0	0	1	4	3	1	3	3	0	0	0	0	0	0	3	6	16	9	2	0	0	0.7	51
	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	3	0	0	0	0.2	15
	0.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	0	0	0	0.1	8
	0.40	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	0
	0.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.0	1
	0.50	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	0
	%	2.6	2.4	2.2	2.6	3.2	4.2	4.8	5.6	4.8	4.5	4.2	2.9	2.9	2.8	2.8	3.1	4.1	5.8	7.3	8.1	6.9	5.4	3.6	3.2	100.0	100.0
	Sum	183	174	157	187	229	298	345	405	344	322	304	208	210	204	202	219	291	415	525	582	495	388	255	227	100.0	7159

Bottom [10,0m]

		Direction/speed matrix for bottom [10.0m]																													
m/s		15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	%	Sum				
0.0		128	97	128	122	118	142	177	178	157	149	162	164	161	130	153	148	173	204	234	181	177	207	175	143	53.3	3818				
0.05		45	41	48	57	63	100	109	159	195	125	114	92	78	66	55	80	111	158	226	256	185	130	79	68	36.7	2652				
0.10		6	3	1	10	8	15	25	58	60	54	28	15	18	7	7	6	24	42	53	56	50	23	6	7	8.1	582				
0.15		1	0	0	1	1	6	13	10	9	5	7	4	2	0	1	2	0	5	9	21	10	3	3	1	1.6	114				
0.20		0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	1	1	5	5	0	0	0	0.2	17				
0.25		0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0.1	5				
0.30		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.0	1				
0.35		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	0				
0.40		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	0				
0.45		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	0				
0.50		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	0				
%		2.5	2.0	2.5	2.7	2.7	3.7	4.5	5.7	5.9	4.7	4.3	3.8	3.6	2.8	3.0	3.3	4.3	5.7	7.3	7.2	6.0	5.1	3.7	3.1	100.0	100.0				
Sum		180	141	177	190	192	263	326	407	423	334	311	275	259	203	216	236	308	410	523	519	429	365	263	219	100.0	7159				

Flow

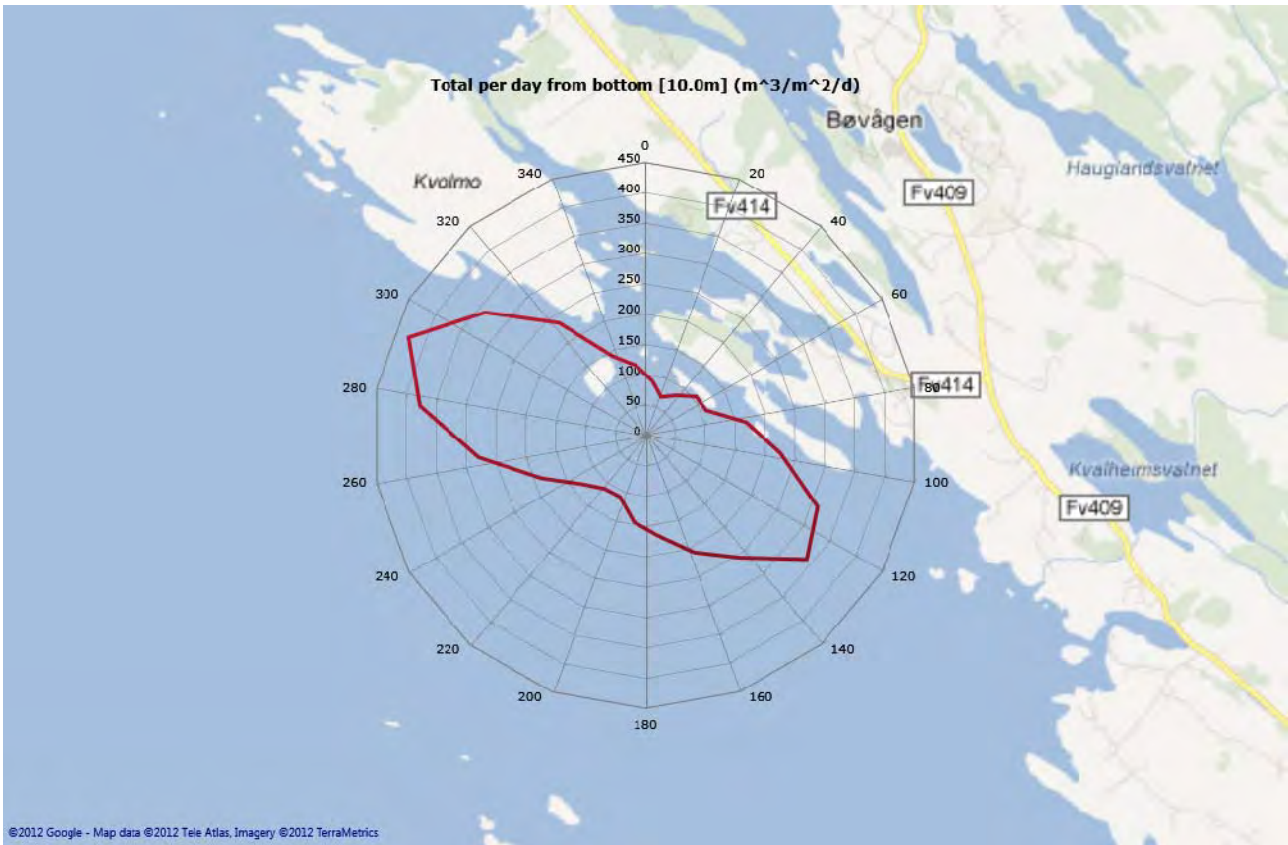
Top [3,0m]



Middle [5,0m]

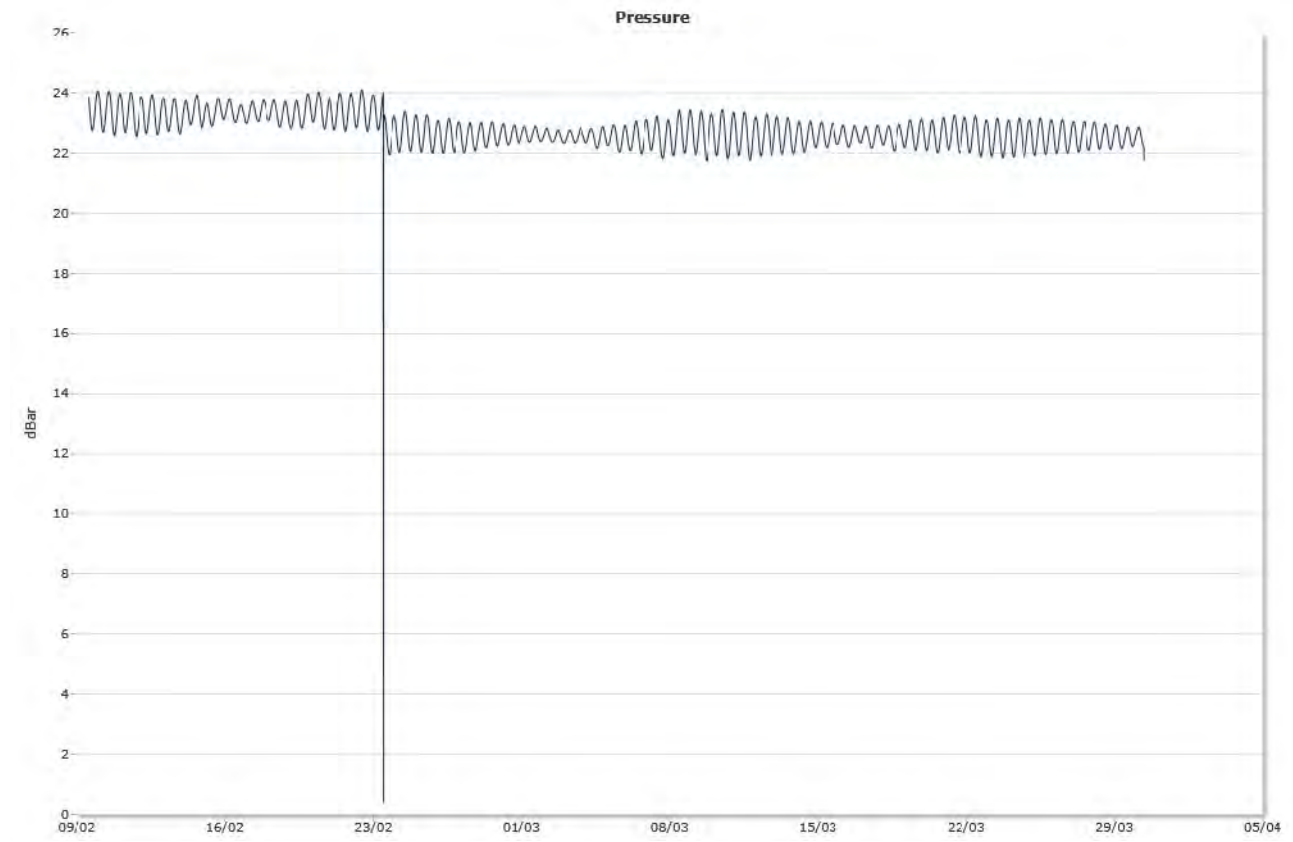


Bottom [10,0m]

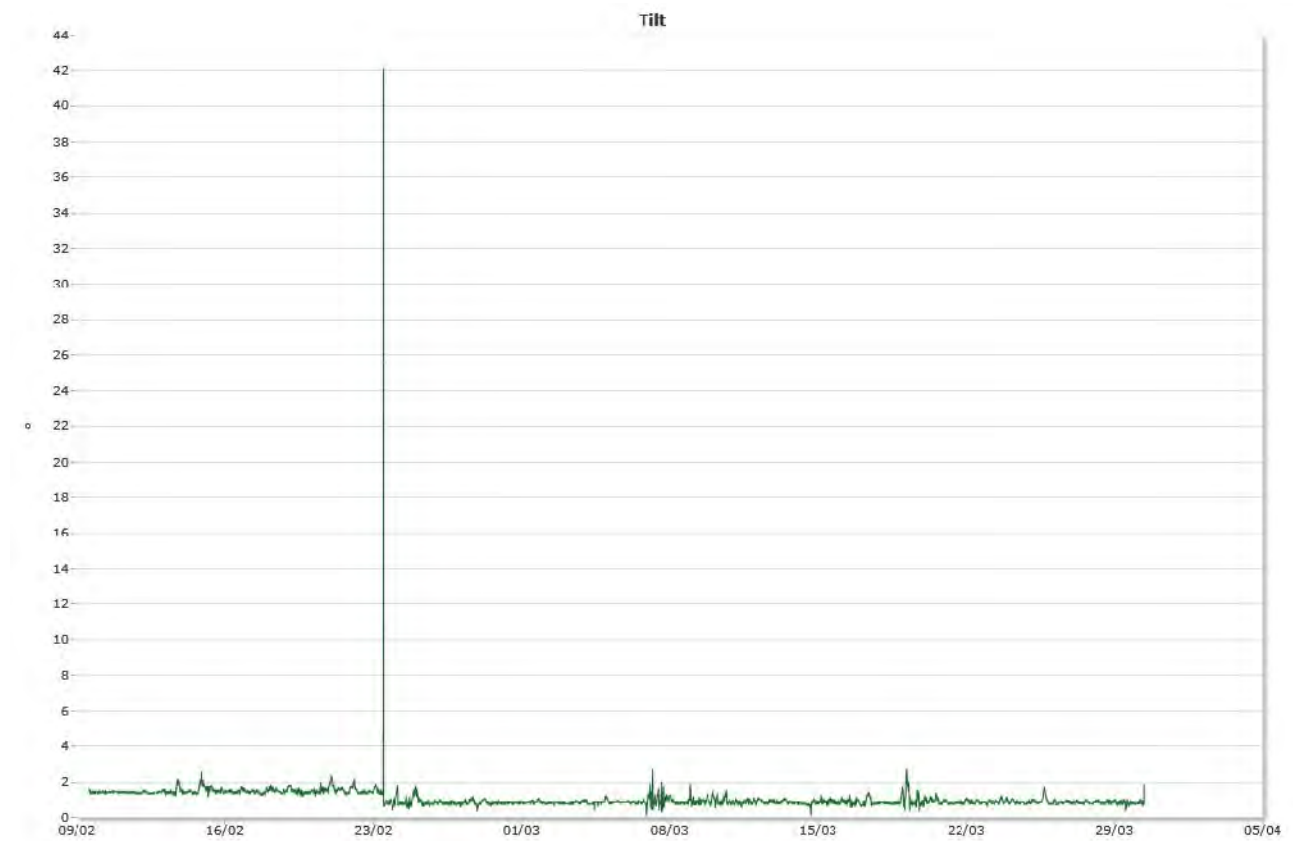


Sensors

Pressure



Tilt



Temperature



Straummåling Otterholmen

Vassutskifting 15 til 20 meter

31.03.2012

Resipientanalyse AS

Frode Berge-Haveland

Content

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Summary

Details

Instrument

Head Id	AQP 5209
Board Id	AQD 9592
Frequency	400000

Configuration

Start	09.02.2012 14:00
End	30.03.2012 10:50
Data records	7182
Longitude	4° 54,57'E
Latitude	60° 41,24'N
Orientation	DOWN
Cells	30
Cell size(m)	2
Blanking distance(m)	0,99
Average interval(sec)	60
Measurement interval(sec)	600

Quality

Low Pressure Threshold	0
HighTilt Threshold	30
Expected Orientation	UP
Amplitude Spike Threshold	70
Velocity Spike Threshold	5
SNR Threshold	3

Post processing

Selected Start	09.02.2012 14:00
Selected End	30.03.2012 09:00
Compass Offset	0
Pressure Offset	0
Selected Records	7171
Reference	Water Surface
Top Depth(m)	15
Top invalid data	1
Middle Depth(m)	18
Middle invalid data	1
Bottom Depth(m)	20
Bottom invalid data	248

Statistics

Top [15,0m]

Mean current [m/s]	0.06
Max current [m/s]	0.32
Min current [m/s]	0.00
Measurements [#]	7170
Std.dev [m/s]	0.04
Significant max velocity [m/s]	0.10
Significant min velocity [m/s]	0.02
10 year return current [m/s]	0.528
50 year return current [m/s]	0.592
Most significant directions [°]	285.00, 300.00, 270.00, 315.00
Most significant speeds [m/s]	0.05, 0.10, 0.15, 0.20
Most flow	14324.22m ³ by 270-285°.
Least flow	5800.90m ³ by 180-195°.

Middle [18,0m]

Mean current [m/s]	0.05
Max current [m/s]	0.25
Min current [m/s]	0.00
Measurements [#]	7170
Std.dev [m/s]	0.04
Significant max velocity [m/s]	0.09
Significant min velocity [m/s]	0.02
10 year return current [m/s]	0.414
50 year return current [m/s]	0.464
Most significant directions [°]	285.00, 300.00, 270.00, 315.00
Most significant speeds [m/s]	0.05, 0.10, 0.15, 0.20
Most flow	19806.14m ³ by 270-285°.
Least flow	5319.88m ³ by 150-165°.

Bottom [20,0m]

Mean current [m/s]	0.05
Max current [m/s]	0.28
Min current [m/s]	0.00
Measurements [#]	6923
Std.dev [m/s]	0.03
Significant max velocity [m/s]	0.09
Significant min velocity [m/s]	0.02
10 year return current [m/s]	0.460
50 year return current [m/s]	0.516
Most significant directions [°]	285.00, 300.00, 270.00, 315.00
Most significant speeds [m/s]	0.05, 0.10, 0.15, 0.20
Most flow	22103.64m ³ by 270-285°.
Least flow	5002.33m ³ by 165-180°.

