



## SD6000 Rapport rådata

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5163 Laksevåg  
Dato: 26/11-2015

**Lokaliteten: Tittelsnes, Sveio. Sprednings- og bunnstrøm. Strøm på 95m og 145m dybde.**

Strømmålingene er utført av Noomas DNV GL. I sammenheng med NS kvalitetssystem skal det skrives ut en rapport på rådata. Rådataene finnes oppbevart i vårt arkiv på lokalitetsnivå.

**Firmanavn / Lokalitet. Type oppdrett:**

Firma : Bremnes Seashore AS  
Lokalitet : Tittelsnes  
Kommune : Sveio Fylke : Hordaland  
UTM-koordinater : 59.43.416N / 05.32.072Ø  
Krav referanse : Krav til akkreditert lokalitetsundersøkelse NYTEK iht NS9415:2009  
Hva er vurdert : Spredningsstrøm og bunnstrøm.

**Måleperioder / frekvenser.**

Se vedlegg.

**Oppsummering fra målingene.**

Se ”Spesifikasjons og resultatoversikt”.

**Vår vurdering:**

Målingene som er gjennomført oppfylder kravene som er stilt ifm lokalitetssøknader.

Med hilsen:

Arild Heggland  
Tlf: 473 75 266

Vedlegg og kopi:

Totalvurdering, resultatoversikt  
Statistisk behandling av rådata.

## SPESIFIKASJONS- OG RESULTATOVERSIKT.

**Firma:** Bremnes Seashore AS

**Lokalitet:** Tittelsnes, Sveio kommune.

### Generelle spesifikasjoner, periode, frekvens og resultater.

Tekst	Strøm 95m dybde; NS9415	Strøm 145m dybde; NS9415
Tidsrom for registreringer	29.10.2015-26.11.2015	29.10.2015-26.11.2015
Dybde på målestedet. Ca.	165	165
Dybde for registreringer (meter). Ca.	95	145
Måler type - nummer	SD6000 - nr1677	SD6000 - nr1669
Type måling	Kontinuerlig	Kontinuerlig
Frekvens – varighet*4	2 min/10 min - 28 døgn	2 min/10 min - 28 døgn
Adresse for arkiv (data)	/59.43.416N / 05.32.072Øo	/59.43.416N / 05.32.072Øs
% strøm mindre enn 1 cm/sek.(ca)	31.7 %	52.5 %
Gjennomsnittsstrøm	3.0	2.5
Rest strøm	1.2	1.0
Neumanns parameter	0.394	0.407
De 4 hyppigst forekommende retningene strømmen beveger seg mot (grader) *1	15, 315, 0, 345	165, 150, 180, 135
De 4 hyppigst forekommende strømhastighetene (cm /sek) *1	1-3, 0-1, 3-4, 4-5	0-1, 1-3, 6-8, 3-4
Mest vannutskiftning / retning / 15 graders sektor.*2	6770m <sup>3</sup> ved 345-360 grader. 242m <sup>3</sup> /m <sup>2</sup> /døgn	11024m <sup>3</sup> ved 165-180 grader. 394m <sup>3</sup> /m <sup>2</sup> /døgn
Minst vannutskiftning / retning / 15 graders sektor.*2	331m <sup>3</sup> ved 90-105 grader. 12m <sup>3</sup> /m <sup>2</sup> /døgn	774m <sup>3</sup> ved 225-240 grader. 28m <sup>3</sup> /m <sup>2</sup> /døgn
Gjennomsnittlig total vannutskiftning pr.døgn. Alle retninger	2571m <sup>3</sup> /døgn	2170m <sup>3</sup> /døgn
Maksimum strøm – signifikant maksimum strøm (cm/sek) *3	17.0 - 5.9	13.8 - 5.3

\*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.

## Overflatestrøm - 95 meter

### TEMPERATURE

File name: Tittelsnes 95m 1677.SD6

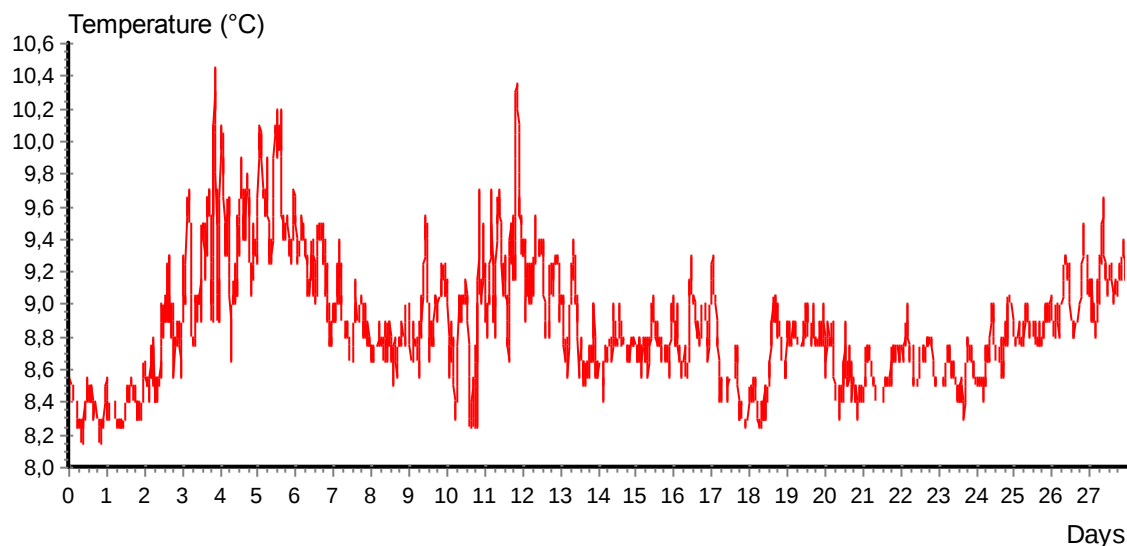
Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15



