



## SD6000 Rapport rådata

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5163 Laksevåg  
Dato: 26/11-2015

### **Lokaliteten: Tittelsnes, Sveio. Overflate- og spredningsstrøm. Strøm på 5m og 15m dybde.**

Strømmålingene er utført av Noomas DNV GL i forbindelse med utarbeidelse av lokalitetsrapport. I sammenheng med NS kvalitetssystem skal det skrives ut en rapport på rådata mottatt av ekstern leverandør. 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 : Overflatestrøm og spredningsstrøm.

### **Måleperioder / frekvenser.**

Se vedlegg.

### **Oppsummering fra målingene.**

Se ”Spesifikasjons og resultatoversikt”.

### **Vår vurdering:**

Strømmålingene blir videre behandlet iht krav i NS9415:2009 til å inngå i egen lokalitetsrapport(NYTEK) utført av akkreditert lokalitetsundersøkelsesorgan; Noomas DNV GL. Kvalitative og geofysiske vurderinger samt justeringer mot returperioder og retninger vil bli gjort i lokalitetsrapporten. Resultatene som fremkommer her er derfor å anse som foreløpige.

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 5m dybde; NS9415	Strøm 15m 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.	5	15
Måler type - nummer	SD6000 - nr1640	SD6000 - nr1679
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)	0.5 %	1.3 %
Gjennomsnittsstrøm	8.1	8.7
Rest strøm	4.1	6.2
Neumanns parameter	0.501	0.705
De 4 hyppigst forekommende retningene strømmen beveger seg mot (grader) *1	345, 330, 0, 15	345, 0, 330, 15
De 4 hyppigst forekommende strømhastighetene (cm /sek) *1	10-15, 1-3, 3-4, 6-8	1-3, 10-15, 15-25, 6-8
Mest vannutskiftning / retning / 15 graders sektor.*2	32764m <sup>3</sup> ved 345-360 grader. 1170m <sup>3</sup> /m <sup>2</sup> /døgn	44455m <sup>3</sup> ved 345-360 grader. 1588m <sup>3</sup> /m <sup>2</sup> /døgn
Minst vannutskiftning / retning / 15 graders sektor.*2	624m <sup>3</sup> ved 120-135 grader. 22m <sup>3</sup> /m <sup>2</sup> /døgn	284m <sup>3</sup> ved 120-135 grader. 10m <sup>3</sup> /m <sup>2</sup> /døgn
Gjennomsnittlig total vannutskiftning pr.døgn. Alle retninger	6993m <sup>3</sup> /døgn	7557m <sup>3</sup> /døgn
Maksimum strøm – signifikant maksimum strøm (cm/sek) *3	38.2 - 14.9	35.4 - 16.1

\*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 - 5 meter

### TEMPERATURE

File name: Tittelsnes 5m 1640.SD6

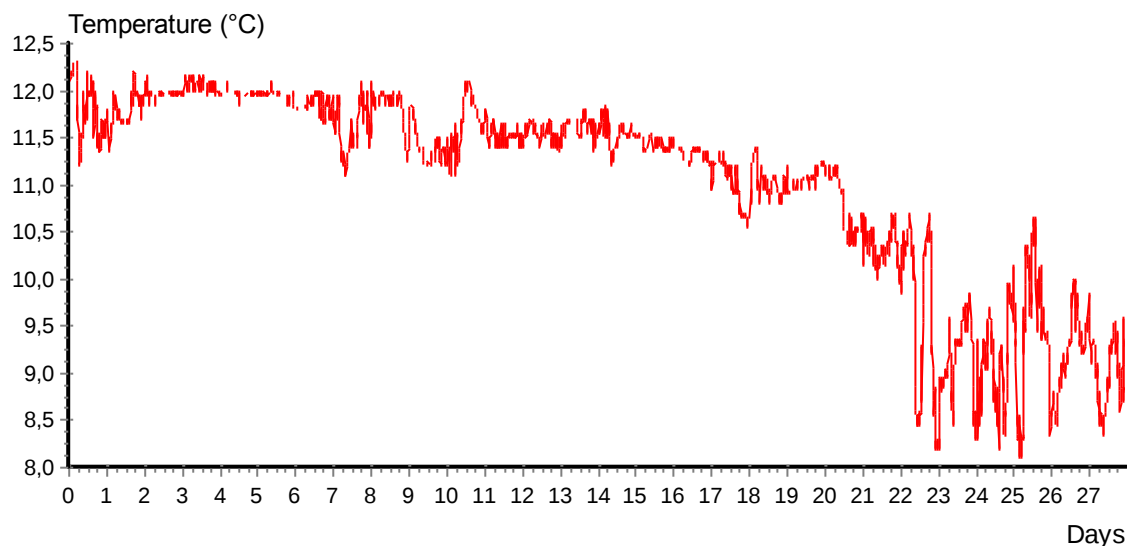
Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15