Direction with return period

Top [15,0m]

Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,054	0,320	0,089	0,528	0,100	0,592
45	0,062	0,244	0,102	0,402	0,114	0,451
90	0,061	0,258	0,101	0,426	0,113	0,477
135	0,054	0,239	0,090	0,394	0,100	0,441
180	0,048	0,196	0,079	0,324	0,088	0,363
225	0,057	0,215	0,095	0,355	0,106	0,398
270	0,058	0,202	0,095	0,334	0,107	0,374
315	0,053	0,266	0,087	0,439	0,097	0,493

Middle [18,0m]

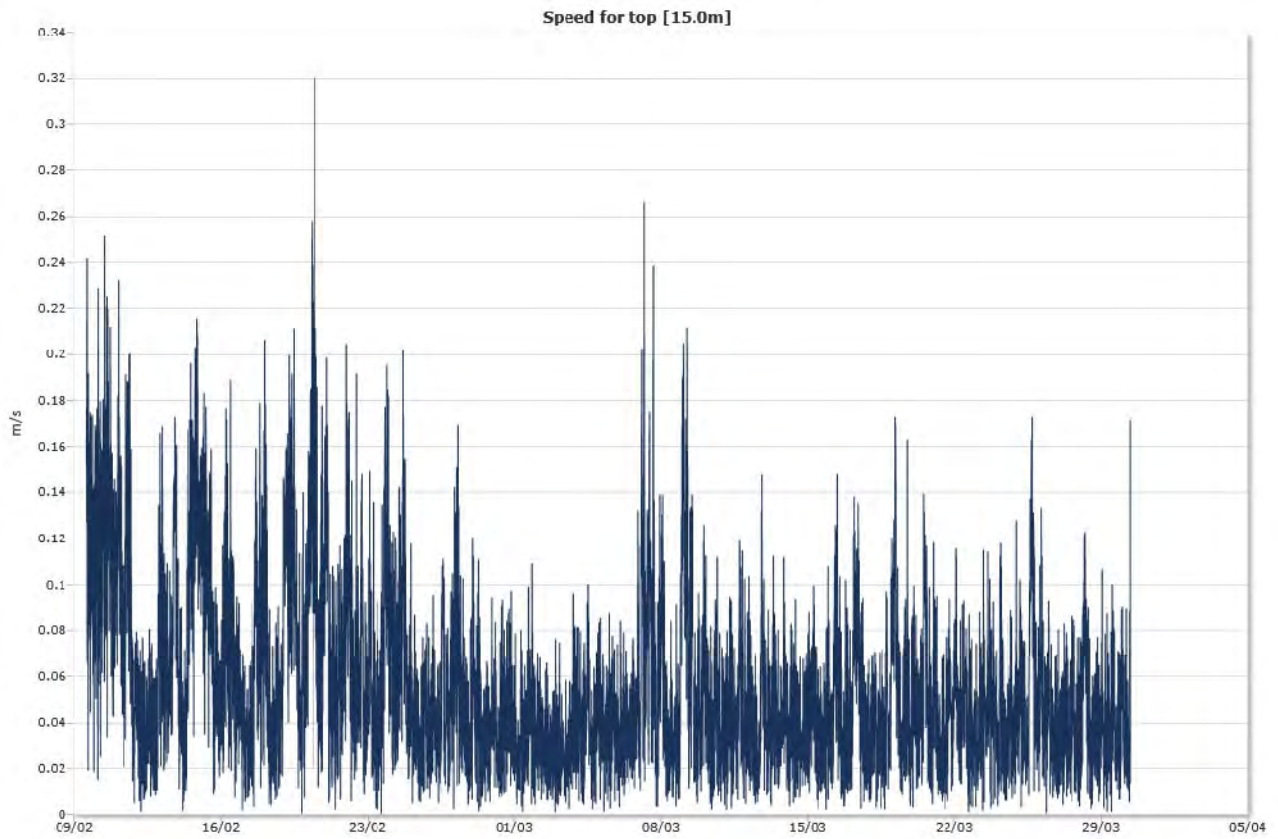
Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,055	0,250	0,091	0,412	0,102	0,462
45	0,049	0,239	0,080	0,394	0,090	0,442
90	0,049	0,174	0,082	0,287	0,091	0,322
135	0,047	0,168	0,077	0,278	0,086	0,312
180	0,047	0,218	0,078	0,359	0,088	0,403
225	0,053	0,231	0,087	0,380	0,097	0,426
270	0,060	0,237	0,100	0,392	0,112	0,439
315	0,056	0,251	0,092	0,414	0,103	0,464

Bottom [20,0m]

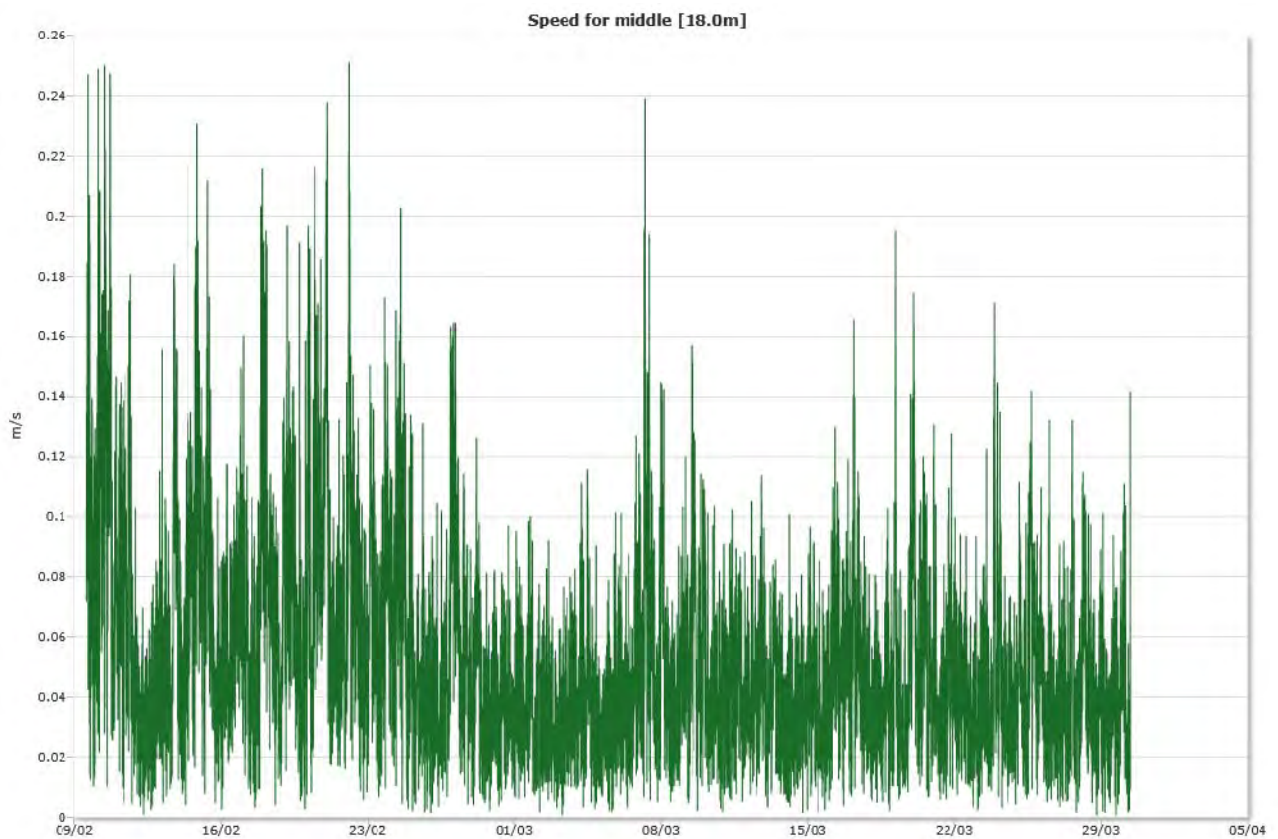
Direction	Mean	Max	Mean 10y	Max 10y	Mean 50y	Max 50y
0	0,049	0,171	0,080	0,282	0,090	0,317
45	0,050	0,279	0,082	0,460	0,092	0,516
90	0,051	0,174	0,084	0,288	0,095	0,323
135	0,046	0,176	0,077	0,291	0,086	0,326
180	0,044	0,166	0,072	0,275	0,081	0,308
225	0,051	0,206	0,084	0,339	0,094	0,380
270	0,064	0,208	0,106	0,344	0,119	0,386
315	0,061	0,204	0,100	0,337	0,112	0,378

Time series

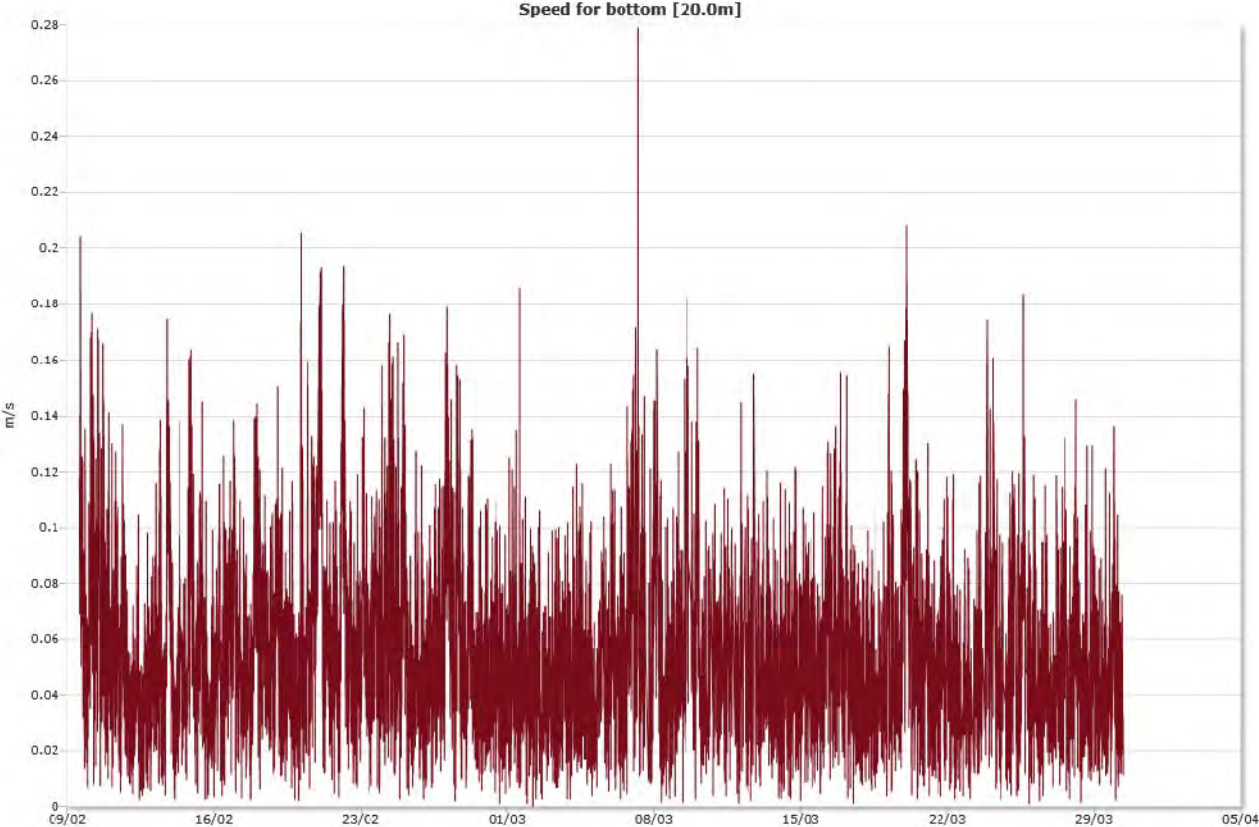
Top [15,0m]



Middle [18,0m]

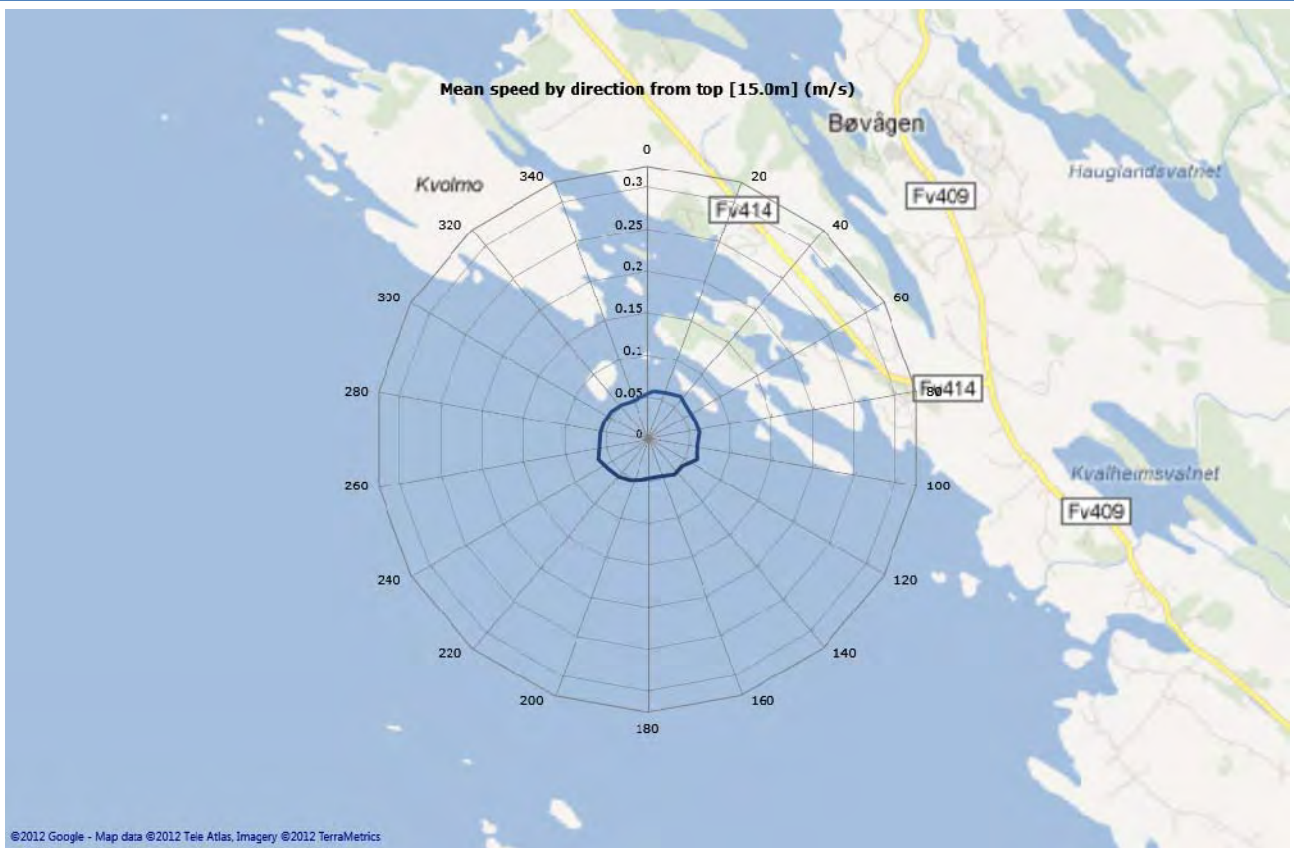


Bottom [20,0m]