### CURRENT SPEED

File name: Tittelsnes 95m 1677.SD6

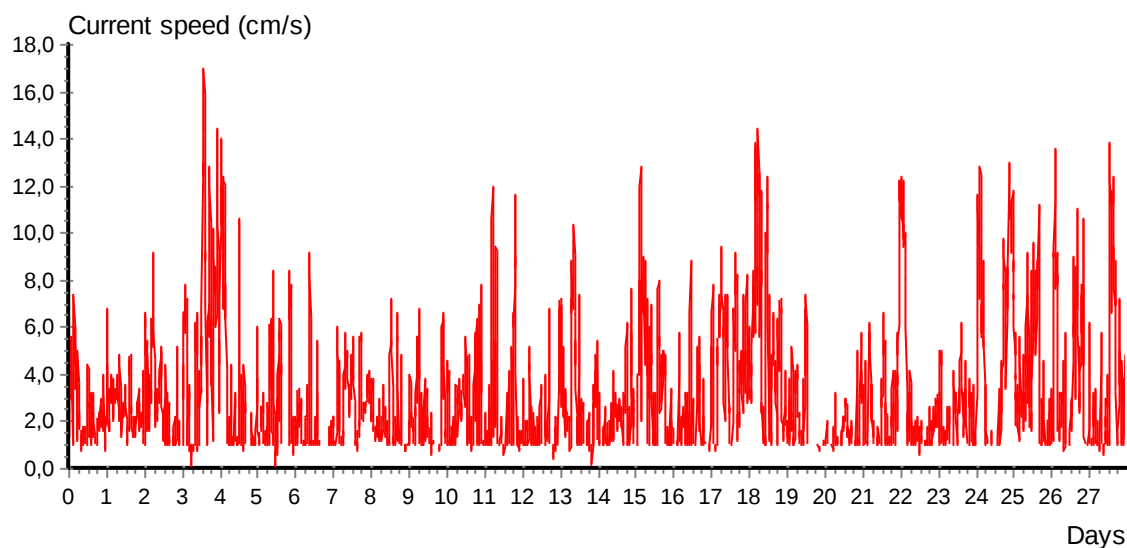
Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15



**CURRENT SPEED BAR CHART**

File name: Tittelsnes 95m 1677.SD6

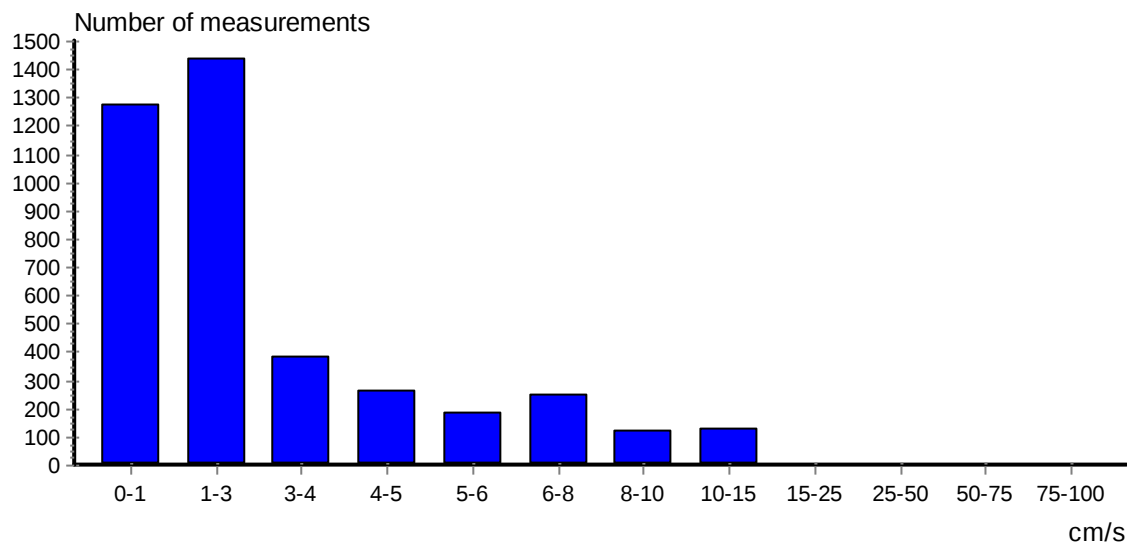
Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15