### CURRENT SPEED

File name: Tittelsnes 5m 1640.SD6

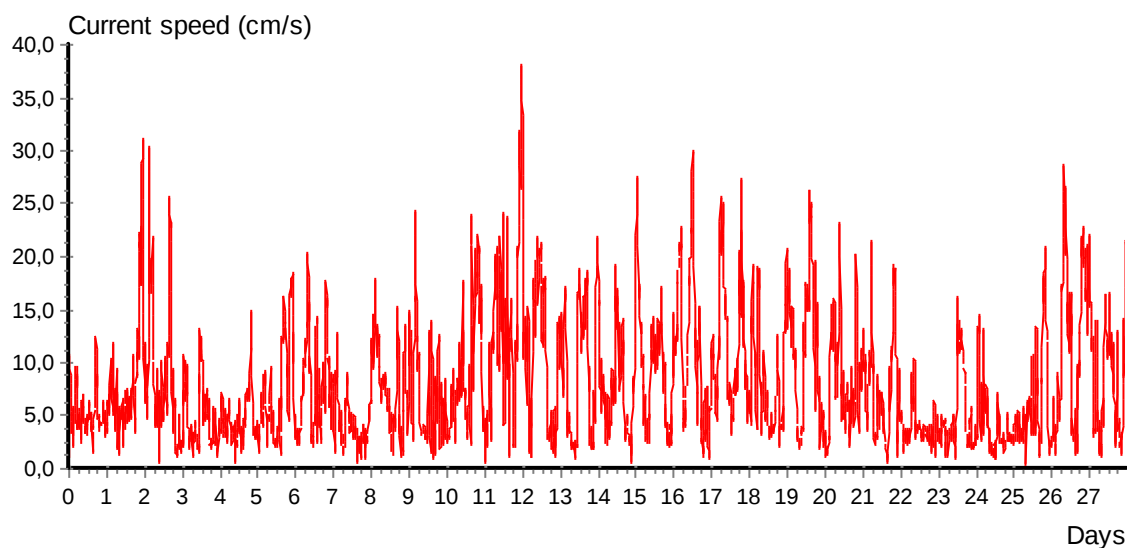
Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15