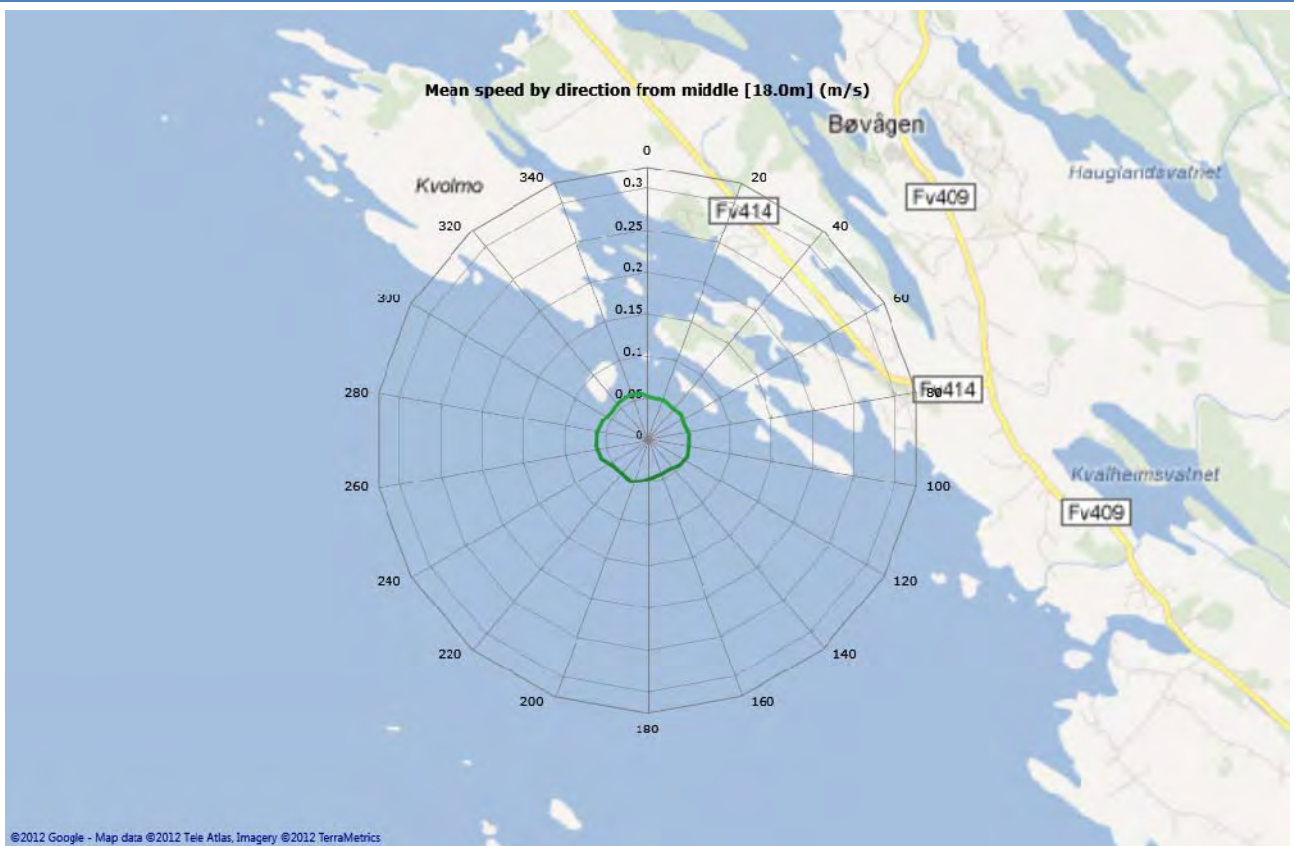


Mean speed - roseplot

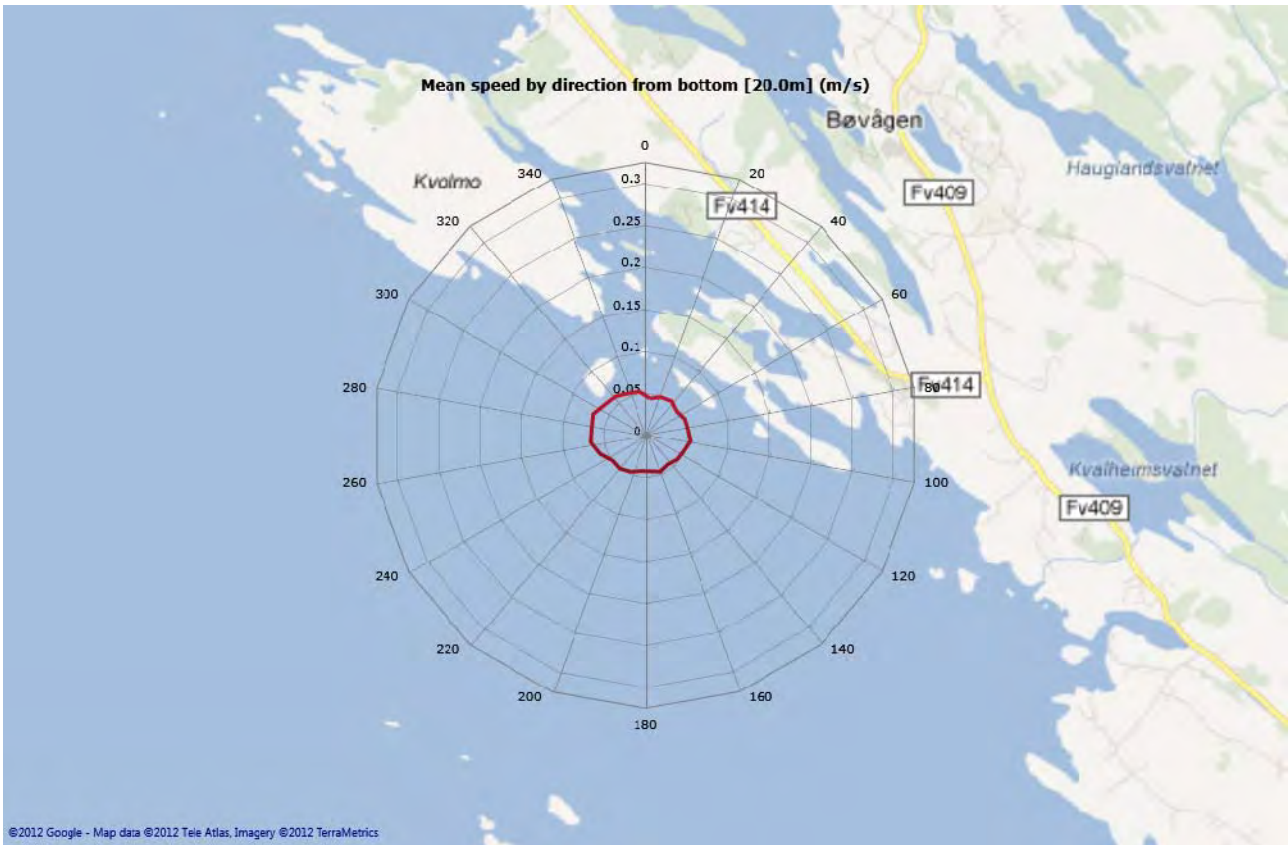
Top [15,0m]



Middle [18,0m]

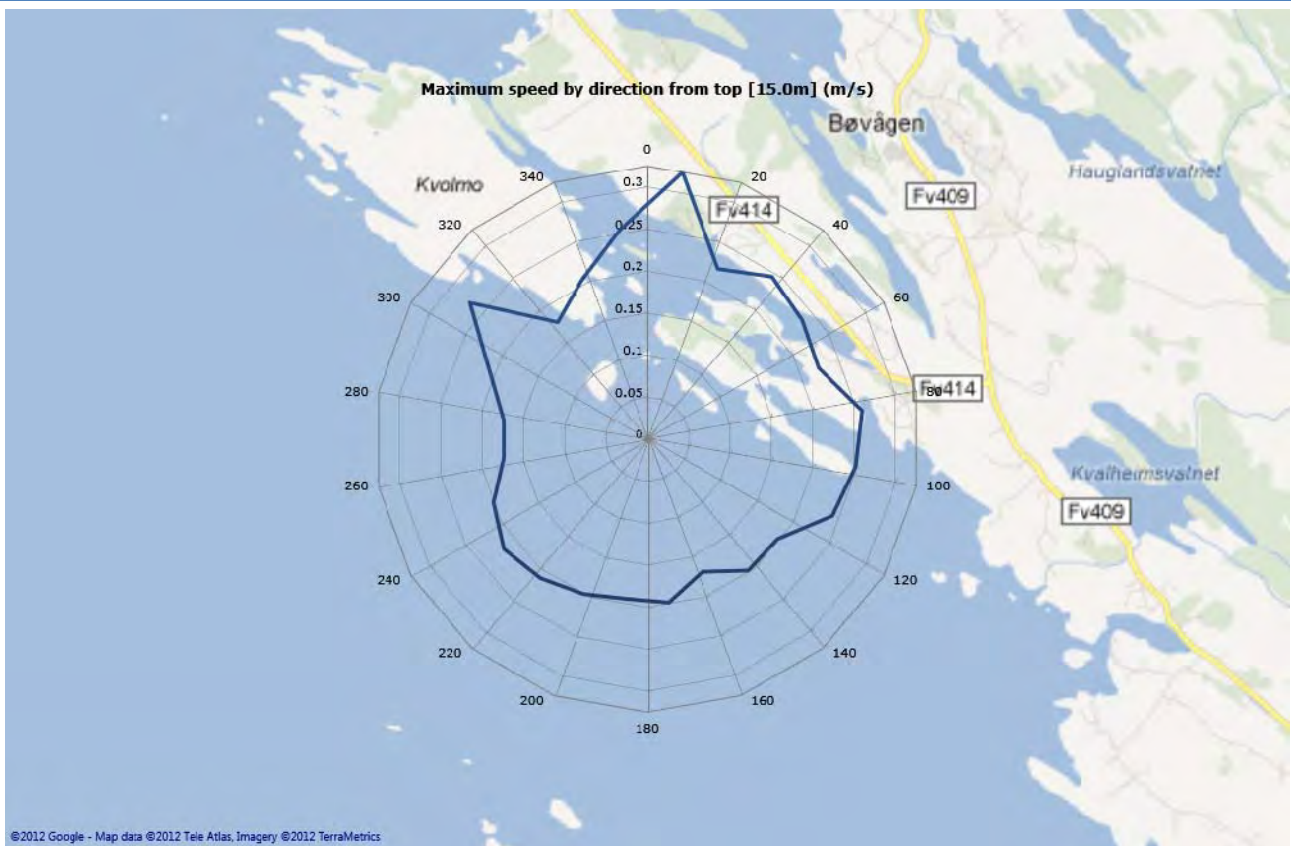


Bottom [20,0m]