**CURRENT DIRECTION BAR CHART**

File name: Tittelsnes 95m 1677.SD6

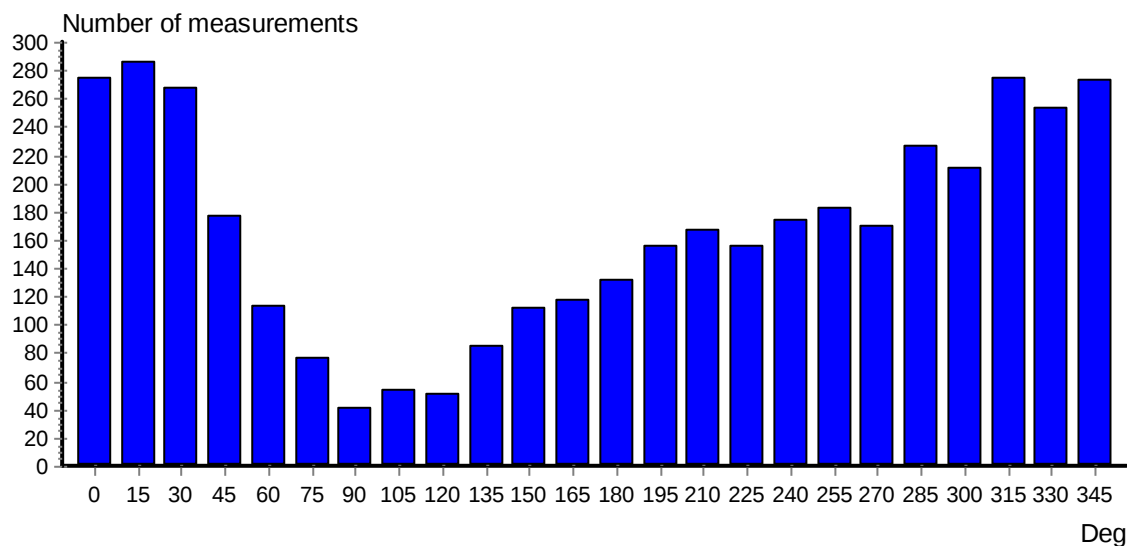
Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15



**PROGRESSIVE VECTOR**

File name: Tittelsnes 95m 1677.SD6

Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

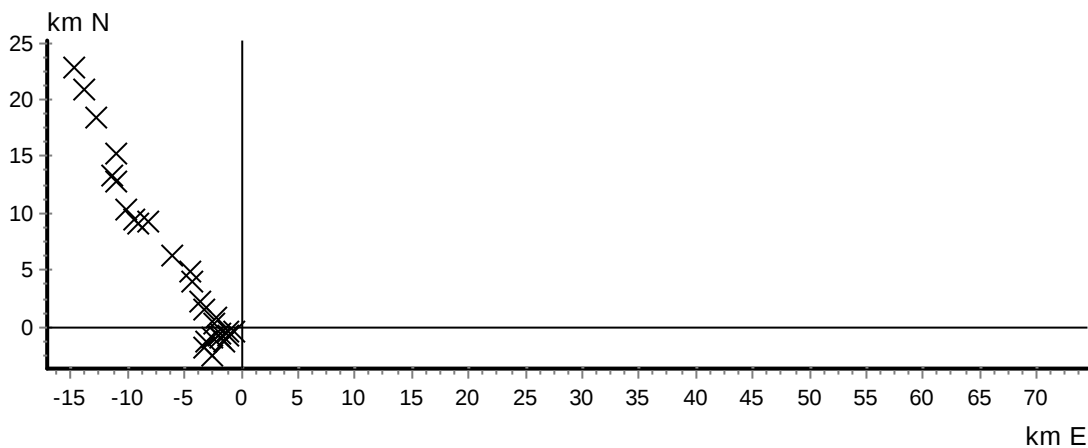
Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15

Neumann parameter: 0.394

Rest speed: 1.2 cm/s

Average speed: 3.0 cm/s

Rest direction: 325 deg.



**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 95m 1677.SD6

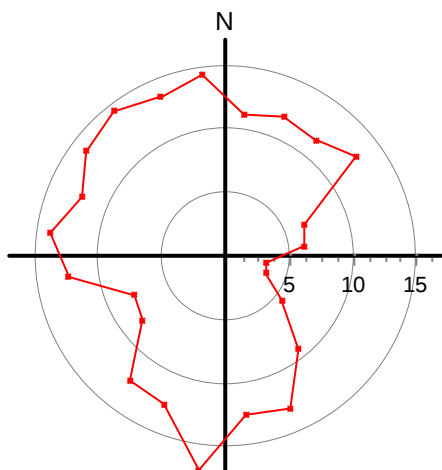
Ref. number: 1677

Series number: 1

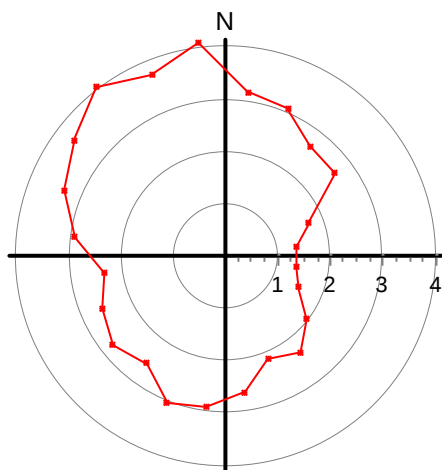
Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15