**CURRENT SPEED BAR CHART**

File name: Tittelsnes 5m 1640.SD6

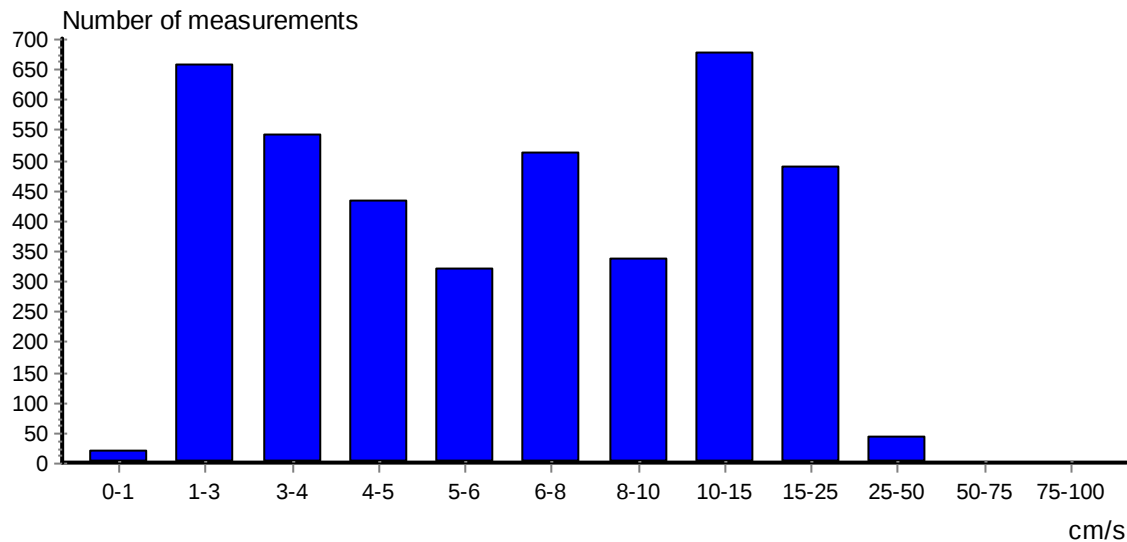
Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15



**CURRENT DIRECTION BAR CHART**

File name: Tittelsnes 5m 1640.SD6

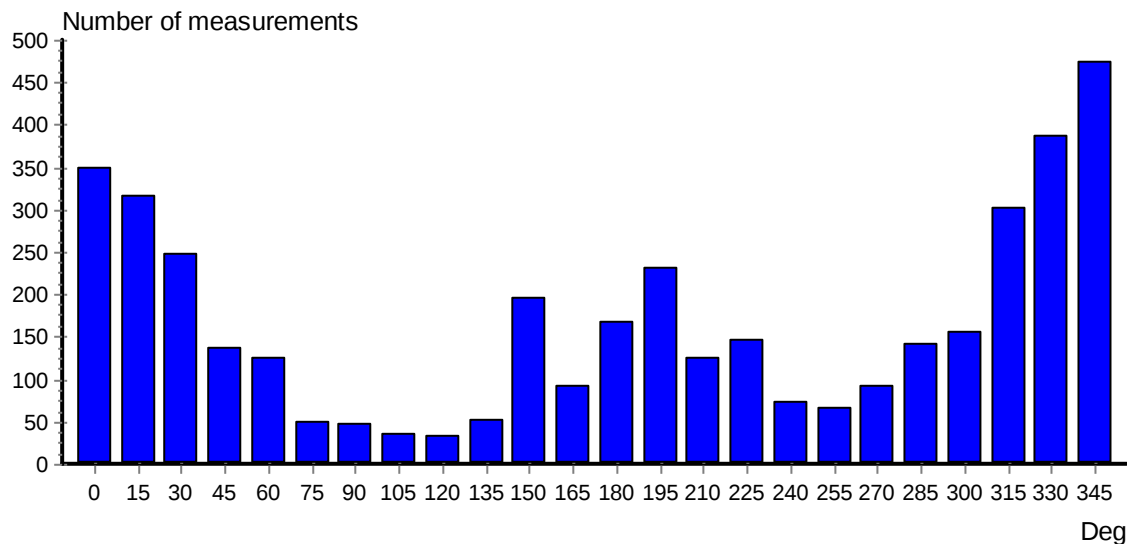
Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15