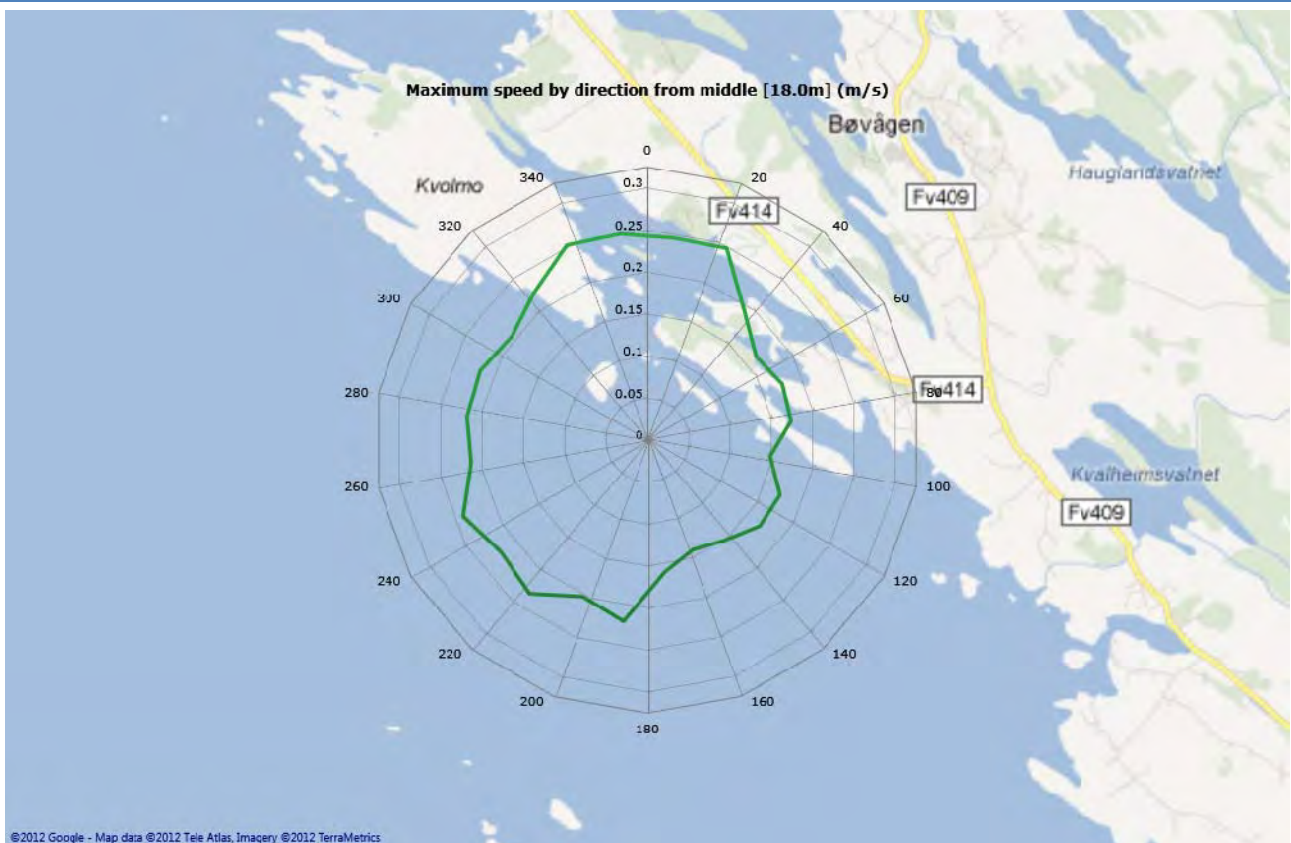


Max speed - roseplot

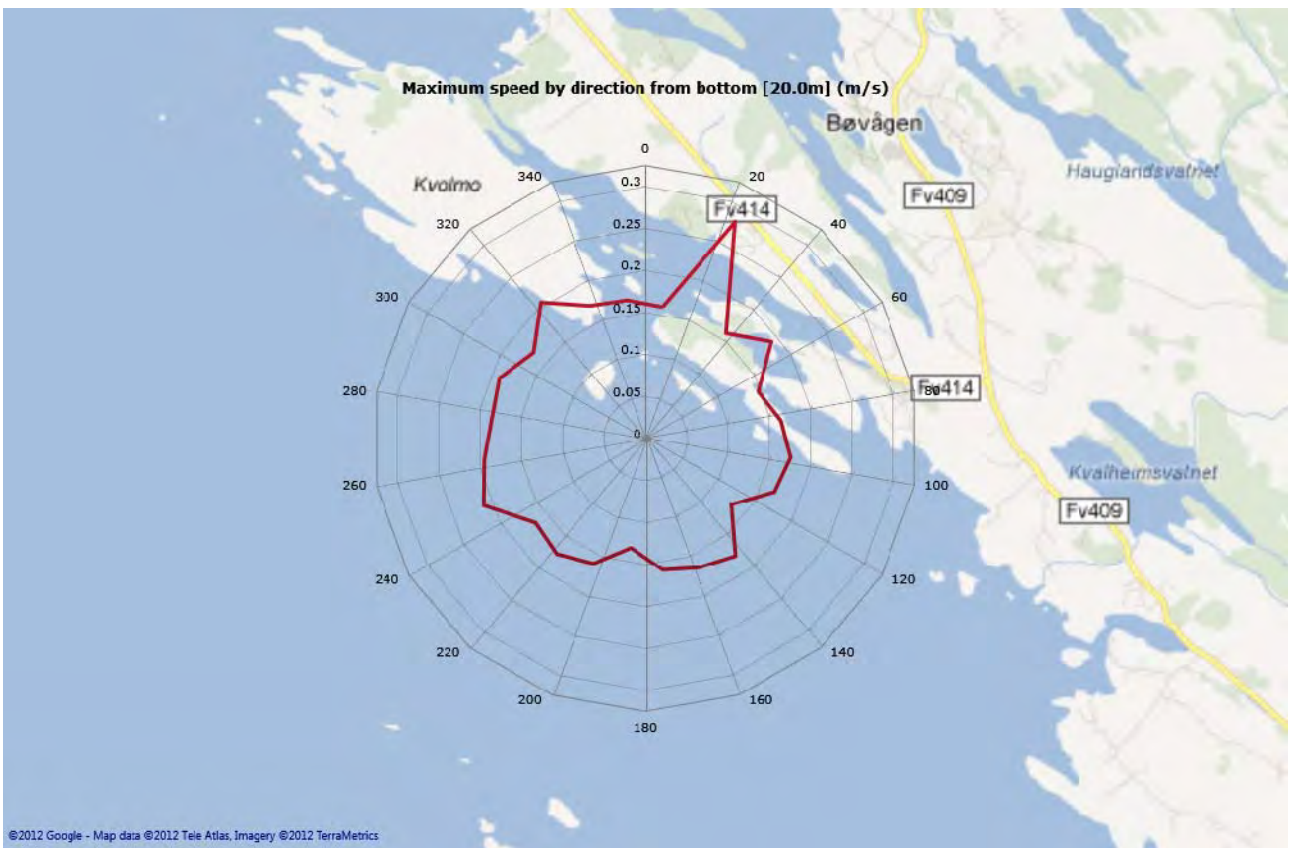
Top [15,0m]



Middle [18,0m]

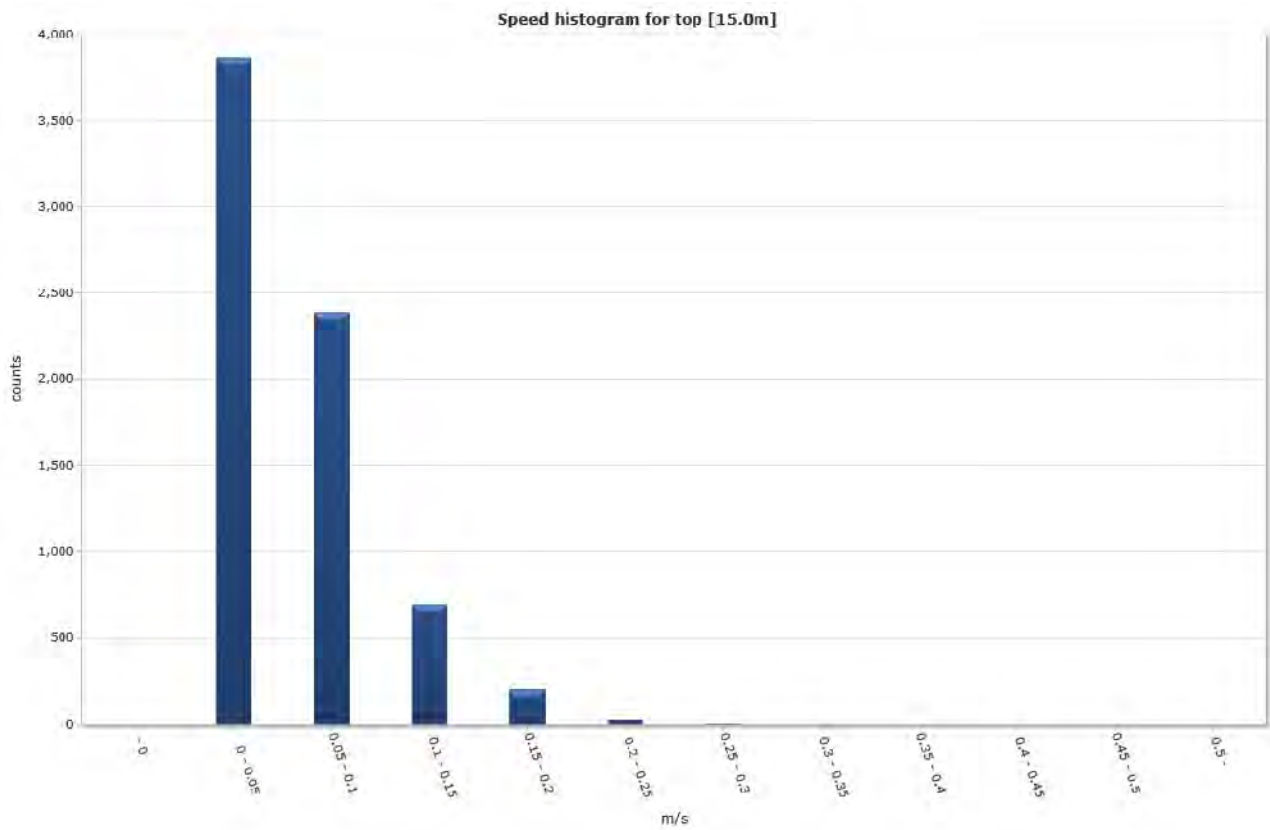


Bottom [20,0m]

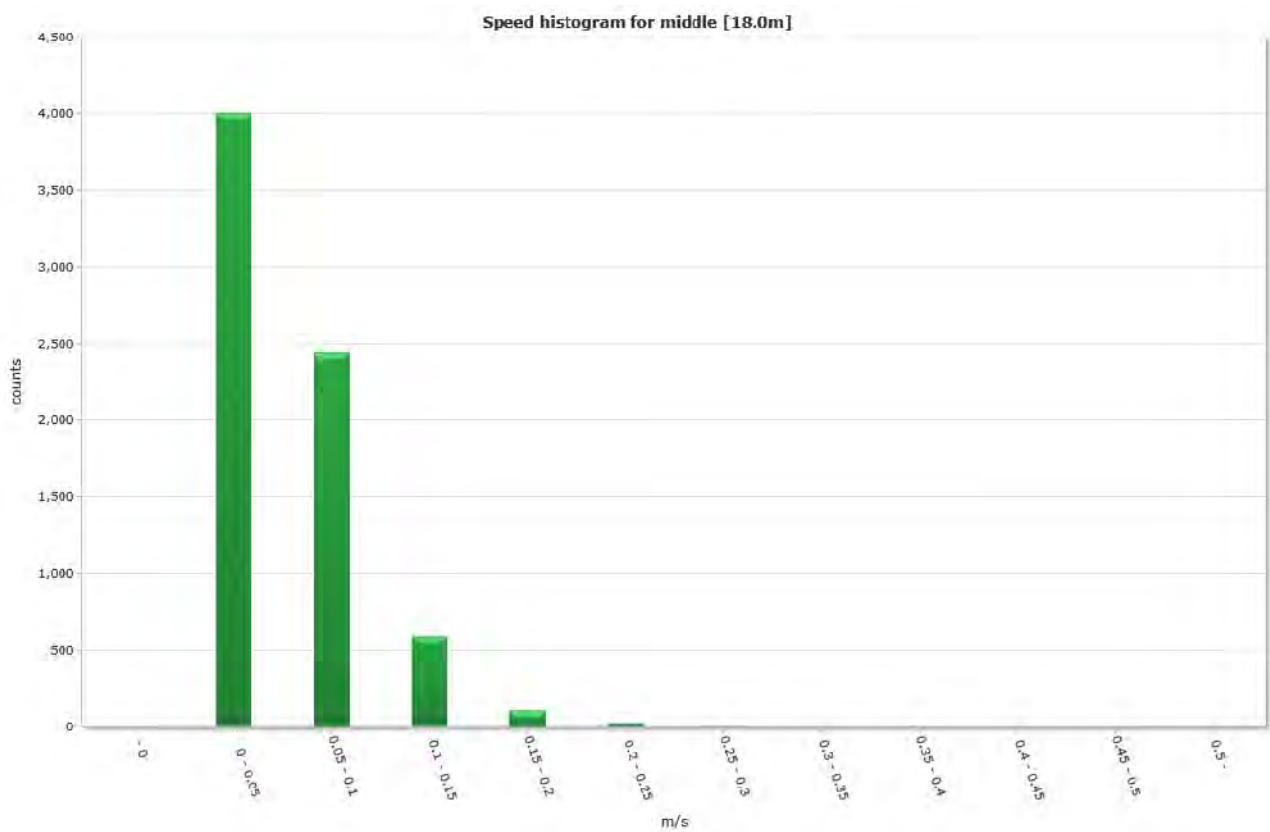


Speed histogram

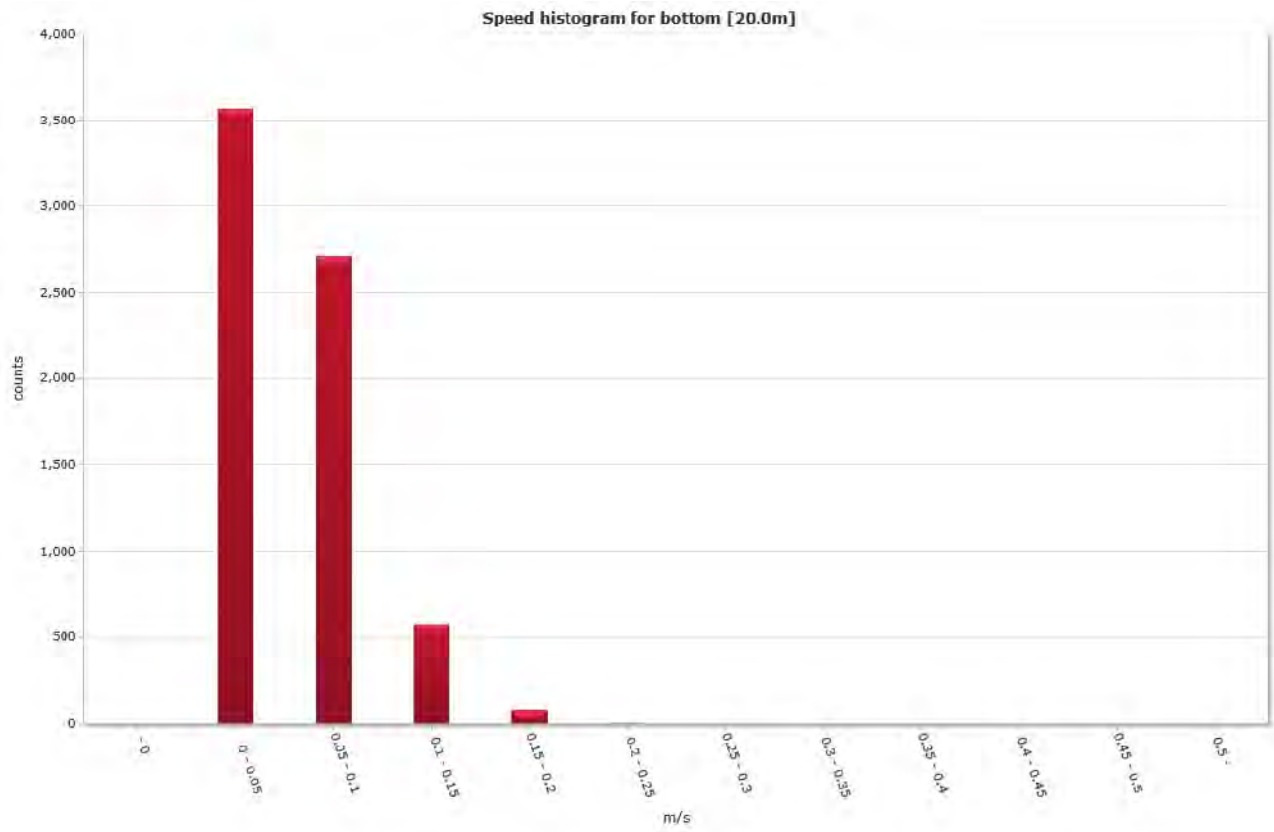
Top [15,0m]



Middle [18,0m]

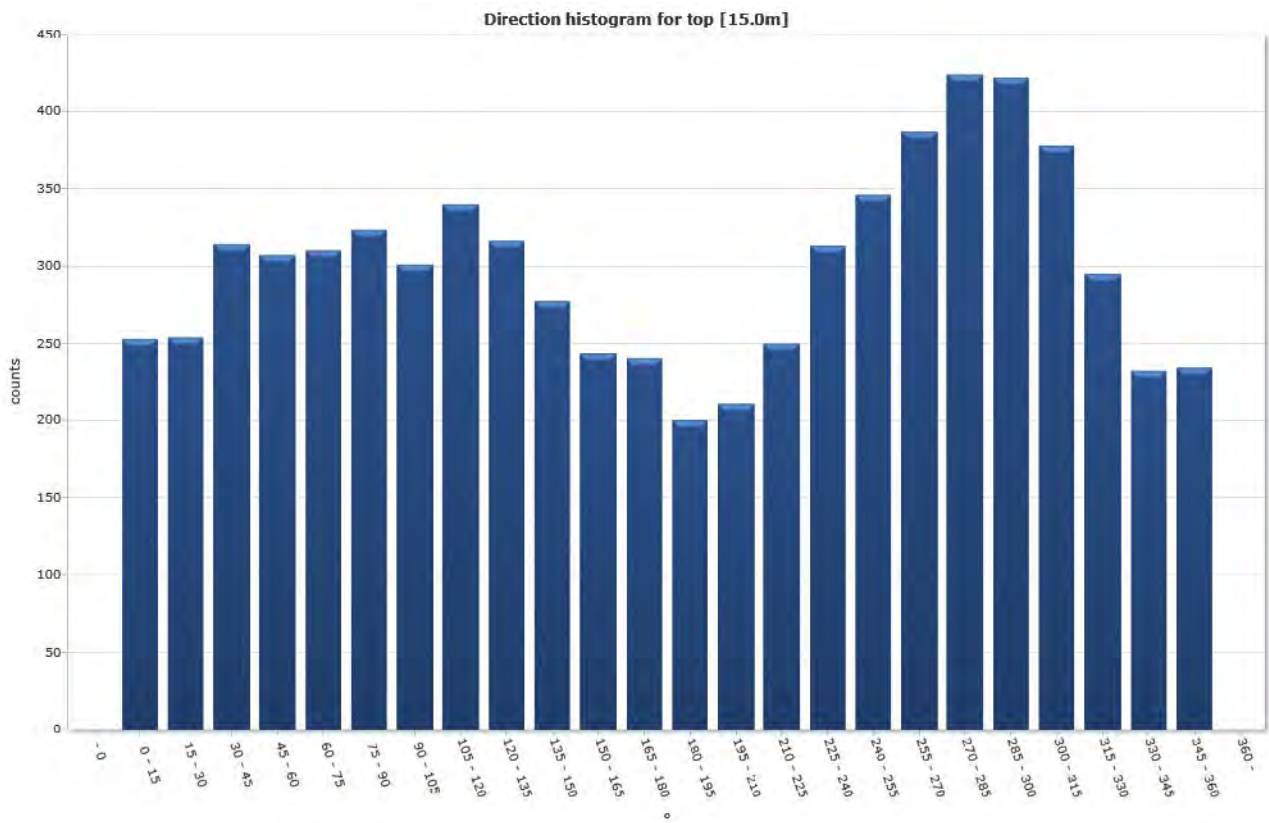


Bottom [20,0m]