Maximum velocity (cm/s)  
per 15 deg sector



Mean velocity (cm/s)  
per 15 deg sector

**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 95m 1677.SD6

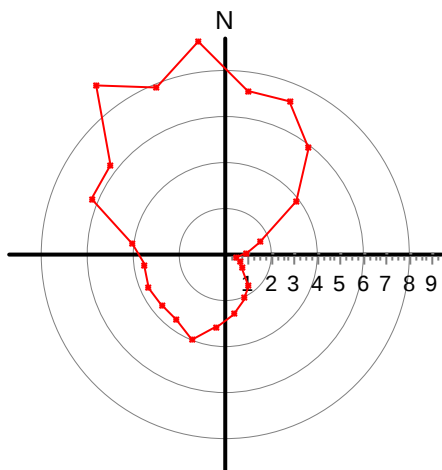
Series number: 1

Number of measurements in data set: 4032

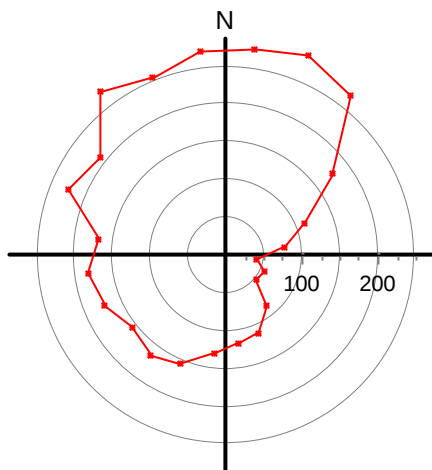
Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15

Ref. number: 1677

Interval time: 10 Minutes



Relative water flux (%)  
per 15 deg sector



Number of measurements  
per 15 deg sector

**STICK DIAGRAM**

File name: Tittelsnes 95m 1677.SD6

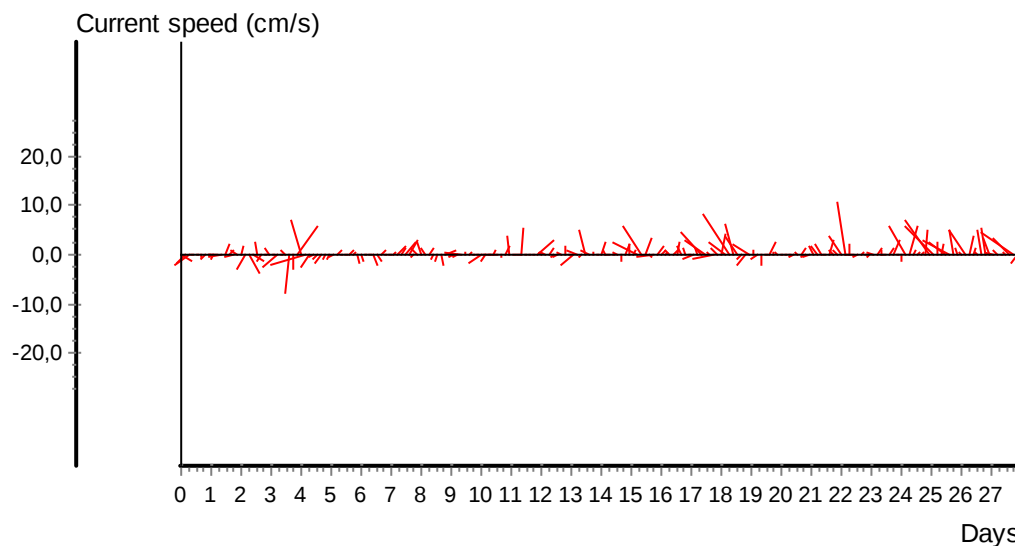
Series number: 1

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15

Ref. number: 1677

Interval time: 10 Minutes



**CURRENT SPEED / DIRECTION MATRIX**

File name: Tittelsnes 95m 1677.SD6

Ref. number: 1677

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:13 - 29.Oct-15 To: 13:03 - 26.Nov-15