**PROGRESSIVE VECTOR**

File name: Tittelsnes 5m 1640.SD6

Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

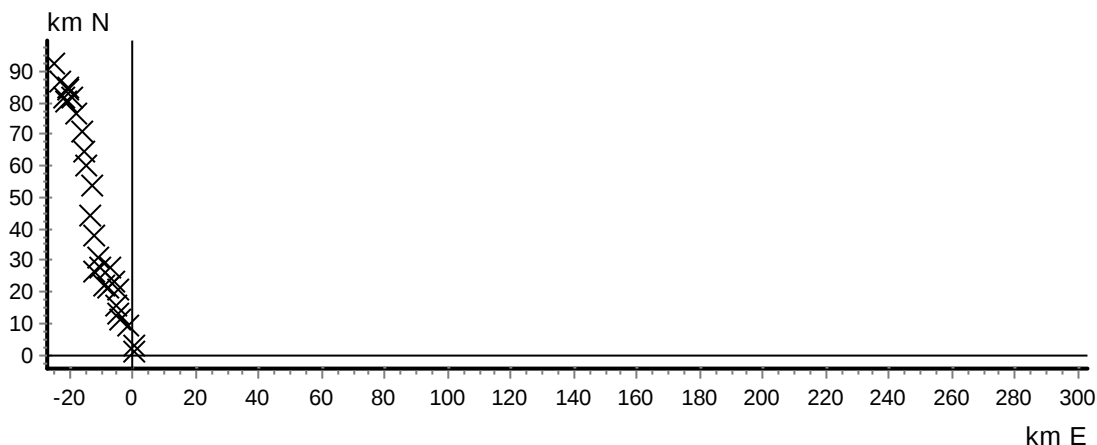
Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15

Neumann parameter: 0.501

Rest speed: 4.1 cm/s

Average speed: 8.1 cm/s

Rest direction: 345 deg.



**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 5m 1640.SD6

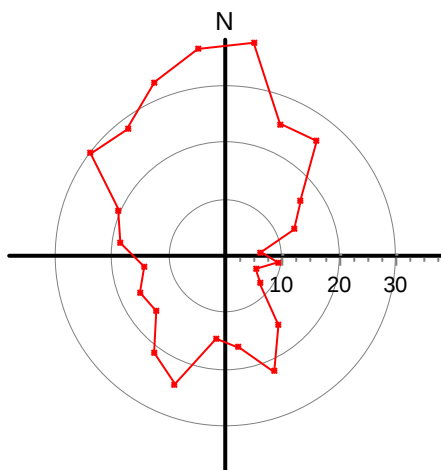
Ref. number: 1640

Series number: 1

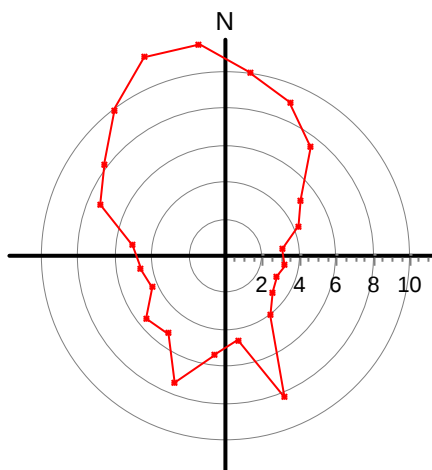
Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 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 5m 1640.SD6

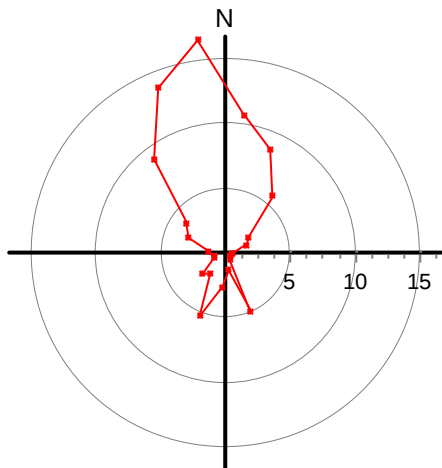
Series number: 1

Number of measurements in data set: 4032

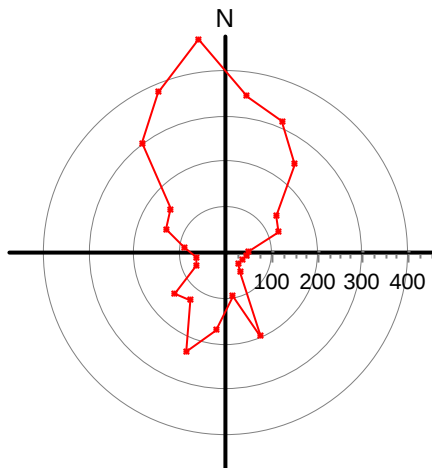
Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15