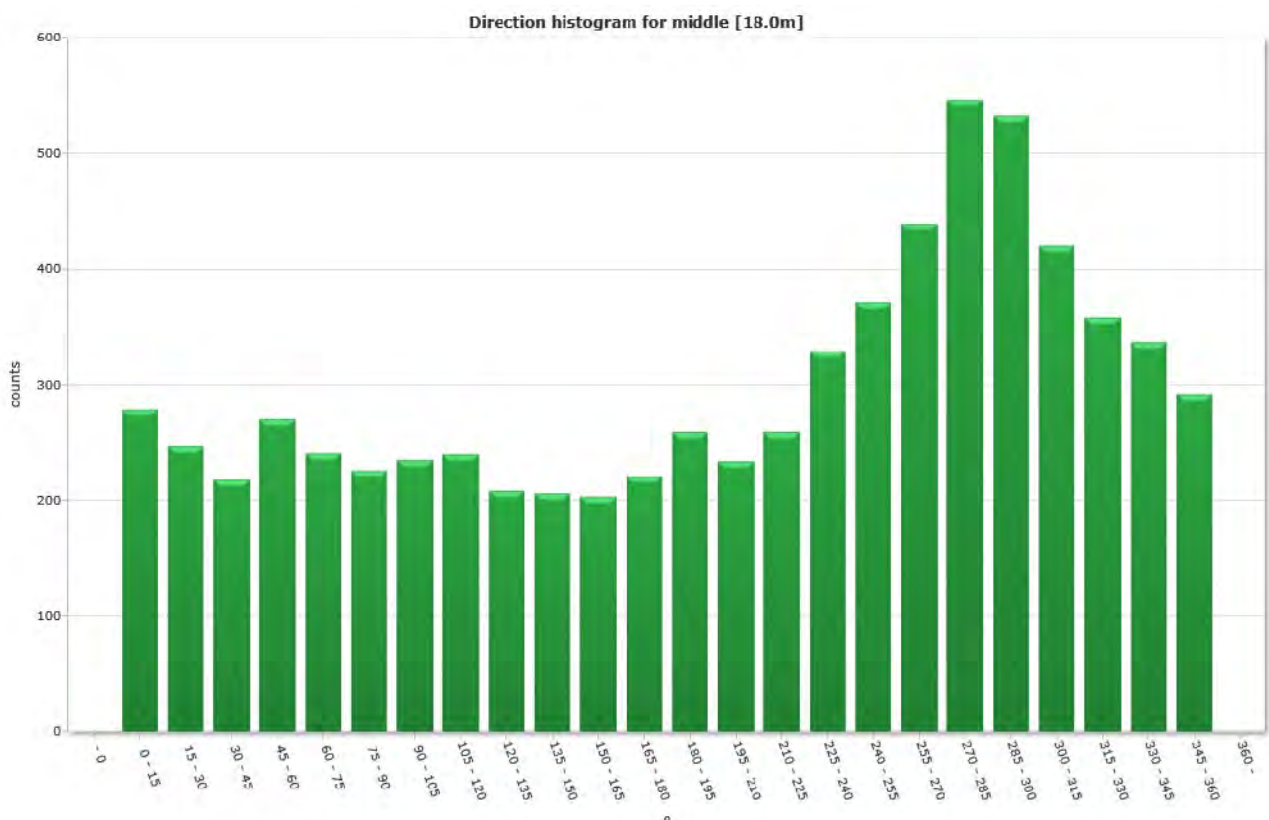


Direction histogram

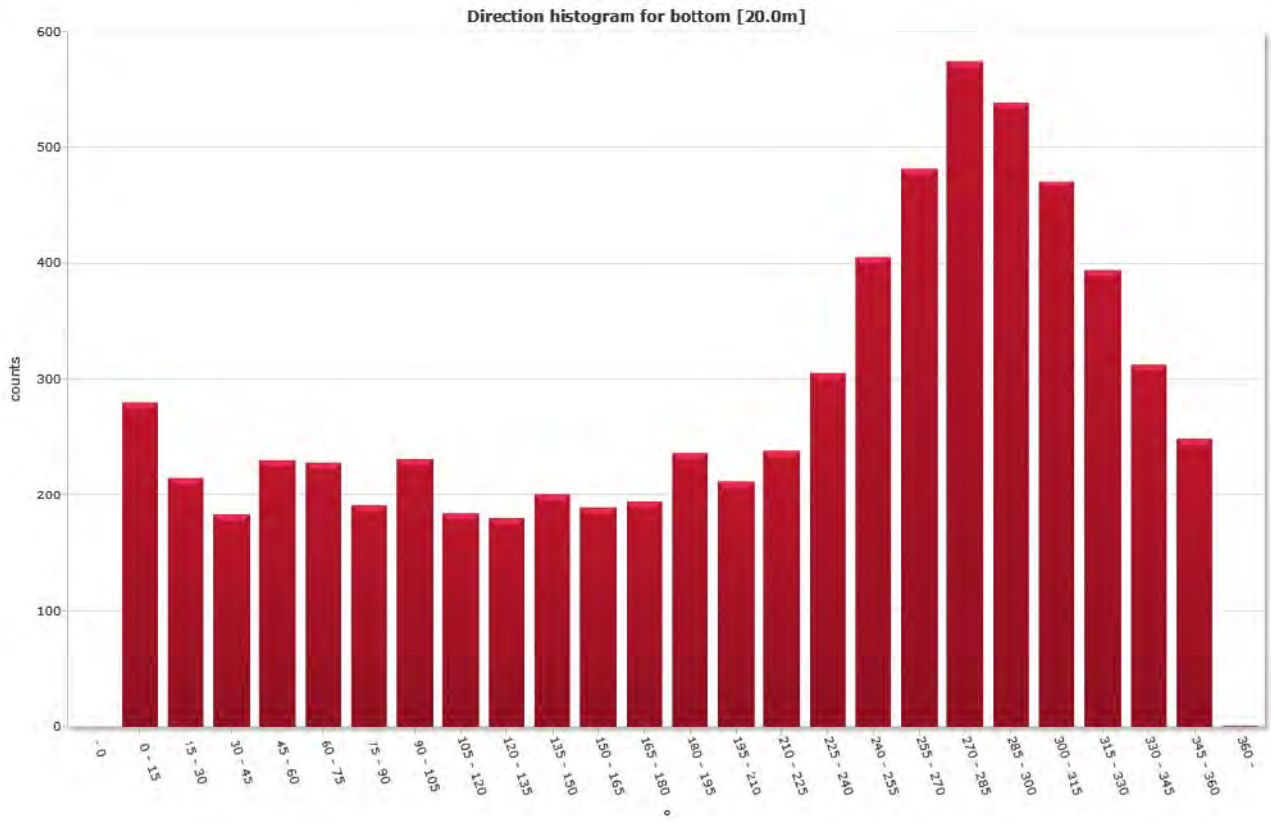
Top [15,0m]



Middle [18,0m]



Bottom [20,0m]



Direction/Speed histogram

Top [15,0m]

		Direction/speed matrix for top [15.0m]																										
°	m/s	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	%	Sum	
	0.0																											
	0.05	144	141	149	155	158	150	154	161	175	160	149	164	130	122	141	177	160	185	200	222	200	166	152	148	53.9	3853	
	0.10	68	72	108	102	103	120	98	120	108	89	77	59	48	62	71	87	122	154	184	160	144	106	60	62	33.2	2384	
	0.15	31	18	33	37	33	40	44	37	25	25	13	9	16	21	25	39	50	43	36	34	30	17	15	17	9.6	688	
	0.20	8	21	15	11	14	10	3	19	3	3	4	8	6	6	12	7	14	5	4	5	2	6	4	5	2.8	200	
	0.25	1	2	9	2	2	2	1	3	0	0	0	0	0	0	1	3	0	0	0	1	1	0	1	1	0.4	30	
	0.30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1	4	
	0.35	1	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	1	
	0.40	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	0	
	0.45	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	0	
	0.50	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	0	
	%	3.5	3.5	4.4	4.3	4.3	4.5	4.2	4.7	4.4	3.9	3.4	3.3	2.8	2.9	3.5	4.4	4.8	5.4	5.9	5.9	5.3	4.1	3.2	3.3	100.0	100.0	
	Sum	253	254	314	307	310	323	301	340	316	277	243	240	200	211	250	313	346	387	424	422	378	295	232	234	100.0	7170	

Middle [18,0m]

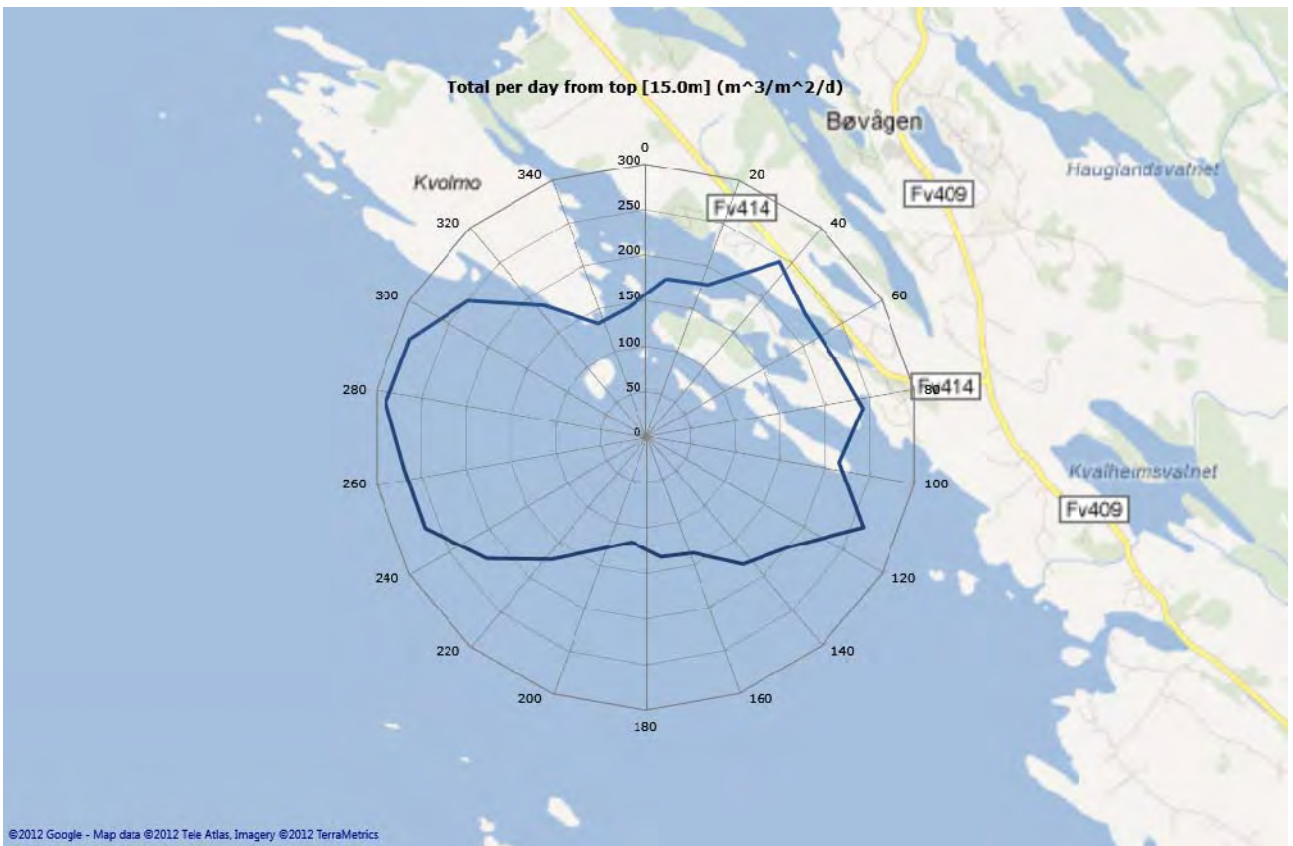
		Direction/speed matrix for middle [18.0m]																										
°	m/s	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	%	Sum	
	0.0																											
	0.05	173	154	143	165	143	124	140	137	127	141	133	145	160	137	163	198	190	196	229	254	210	187	191	163	55.8	4023	
	0.10	73	68	51	77	83	89	79	80	72	55	58	58	78	70	76	99	130	173	250	229	175	133	93	88	34.0	2439	
	0.15	26	19	21	25	11	11	16	19	5	8	12	17	14	22	12	27	39	61	59	42	27	28	38	32	8.3	592	
	0.20	5	4	3	3	2	2	0	4	3	2	0	1	5	4	7	4	9	6	7	6	7	9	9	6	1.5	108	
	0.25	2	2	0	0	0	0	0	0	0	0	0	0	2	1	1	1	3	3	1	1	1	1	5	3	0.4	27	
	0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0	1		
	0.35	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	0	
	0.40	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	0	
	0.45	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	0	
	0.50	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	0	
	%	3.9	3.4	3.0	3.8	3.4	3.2	3.3	3.3	2.9	2.9	2.8	3.1	3.6	3.3	3.6	4.6	5.2	6.1	7.6	7.4	5.9	5.0	4.7	4.1	100.0	100.0	
	Sum	279	247	218	270	241	226	235	240	208	206	203	221	259	234	259	329	371	439	546	532	420	358	337	292	100.0	7170	

Bottom [20,0m]

m/s	Direction/speed matrix for bottom [20.0m]																										%	Sum
	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360				
0.0																												
0.05	179	121	93	143	124	113	128	109	112	134	110	131	153	130	140	177	183	189	231	199	203	172	156	135	51.5	3555		
0.10	89	83	77	77	83	69	78	62	56	61	73	56	77	74	87	114	180	200	245	241	213	183	131	97	39.1	2708		
0.15	11	10	12	7	19	8	21	9	12	4	5	6	6	6	10	13	36	80	83	86	53	36	24	12	8.2	569		
0.20	1	0	1	3	0	1	4	4	0	1	1	1	0	2	1	1	4	13	15	13	2	2	2	4	1.1	75		
0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0.0	3		
0.30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1		
0.35	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	0		
0.40	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	0		
0.45	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	0		
0.50	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	0		
%	4.0	3.1	2.6	3.3	3.3	2.8	3.3	2.7	2.6	2.9	2.7	2.8	3.4	3.1	3.4	4.4	5.9	7.0	8.3	7.8	6.8	5.7	4.5	3.6	100.0	100.0		
Sum	280	215	183	230	228	191	231	184	130	200	189	194	236	212	238	305	405	482	574	539	471	394	313	248	100.0	6922		