	Current speed groups													Total flow		Max curr
	1	3	4	5	6	8	10	15	25	50	75	100	Sum%	m <sup>3</sup> /m <sup>2</sup>	%	
0	59	104	32	25	27	15	10	2	0	0	0	0	6.8	5196	7.2	11.2
15	73	106	35	24	12	25	6	5	0	0	0	0	7.1	5250	7.3	12.0
30	73	116	36	15	10	9	8	1	0	0	0	0	6.6	4261	5.9	11.6
45	56	69	17	17	9	4	1	4	0	0	0	0	4.4	2785	3.9	12.8
60	61	41	4	1	4	2	0	0	0	0	0	0	2.8	1158	1.6	6.6
75	50	24	1	1	0	1	0	0	0	0	0	0	1.9	626	0.9	6.2
90	29	11	1	0	0	0	0	0	0	0	0	0	1.0	331	0.5	3.2
105	32	19	3	0	0	0	0	0	0	0	0	0	1.3	479	0.7	3.4
120	22	22	4	0	3	0	0	0	0	0	0	0	1.3	598	0.8	5.6
135	40	24	7	4	3	4	3	0	0	0	0	0	2.1	1176	1.6	9.2
150	49	42	6	9	2	3	0	1	0	0	0	0	2.8	1429	2.0	13.0
165	45	38	14	3	5	10	1	2	0	0	0	0	2.9	1858	2.6	12.6
180	48	43	16	7	6	4	1	3	3	0	0	0	3.2	2276	3.2	17.0
195	38	64	20	11	4	7	7	5	0	0	0	0	3.9	2844	4.0	12.6
210	54	68	18	8	2	13	1	3	0	0	0	0	4.1	2551	3.5	12.4
225	53	54	13	11	10	14	1	0	0	0	0	0	3.9	2561	3.6	8.4
240	64	52	19	22	8	9	0	0	0	0	0	0	4.3	2677	3.7	7.8
255	68	73	18	8	4	6	3	3	0	0	0	0	4.5	2588	3.6	12.6
270	42	74	19	12	8	5	3	7	0	0	0	0	4.2	2992	4.2	14.0
285	61	79	20	12	13	25	9	8	0	0	0	0	5.6	4543	6.3	12.2
300	63	55	20	15	13	25	10	10	0	0	0	0	5.2	4619	6.4	13.8
315	77	77	21	20	11	19	23	26	0	0	0	0	6.8	6709	9.3	14.4
330	57	92	19	16	15	24	12	19	0	0	0	0	6.3	5714	7.9	13.6
345	63	86	21	20	14	21	21	27	0	0	0	0	6.8	6770	9.4	14.4
Sum%	31.7	35.5	9.5	6.5	4.5	6.1	3.0	3.1	0.1	0.0	0.0	0.0		71993		17.0

**STATISTICAL SUMMARY**

	Total	East / west	North / south
Mean current speed (cm/s)	3,0	1,6	2,2
Variance (cm/s) <sup>2</sup>	6,828	3,032	5,259
Standard deviation (cm/s)	2,613	1,741	2,293
Mean standard deviation	0,878	1,056	1,061
Maximum current velocity	17,0		
Minimum current velocity	0,0		
Significant max velocity	5,9		
Significant min velocity	1,0		

## Spredningsstrøm

### TEMPERATURE

File name: Tittelsnes 145m 1669.SD6

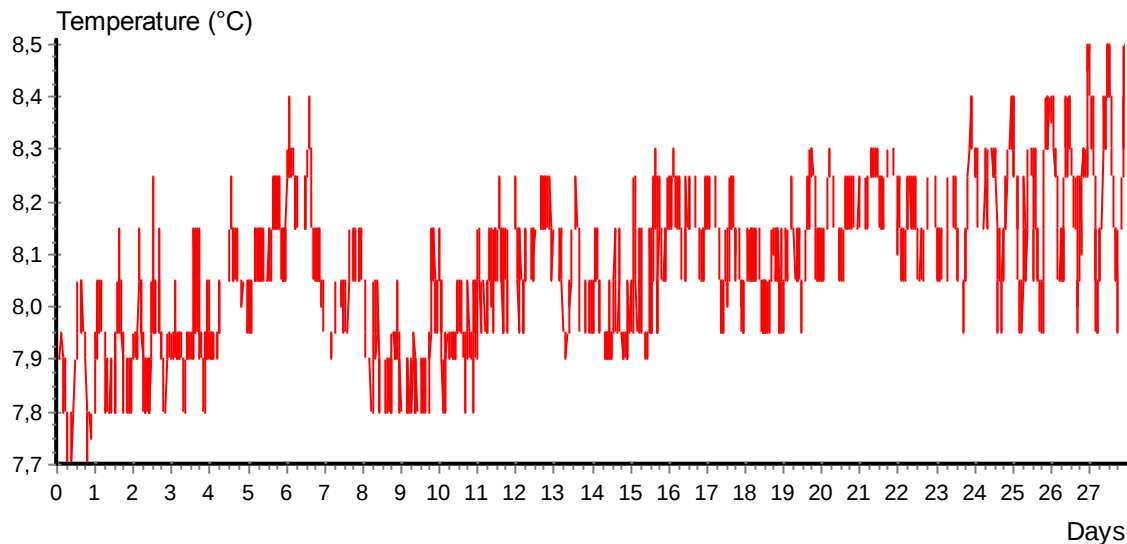
Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



### CURRENT SPEED

File name: Tittelsnes 145m 1669.SD6

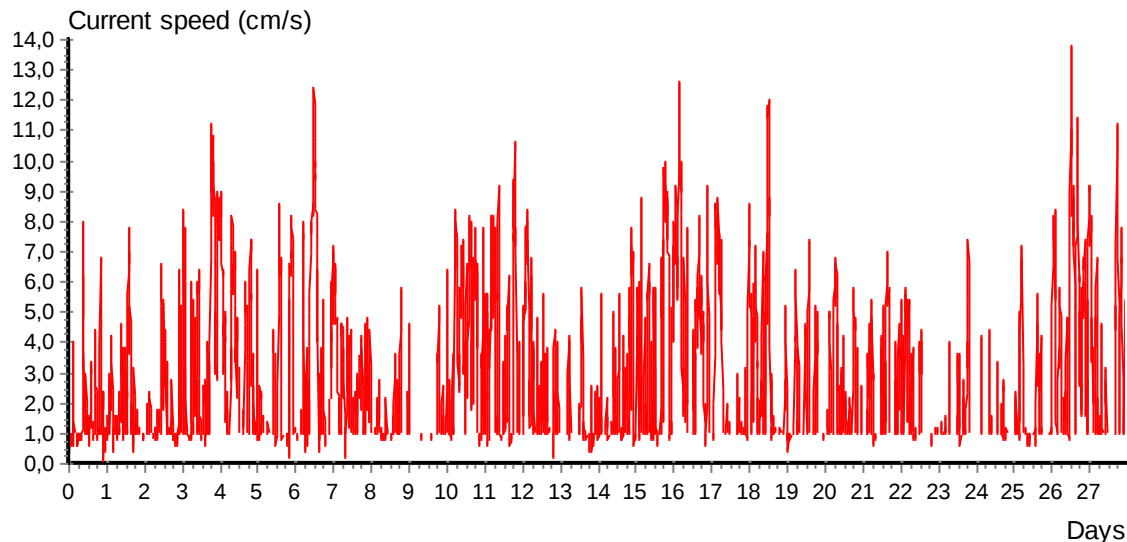
Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15