Ref. number: 1640

Interval time: 10 Minutes



Relative water flux (%)  
per 15 deg sector



Number of measurements  
per 15 deg sector

**STICK DIAGRAM**

File name: Tittelsnes 5m 1640.SD6

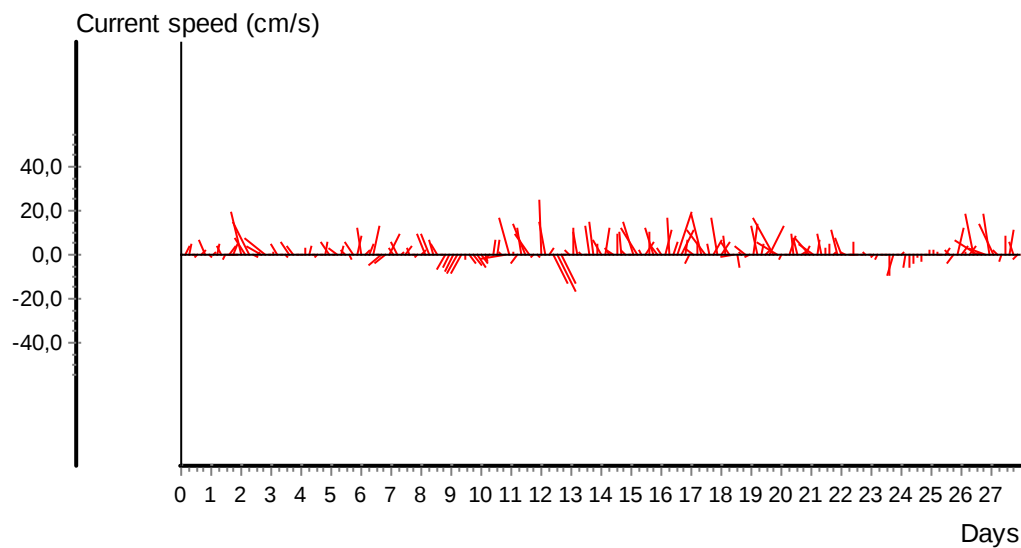
Series number: 1

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 26.Nov-15

Ref. number: 1640

Interval time: 10 Minutes



**CURRENT SPEED / DIRECTION MATRIX**

File name: Tittelsnes 5m 1640.SD6

Ref. number: 1640

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 12:17 - 29.Oct-15 To: 12:07 - 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	1	18	31	29	29	50	42	87	54	8	0	0	8.7	21089	10.8	38.2
15	1	22	29	30	36	48	34	58	56	1	0	0	7.8	17123	8.7	25.2
30	2	22	29	41	21	42	26	50	14	1	0	0	6.2	11240	5.7	26.0
45	0	21	38	23	20	21	7	6	1	0	0	0	3.4	4150	2.1	16.4
60	1	39	31	19	13	15	3	3	0	0	0	0	3.1	3168	1.6	13.0
75	0	35	4	5	6	0	0	0	0	0	0	0	1.2	908	0.5	6.0
90	1	26	11	4	2	1	1	0	0	0	0	0	1.1	871	0.4	9.4
105	1	20	11	0	4	0	0	0	0	0	0	0	0.9	625	0.3	5.6
120	1	20	6	1	2	3	0	0	0	0	0	0	0.8	624	0.3	7.4
135	2	22	9	8	5	4	0	1	1	0	0	0	1.3	1220	0.6	15.2
150	3	47	24	17	11	19	11	21	42	0	0	0	4.8	9554	4.9	21.8
165	2	36	15	14	8	6	1	8	1	0	0	0	2.3	2512	1.3	16.2
180	0	45	35	24	14	20	7	22	0	0	0	0	4.1	5314	2.7	14.6
195	0	34	43	23	16	27	24	52	12	0	0	0	5.7	10223	5.2	24.4
210	2	32	27	25	9	13	7	8	3	0	0	0	3.1	3914	2.0	21.2
225	0	39	26	21	13	23	13	9	2	0	0	0	3.6	4764	2.4	15.4
240	0	26	14	17	8	2	1	3	1	0	0	0	1.8	1853	0.9	16.6
255	0	21	16	15	3	2	0	8	0	0	0	0	1.6	1820	0.9	14.6
270	3	25	25	6	8	9	6	6	3	0	0	0	2.3	2803	1.4	19.0
285	0	16	20	22	11	20	17	25	11	0	0	0	3.5	6322	3.2	20.8
300	0	18	21	20	8	21	19	27	20	1	0	0	3.8	7694	3.9	30.4
315	0	26	27	21	23	47	38	57	54	9	0	0	7.5	18157	9.3	28.6
330	1	18	24	22	24	47	38	103	100	9	0	0	9.6	27100	13.8	33.2
345	0	30	25	24	27	73	41	123	115	15	0	0	11.7	32764	16.7	37.2
Sum%	0.5	16.3	13.4	10.7	8.0	12.7	8.3	16.8	12.2	1.1	0.0	0.0		195812		38.2