Flow

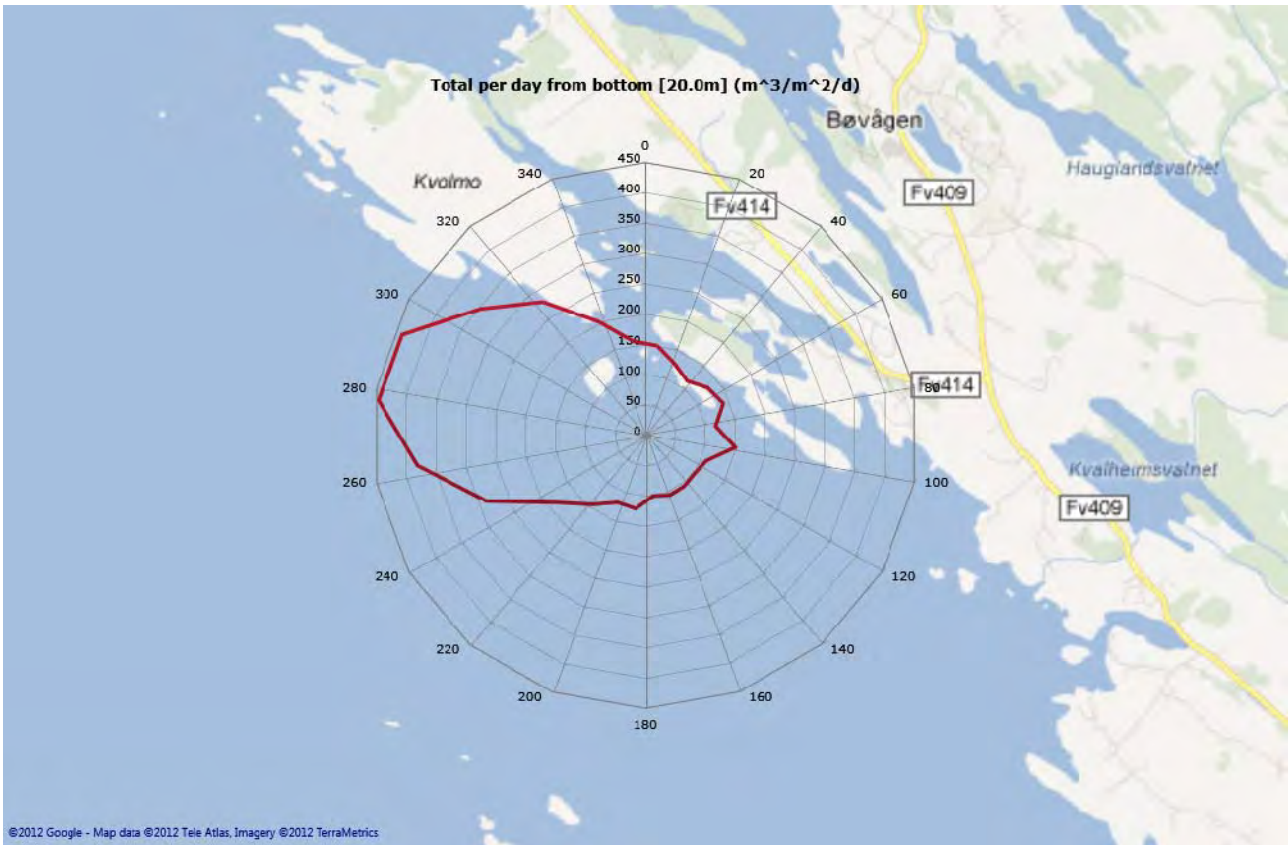
Top [15,0m]



Middle [18,0m]

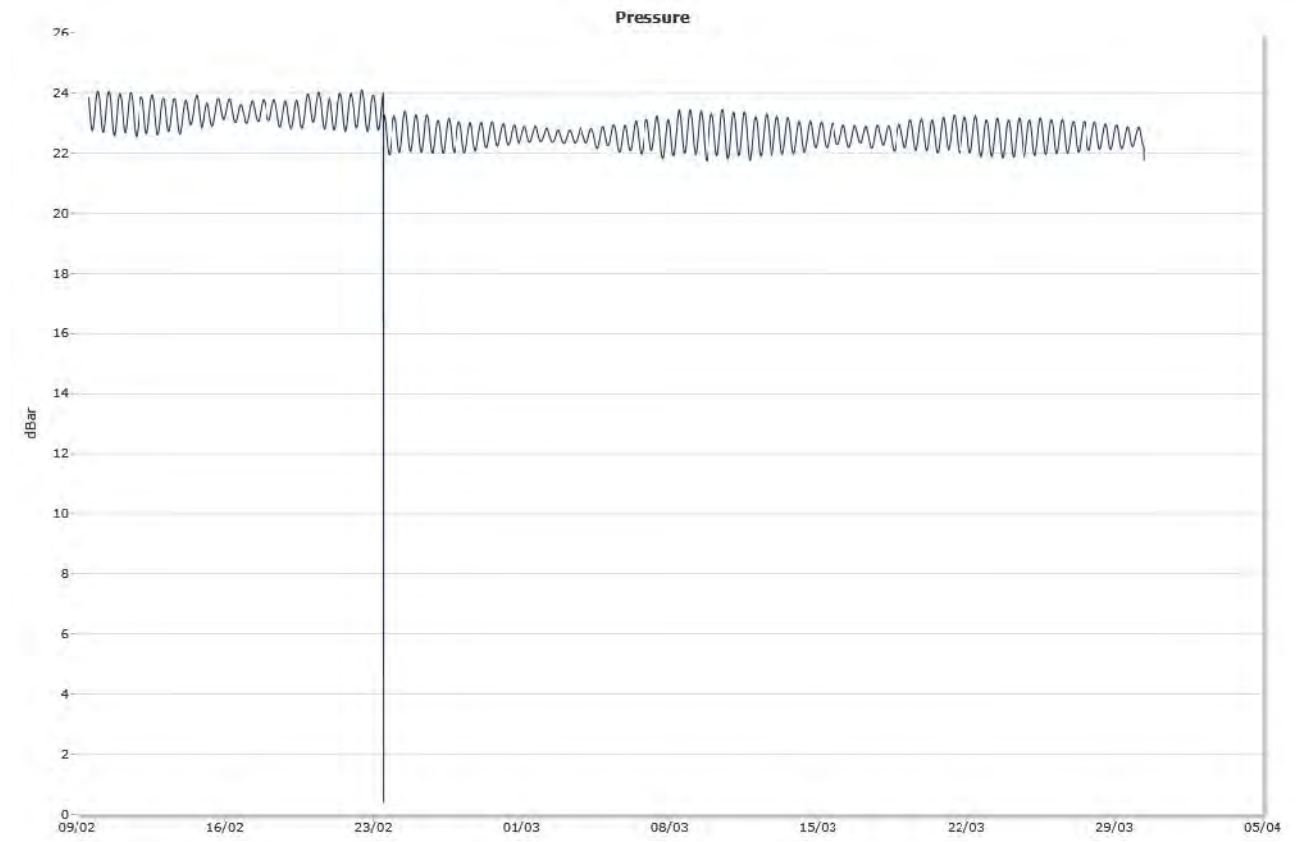


Bottom [20,0m]

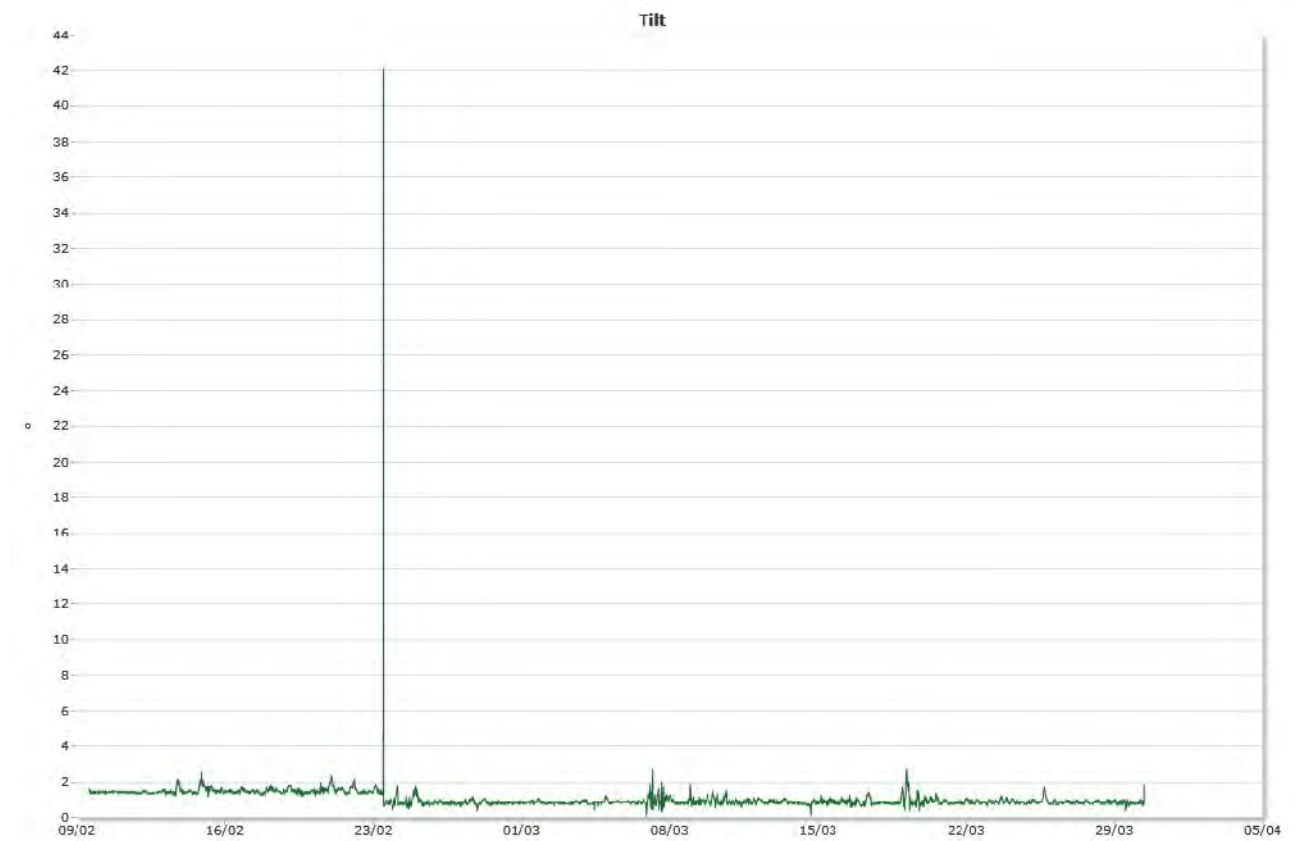


Sensors

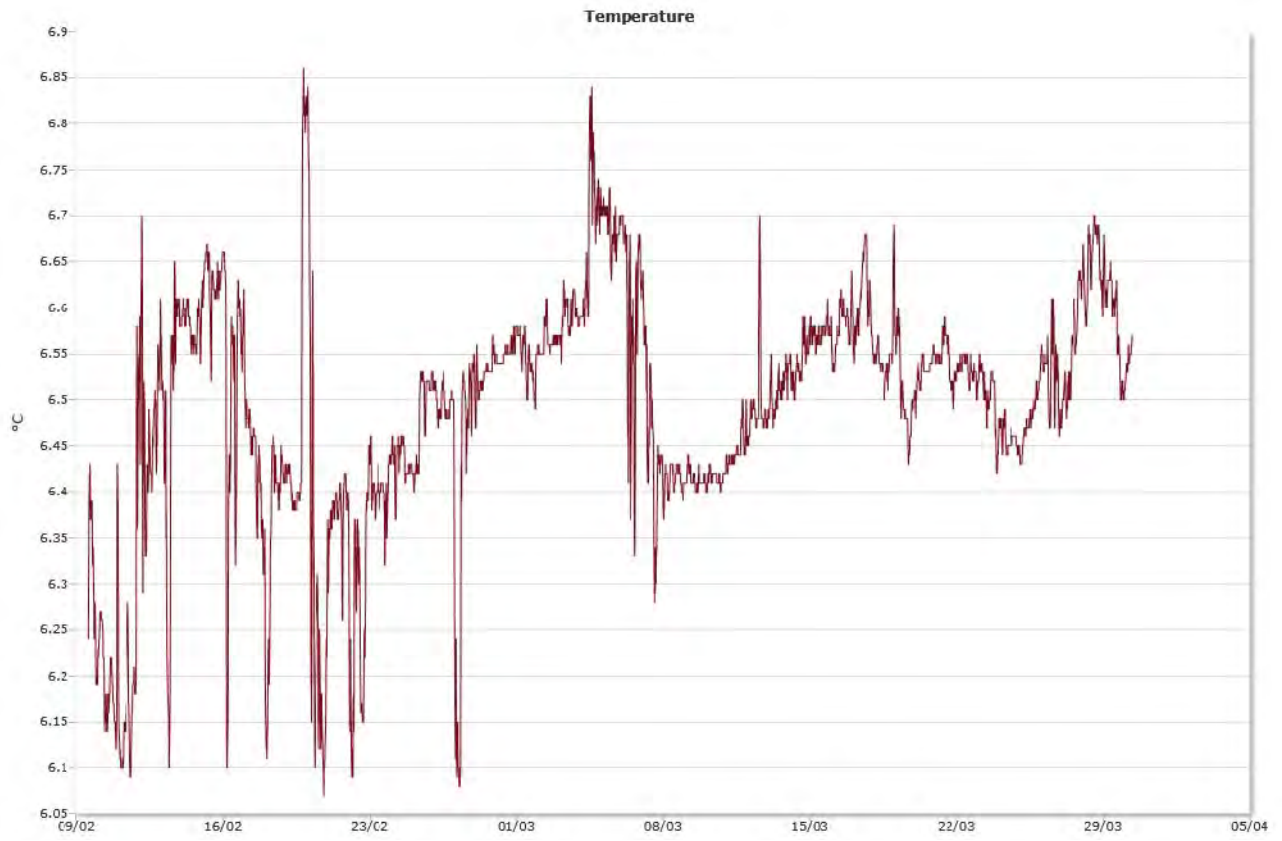
Pressure



Tilt



Temperature





Resipientanalyse AS

Foretaksnr.: NO 998 058 376 MVA
Adresse: Dortledhaugen 156
5239 Rådal

Kontaktperson: Frode Berge-Haveland
Telefon: 40231779

Epost: resipientanalyse@online.no

Internett: <http://www.resipientanalyse.no>

Dato: 02/04-2012

Lokaliteten: Otterholmen, Radøy. Sprednings- og bunnstrøm.

Som avtalt oversender vi resultatene fra våre strømmålinger utført i området ved Otterholmen i Radøy kommune. Vår vurdering av lokaliteten er i hovedsak basert på de viste måledata. Vi anbefaler sterkt at dere studerer de vedlagte data nøye selv. Rådataene finnes oppbevart i vårt arkiv.