**CURRENT SPEED BAR CHART**

File name: Tittelsnes 145m 1669.SD6

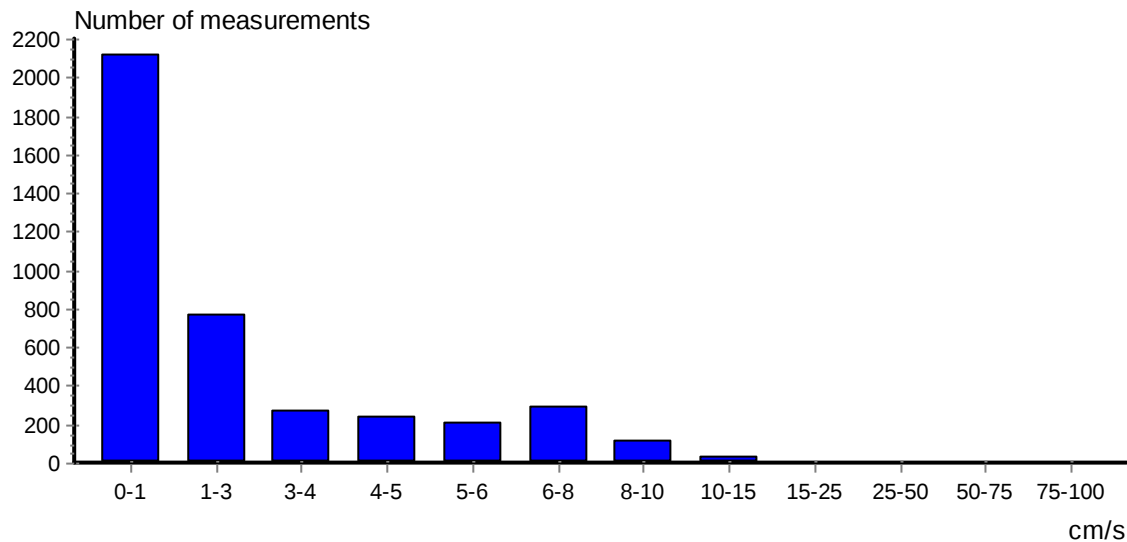
Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



**CURRENT DIRECTION BAR CHART**

File name: Tittelsnes 145m 1669.SD6

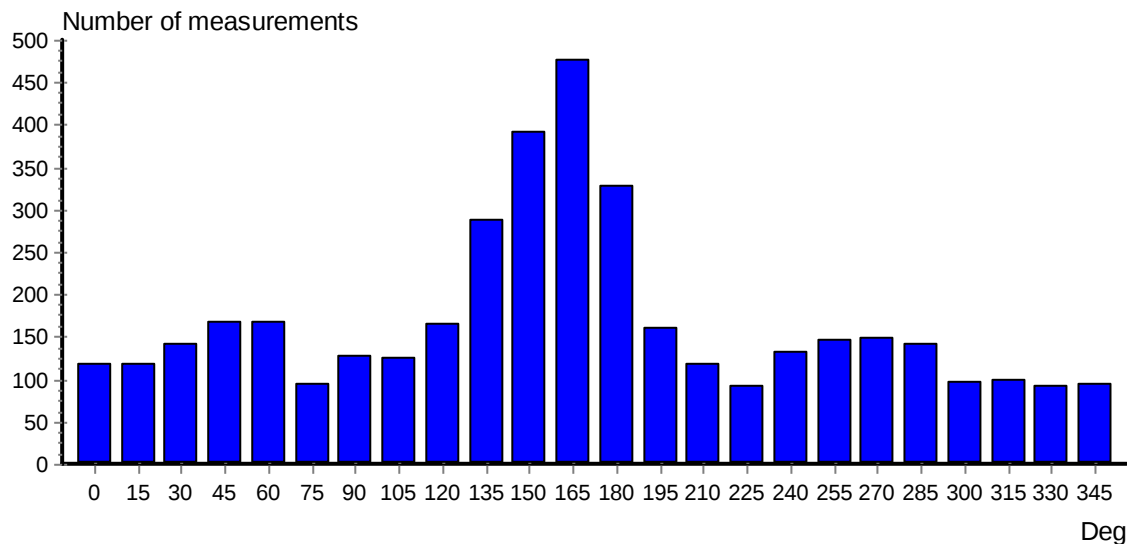
Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