**STATISTICAL SUMMARY**

	Total	East / west	North / south
Mean current speed (cm/s)	8,1	3,5	6,8
Variance (cm/s) <sup>2</sup>	32,840	8,747	31,836
Standard deviation (cm/s)	5,731	2,957	5,642
Mean standard deviation	0,708	0,848	0,836
Maximum current velocity	38,2		
Minimum current velocity	0,4		
Significant max velocity	14,9		
Significant min velocity	3,0		

## Spredningsstrøm – 15 meter

### TEMPERATURE

File name: Tittelsnes 15m 1679.SD6

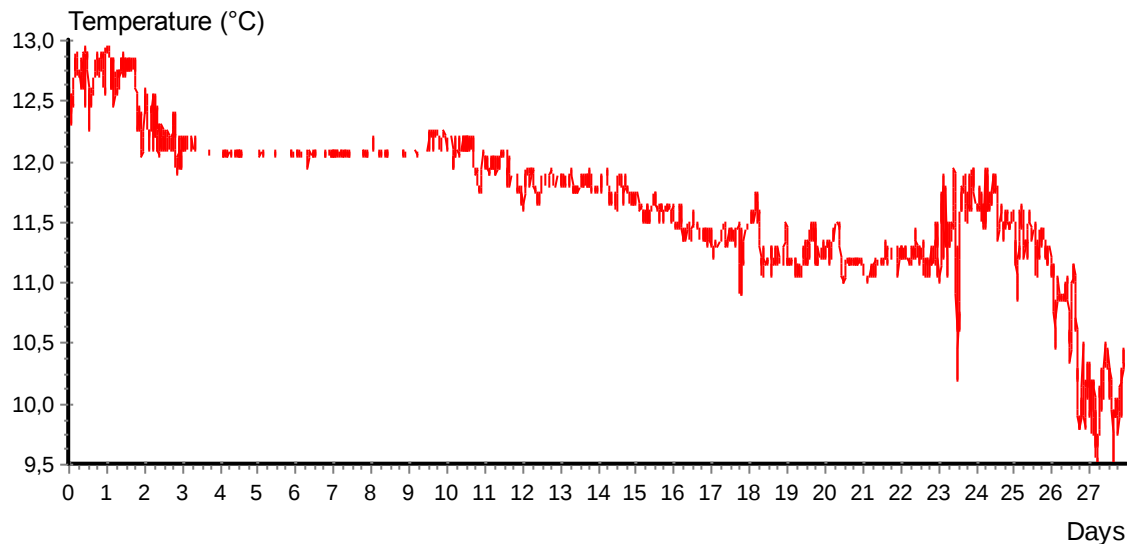
Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15