Firmanavn / Lokalitet. Type oppdrett:

Firma : Blom Fiskeoppdrett AS Adresse :
Lokalitet : Otterholmen
Kommune : Radøy Fylke : Hordaland
UTM-koordinater : N60 41 243 / E4 54 566
Oppdrettstype : Generelle strømforhold - matfiskanlegg
Hva er vurdert : Spredningsstrøm og bunnstrøm.

Måleperioder / frekvenser.

Se vedlegg.

Oppsummering fra målingene.

Se "Spesifikasjons og resultatoversikt".

Vår vurdering:

Med hilsen:

Kvalitetssikret av:

Vedlegg og kopi:

Totalvurdering, resultatoversikt

Statistisk behandling av rådata.

SPESIFIKASJONS- OG RESULTATOVERSIKT.

Firma:

Lokalitet: Otterholmen, Radøy kommune.

Generelle spesifikasjoner, periode, frekvens og resultater.

Tekst	Overflatestrøm	Spredningsstrøm	Bunnstrøm
Tidsrom for registreringer		23.02.2012-30.03.2012	23.02.2012-30.03.2012
Dybde på målestedet. Ca.	65	65	65
Dybde for registreringer (meter). Ca.		35	60
Måler type - nummer		SD6000 - nr1268	SD6000 - nr1320
Type måling	Kontinuerlig	Kontinuerlig	Kontinuerlig
Frekvens – varighet*4		2 min/10 min - 36 døgn	2 min/10 min - 36 døgn
Adresse for arkiv (data)	/N60 41 243 / E4 54 566o	/N60 41 243 / E4 54 566s	/N60 41 243 / E4 54 566b
% strøm mindre enn 1 cm/sek.(ca)		19.7 %	89.0 %
Gjennomsnittsstrøm		2.2	1.1
Rest strøm		0.9	0.5
Neumanns parameter		0.399	0.394
De 4 hyppigst forekommende retningene strømmen beveger seg mot (grader) *1		285, 270, 300, 315	15, 30, 0, 45
De 4 hyppigst forekommende strømhastighetene (cm /sek) *1		1-3, 0-1, 3-4, 4-5	0-1, 1-3, 3-4, 5-6
Mest vannutskiftning / retning / 15 graders sektor.*2		11465m ³ ved 285-300 grader. 318m ³ /m ² /døgn	4982m ³ ved 15-30 grader. 138m ³ /m ² /døgn
Minst vannutskiftning / retning / 15 graders sektor.*2		770m ³ ved 150-165 grader. 21m ³ /m ² /døgn	200m ³ ved 285-300 grader. 6m ³ /m ² /døgn
Gjennomsnittlig total vannutskiftning pr.døgn. Alle retninger		1935m ³ /døgn	996m ³ /døgn
Maksimum strøm – signifikant maksimum strøm (cm/sek) *3		17.0 - 3.8	26.2 - 1.4

*1: gruppert i synkende rekkefølge *2: vann som passerer gjennom hver loddrett plassert kvadratmeter.*3: gjennomsnittet av 1/3 målingene som viser høyest verdi. *4:måleren måler hvert x minutt, hvert y minutt gir måleren et gjennomsnitt av verdiene for 5 målinger."

Spredningsstrøm

TEMPERATURE

File name: Otterholmen spreingsstraum.SD6

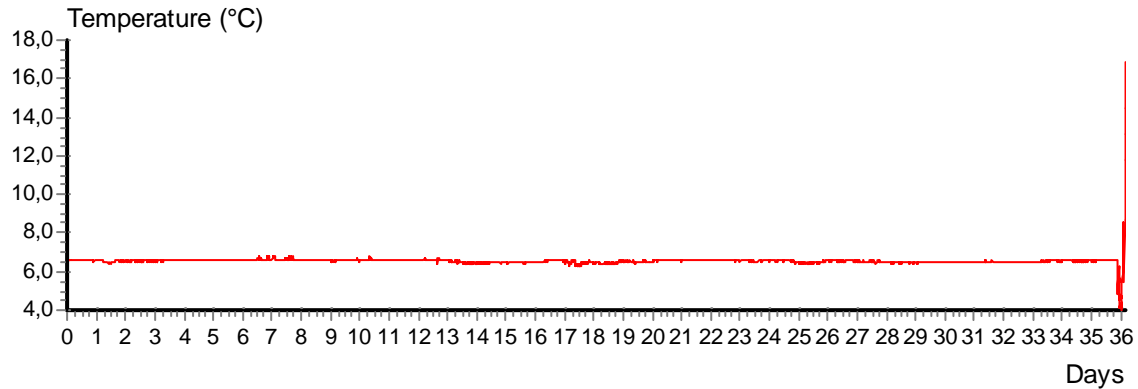
Ref. number: 1268

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12



CURRENT SPEED

File name: Otterholmen spreingsstraum.SD6

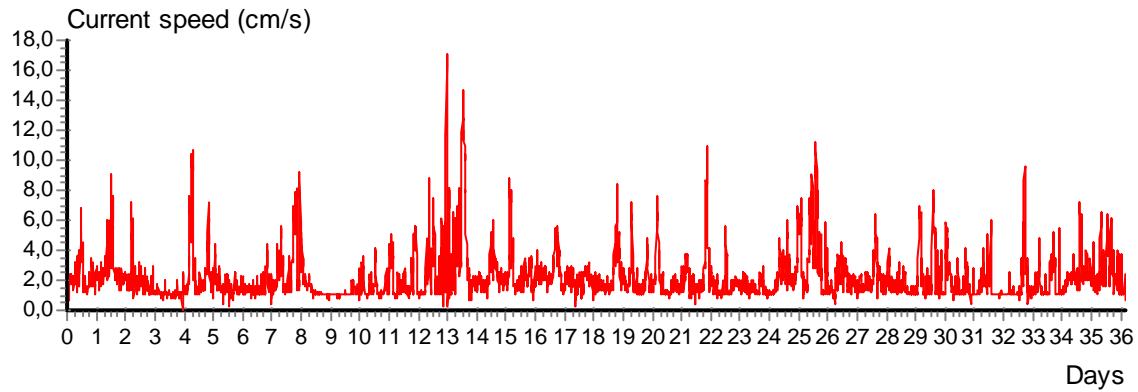
Ref. number: 1268

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

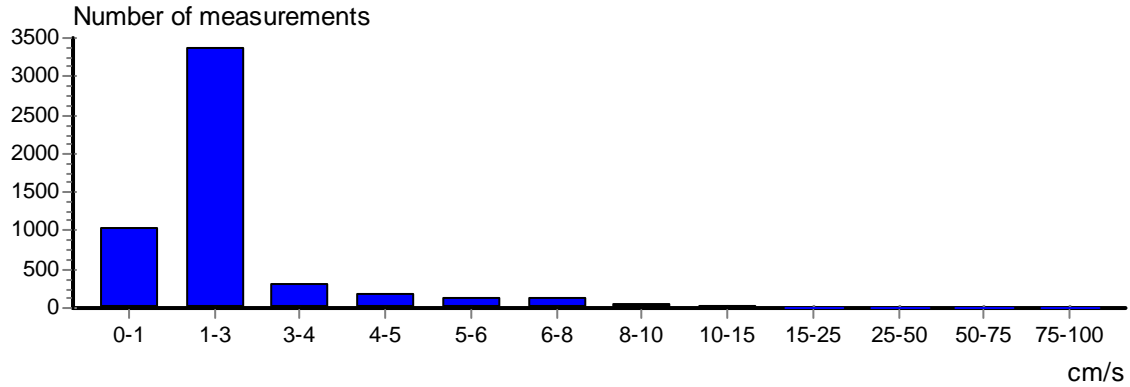
Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12



CURRENT SPEED BAR CHART

File name: Otterholmen spreingsstraum.SD6
 Series number: 1
 Number of measurements in data set: 5209
 Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12

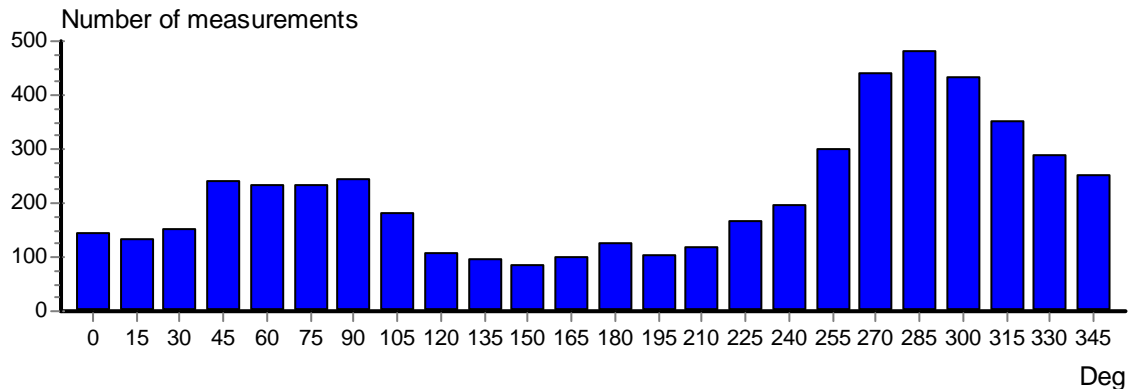
Ref. number: 1268
 Interval time: 10 Minutes



CURRENT DIRECTION BAR CHART

File name: Otterholmen spreingsstraum.SD6
 Series number: 1
 Number of measurements in data set: 5209
 Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12

Ref. number: 1268
 Interval time: 10 Minutes

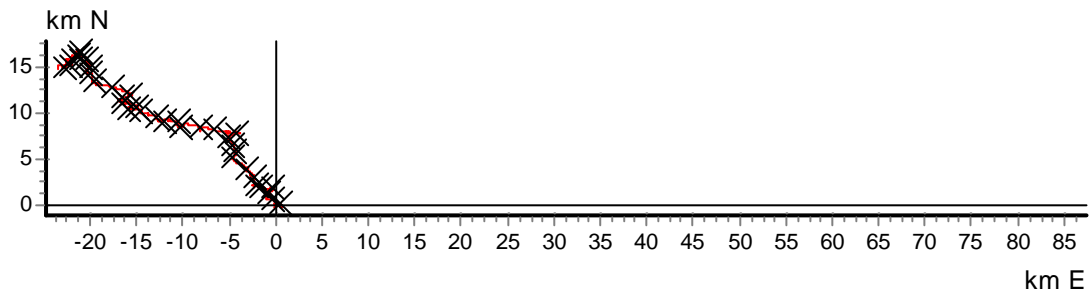


PROGRESSIVE VECTOR

File name: Otterholmen spreingsstraum.SD6
 Series number: 1
 Number of measurements in data set: 5209
 Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12

Ref. number: 1268
 Interval time: 10 Minutes

Neumann parameter: 0.399 Rest speed: 0.9 cm/s
 Average speed: 2.2 cm/s Rest direction: 302 deg.



CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Otterholmen spreingsstraum.SD6

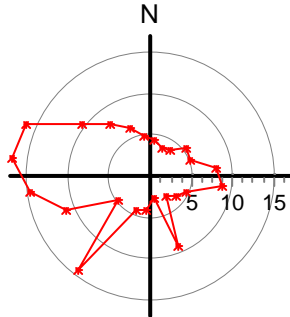
Ref. number: 1268

Series number: 1

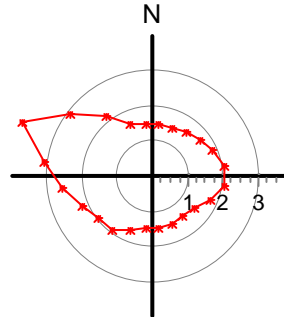
Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12



Maximum velocity (cm/s)
per 15 deg sector



Mean velocity (cm/s)
per 15 deg sector

CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Otterholmen spreingsstraum.SD6

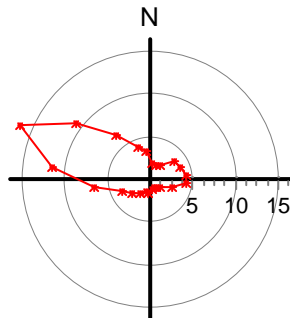
Ref. number: 1268

Series number: 1

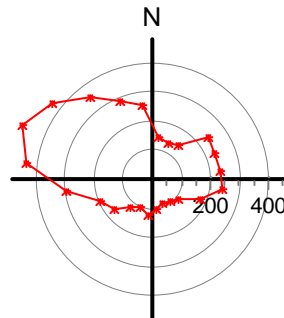
Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12



Relative water flux (%)
per 15 deg sector



Number of measurements
per 15 deg sector

STICK DIAGRAM

File name: Otterholmen spreingsstraum.SD6

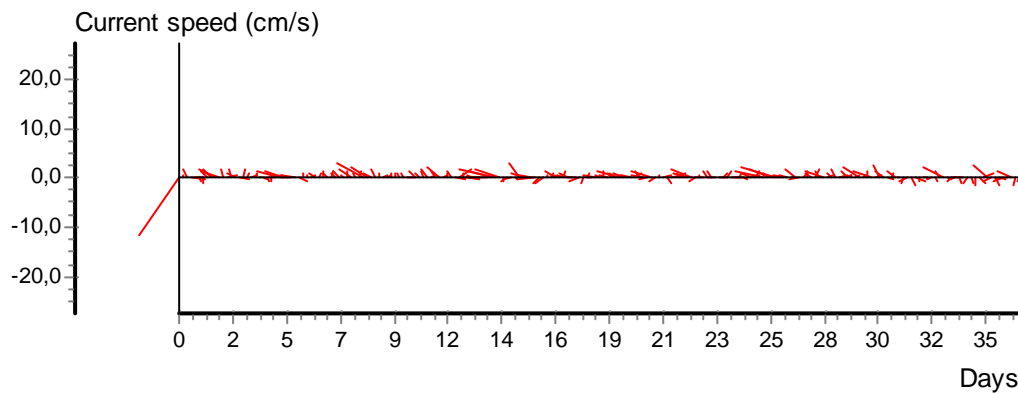
Ref. number: 1268

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12



CURRENT SPEED / DIRECTION MATRIX

File name: Otterholmen spreingsstrøm.SD6

Ref. number: 1268

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:14 - 23.Feb-12 To: 15:14 - 30.Mar-12