**PROGRESSIVE VECTOR**

File name: Tittelsnes 145m 1669.SD6

Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

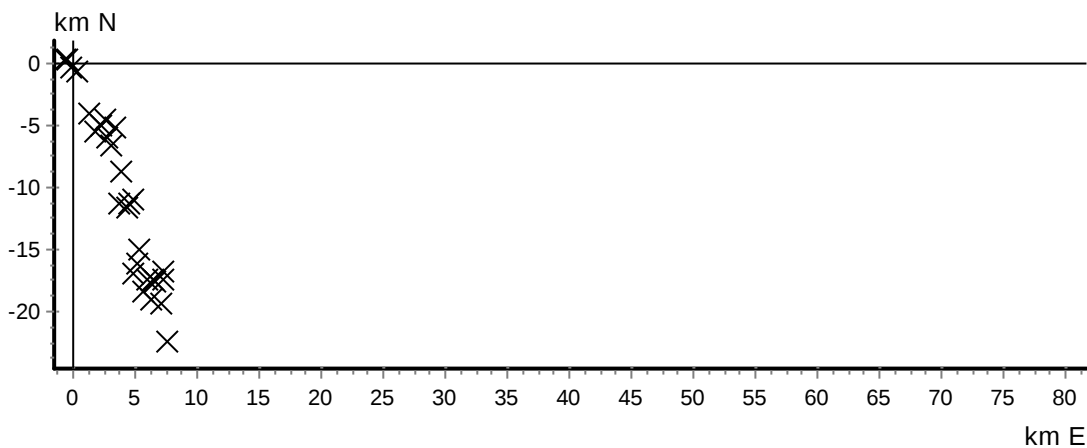
Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15

Neumann parameter: 0.407

Rest speed: 1.0 cm/s

Average speed: 2.5 cm/s

Rest direction: 162 deg.



**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 145m 1669.SD6

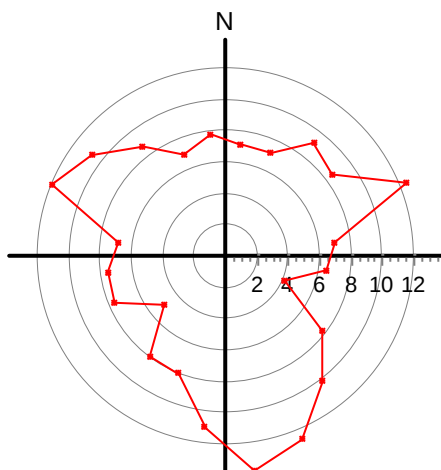
Ref. number: 1669

Series number: 1

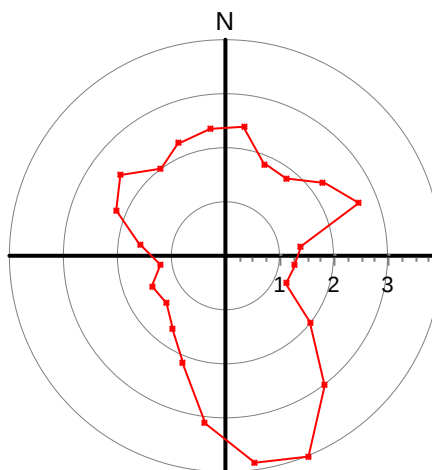
Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



Maximum velocity (cm/s)  
per 15 deg sector



Mean velocity (cm/s)  
per 15 deg sector

**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 145m 1669.SD6

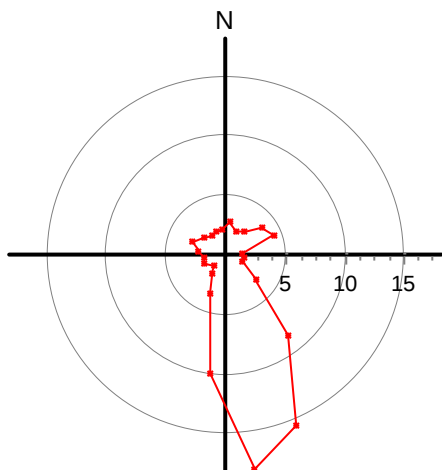
Ref. number: 1669

Series number: 1

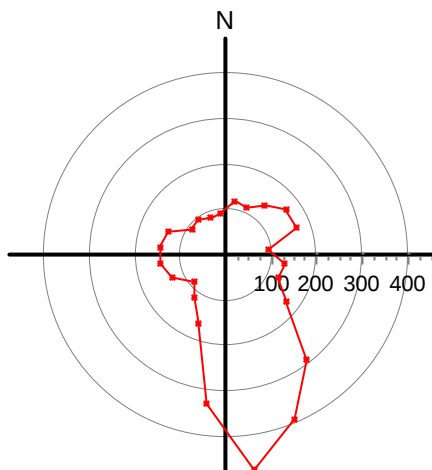
Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