	Current speed groups													Total flow		Max curr
	1	3	4	5	6	8	10	15	25	50	75	100	Sum%	m ³ /m ²	%	
0	43	98	1	2	0	0	0	0	0	0	0	0	2.8	1302	1.9	4.4
15	40	94	1	0	0	0	0	0	0	0	0	0	2.6	1210	1.7	3.8
30	34	114	3	0	0	0	0	0	0	0	0	0	2.9	1417	2.0	4.0
45	62	161	8	4	4	0	0	0	0	0	0	0	4.6	2468	3.5	5.6
60	44	170	12	5	1	0	0	0	0	0	0	0	4.5	2606	3.7	5.2
75	51	153	17	4	2	7	1	0	0	0	0	0	4.5	2940	4.2	8.2
90	60	150	20	6	5	2	1	0	0	0	0	0	4.7	3037	4.4	8.8
105	41	129	7	3	0	0	0	0	0	0	0	0	3.5	1907	2.7	4.8
120	48	56	5	0	0	0	0	0	0	0	0	0	2.1	1003	1.4	4.0
135	48	48	0	0	0	0	0	0	0	0	0	0	1.8	805	1.2	3.0
150	34	52	0	0	0	0	1	0	0	0	0	0	1.7	770	1.1	9.2
165	37	64	0	0	0	0	0	0	0	0	0	0	1.9	900	1.3	2.8
180	51	74	1	1	0	0	0	0	0	0	0	0	2.4	1154	1.7	4.2
195	37	61	3	1	0	0	0	0	0	0	0	0	2.0	1010	1.5	4.4
210	31	81	5	1	0	0	0	1	0	0	0	0	2.3	1354	1.9	14.4
225	28	128	8	1	0	0	0	0	0	0	0	0	3.2	1898	2.7	4.8
240	13	165	14	3	0	1	0	1	0	0	0	0	3.8	2545	3.7	11.0
255	15	216	36	20	4	8	0	1	0	0	0	0	5.8	4666	6.7	14.6
270	22	268	47	36	31	23	5	6	1	0	0	0	8.4	8137	11.7	17.0
285	17	233	38	48	46	61	21	16	1	0	0	0	9.2	11465	16.5	16.2
300	32	264	46	35	22	20	11	2	0	0	0	0	8.3	7556	10.8	10.4
315	69	226	30	12	10	6	0	0	0	0	0	0	6.8	4508	6.5	8.0
330	81	197	6	2	1	1	0	0	0	0	0	0	5.5	2755	4.0	6.2
345	89	162	0	2	0	0	0	0	0	0	0	0	4.9	2261	3.2	5.0
Sum%	19.7	64.6	5.9	3.6	2.4	2.5	0.8	0.5	0.0	0.0	0.0	0.0		69677		17.0

STATISTICAL SUMMARY

	Total	East / west	North / south
Mean current speed (cm/s)	2,2	1,7	1,1
Variance (cm/s) ²	2,587	2,665	0,715
Standard deviation (cm/s)	1,608	1,632	0,846
Mean standard deviation	0,722	0,946	0,772
Maximum current velocity	17,0		
Minimum current velocity	0,0		
Significant max velocity	3,8		
Significant min velocity	1,1		

Bunnstrøm

TEMPERATURE

File name: Otterholmen botnstraum.SD6

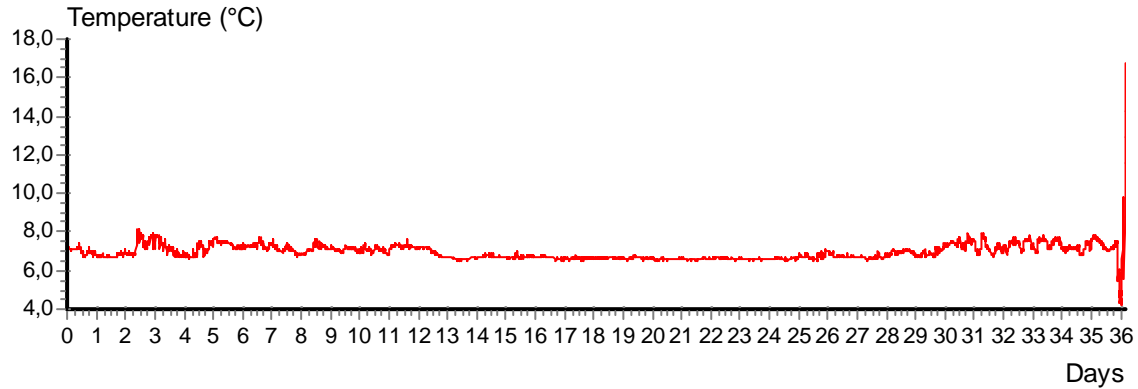
Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



CURRENT SPEED

File name: Otterholmen botnstraum.SD6

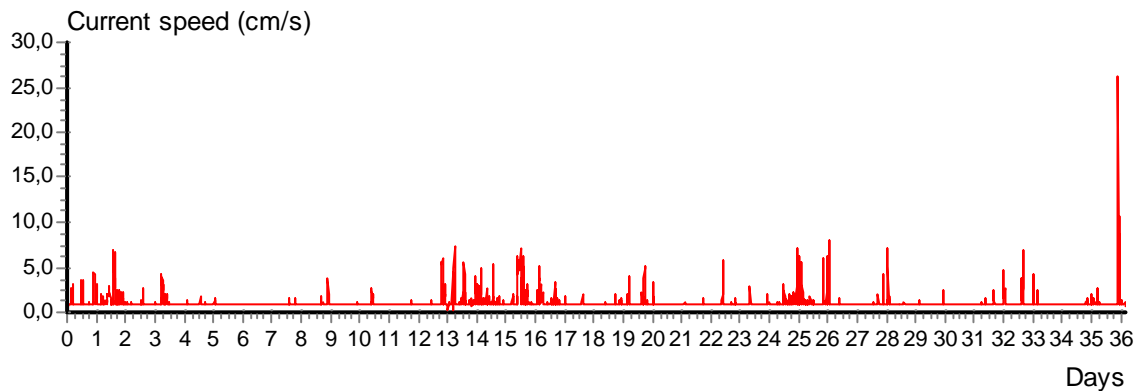
Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



CURRENT SPEED BAR CHART

File name: Otterholmen botnstraum.SD6

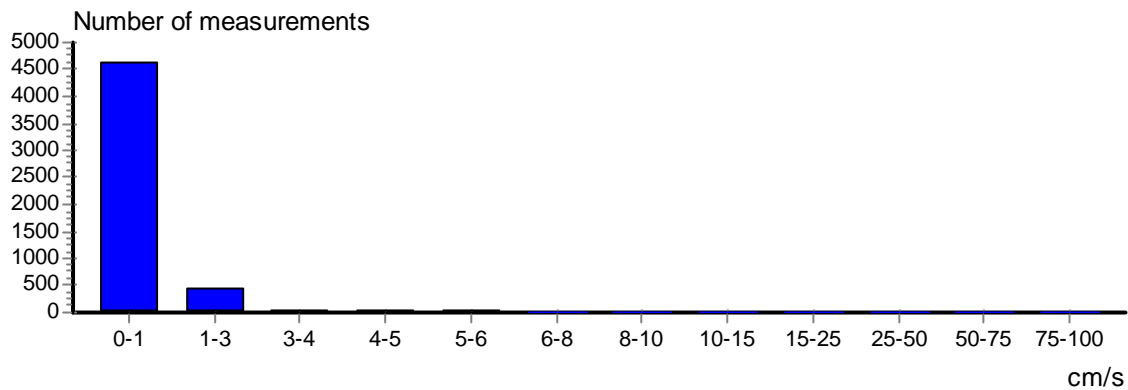
Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



CURRENT DIRECTION BAR CHART

File name: Otterholmen botnstraum.SD6

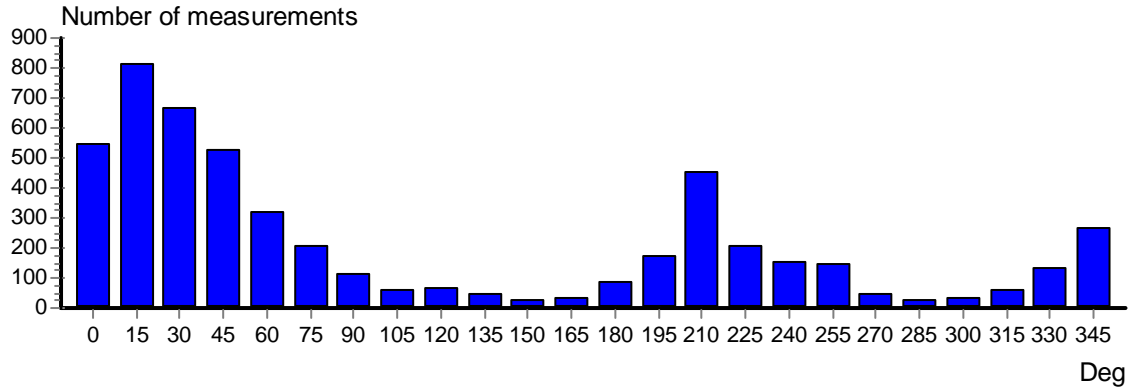
Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



PROGRESSIVE VECTOR

File name: Otterholmen botnstraum.SD6

Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

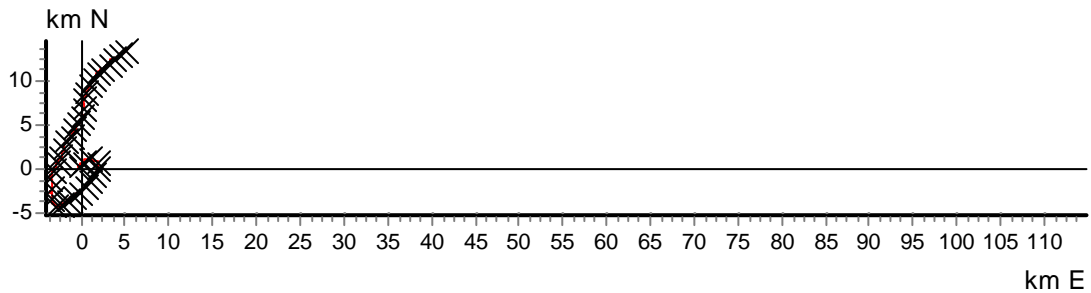
Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12

Neumann parameter: 0.394

Rest speed: 0.5 cm/s

Average speed: 1.1 cm/s

Rest direction: 20 deg.



CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Otterholmen botnstraum.SD6

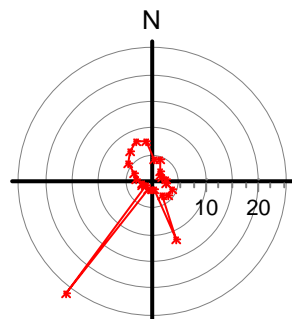
Ref. number: 1320

Series number: 1

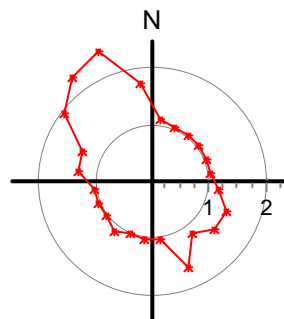
Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



Maximum velocity (cm/s)
per 15 deg sector



Mean velocity (cm/s)
per 15 deg sector

CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Otterholmen botnstraum.SD6

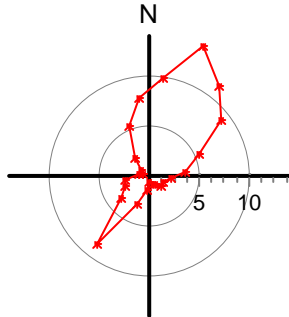
Ref. number: 1320

Series number: 1

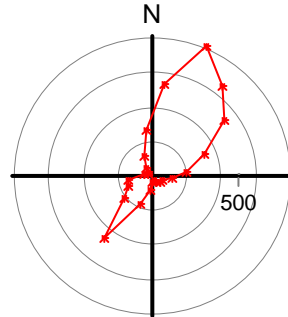
Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



Relative water flux (%)
per 15 deg sector



Number of measurements
per 15 deg sector

STICK DIAGRAM

File name: Otterholmen botnstraum.SD6

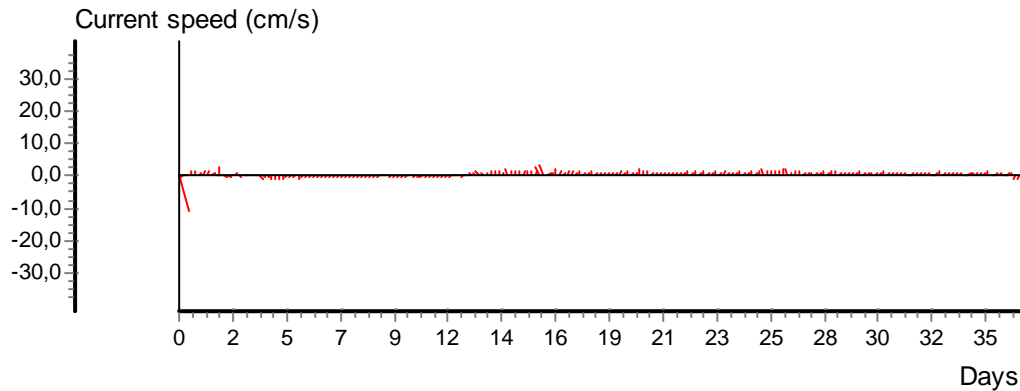
Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12



CURRENT SPEED / DIRECTION MATRIX

File name: Otterholmen botnstraum.SD6

Ref. number: 1320

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 5209

Data displayed from: 11:13 - 23.Feb-12 To: 15:13 - 30.Mar-12

	Current speed groups													Total flow		Max curr
	1	3	4	5	6	8	10	15	25	50	75	100	Sum%	m ³ /m ²	%	
0	480	61	2	1	0	0	0	0	0	0	0	0	10.4	3547	9.9	4.2
15	777	34	0	2	0	0	0	0	0	0	0	0	15.6	4982	13.9	4.4
30	639	26	0	0	0	0	0	0	0	0	0	0	12.8	4044	11.3	2.4
45	502	27	0	0	0	0	0	0	0	0	0	0	10.2	3234	9.0	1.8
60	300	21	0	0	0	0	0	0	0	0	0	0	6.2	1963	5.5	2.0
75	189	15	0	0	0	0	0	0	0	0	0	0	3.9	1274	3.6	2.6
90	87	27	0	0	0	0	0	0	0	0	0	0	2.2	793	2.2	2.6
105	36	25	1	1	0	0	0	0	0	0	0	0	1.2	527	1.5	4.2
120	46	15	4	0	0	0	0	0	0	0	0	0	1.2	540	1.5	4.0
135	38	7	1	0	0	0	0	0	0	0	0	0	0.9	316	0.9	3.2
150	26	2	0	0	0	1	0	1	0	0	0	0	0.6	292	0.8	11.8
165	33	1	0	0	0	0	0	0	0	0	0	0	0.7	206	0.6	1.6
180	80	4	0	0	0	0	0	0	0	0	0	0	1.6	510	1.4	1.4
195	174	2	0	0	0	0	0	0	0	0	0	0	3.4	1060	3.0	1.8
210	447	3	1	1	0	1	1	1	0	1	0	0	8.8	3076	8.6	26.2
225	205	4	0	0	0	0	0	0	0	0	0	0	4.0	1256	3.5	1.4
240	148	4	0	0	0	0	0	0	0	0	0	0	2.9	919	2.6	2.2
255	139	6	0	0	0	0	0	0	0	0	0	0	2.8	882	2.5	1.8
270	29	17	0	0	0	0	0	0	0	0	0	0	0.9	359	1.0	3.0
285	16	8	1	0	0	0	0	0	0	0	0	0	0.5	200	0.6	3.8
300	16	10	5	1	2	0	0	0	0	0	0	0	0.7	396	1.1	5.8
315	28	14	5	2	6	3	0	0	0	0	0	0	1.1	794	2.2	7.0
330	53	37	15	7	11	7	0	0	0	0	0	0	2.5	1916	5.3	8.0
345	146	84	18	5	8	5	0	0	0	0	0	0	5.1	2774	7.7	7.4
Sum%	89.0	8.7	1.0	0.4	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0		35862		26.2

STATISTICAL SUMMARY

	Total	East / west	North / south
Mean current speed (cm/s)	1,1	0,6	0,8
Variance (cm/s) ²	0,541	0,233	0,512
Standard deviation (cm/s)	0,736	0,483	0,716
Mean standard deviation	0,641	0,758	0,852
Maximum current velocity	26,2		
Minimum current velocity	0,2		
Significant max velocity	1,4		
Significant min velocity	1,0		