Relative water flux (%)  
per 15 deg sector



Number of measurements  
per 15 deg sector

**STICK DIAGRAM**

File name: Tittelsnes 145m 1669.SD6

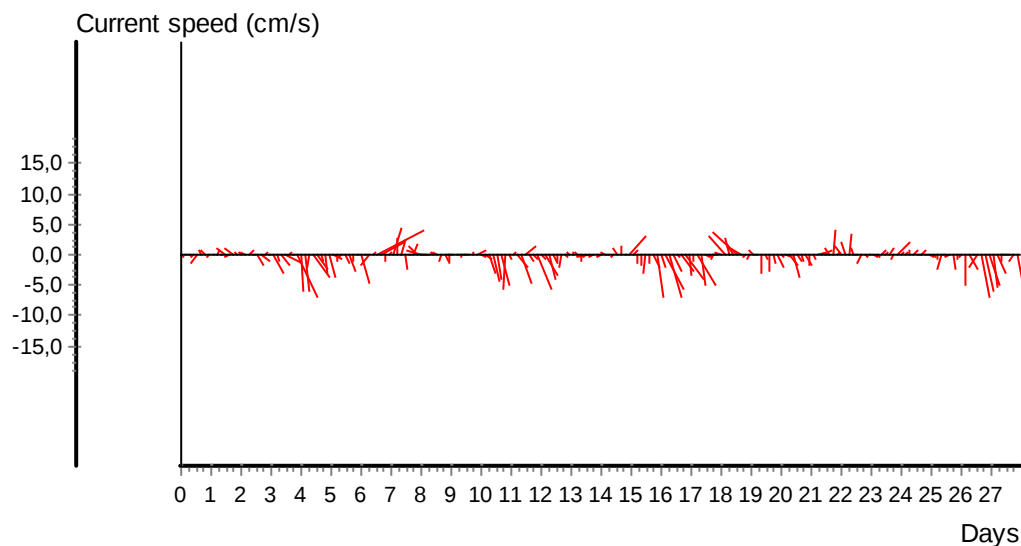
Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15



**CURRENT SPEED / DIRECTION MATRIX**

File name: Tittelsnes 145m 1669.SD6

Ref. number: 1669

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:13 - 29.Oct-15 To: 12:03 - 26.Nov-15

	Current speed groups													Total flow		Max curr
	1	3	4	5	6	8	10	15	25	50	75	100	Sum%	m <sup>3</sup> /m <sup>2</sup>	%	
0	52	28	13	9	12	5	0	0	0	0	0	0	3.0	1732	2.8	7.2
15	72	23	9	7	3	3	0	0	0	0	0	0	2.9	1288	2.1	7.2
30	95	22	5	6	7	5	1	0	0	0	0	0	3.5	1544	2.5	9.2
45	102	25	8	9	10	13	1	0	0	0	0	0	4.2	2282	3.8	8.6
60	92	31	15	4	2	7	11	5	0	0	0	0	4.1	2657	4.4	12.4
75	79	9	1	2	2	2	0	0	0	0	0	0	2.4	784	1.3	7.0
90	101	20	1	1	3	1	0	0	0	0	0	0	3.1	972	1.6	6.4
105	100	21	5	0	0	0	0	0	0	0	0	0	3.1	922	1.5	4.0
120	101	33	6	9	9	7	0	0	0	0	0	0	4.1	1964	3.2	7.8
135	116	54	29	32	25	26	6	0	0	0	0	0	7.1	5176	8.5	10.0
150	113	69	34	28	44	62	37	5	0	0	0	0	9.7	9431	15.5	12.6
165	154	90	32	35	37	83	35	11	0	0	0	0	11.8	11024	18.1	13.8
180	143	54	28	30	15	41	14	3	0	0	0	0	8.1	6090	10.0	11.0
195	92	34	10	8	9	8	0	0	0	0	0	0	4.0	2050	3.4	8.0
210	83	18	7	2	5	3	0	0	0	0	0	0	2.9	1186	2.0	8.0
225	63	20	6	2	0	0	0	0	0	0	0	0	2.3	774	1.3	5.0
240	94	26	4	1	4	2	0	0	0	0	0	0	3.2	1162	1.9	7.8
255	124	15	4	1	0	2	0	0	0	0	0	0	3.6	1090	1.8	7.6
270	97	32	7	10	2	1	0	0	0	0	0	0	3.7	1450	2.4	7.0
285	78	31	11	11	2	3	0	5	0	0	0	0	3.5	1854	3.1	12.0
300	47	20	10	6	6	4	3	1	0	0	0	0	2.4	1446	2.4	10.8
315	49	30	9	5	2	4	1	0	0	0	0	0	2.5	1225	2.0	8.8
330	36	31	7	8	8	3	0	0	0	0	0	0	2.3	1286	2.1	7.0
345	34	31	13	9	5	3	0	0	0	0	0	0	2.4	1376	2.3	7.8
<b>Sum%</b>	<b>52.5</b>	<b>19.0</b>	<b>6.8</b>	<b>5.8</b>	<b>5.3</b>	<b>7.1</b>	<b>2.7</b>	<b>0.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>		<b>60763</b>		<b>13.8</b>

**STATISTICAL SUMMARY**

	Total	East / west	North / south
Mean current speed (cm/s)	2,5	1,2	2,0
Variance (cm/s) <sup>2</sup>	5,339	1,661	4,769
Standard deviation (cm/s)	2,311	1,289	2,184
Mean standard deviation	0,920	1,089	1,118
Maximum current velocity	13,8		
Minimum current velocity	0,0		
Significant max velocity	5,3		
Significant min velocity	1,0		