### CURRENT SPEED

File name: Tittelsnes 15m 1679.SD6

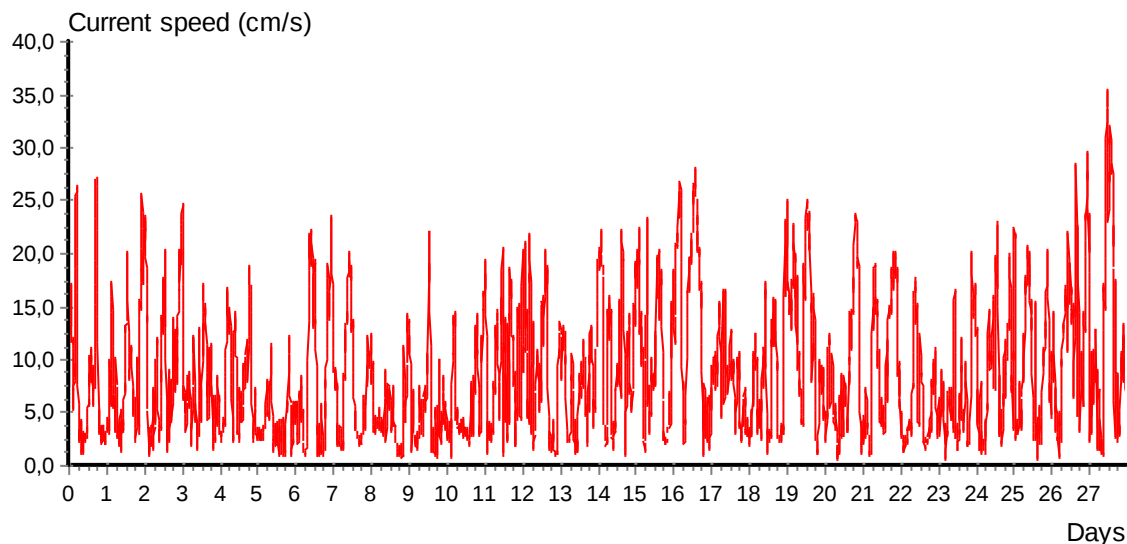
Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15





**CURRENT SPEED BAR CHART**

File name: Tittelsnes 15m 1679.SD6

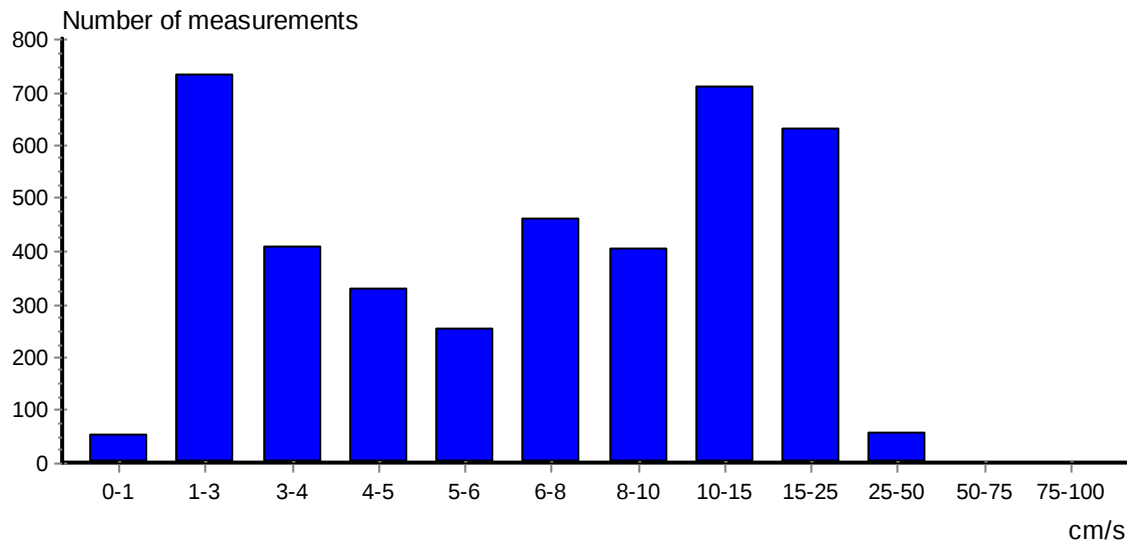
Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15



**CURRENT DIRECTION BAR CHART**

File name: Tittelsnes 15m 1679.SD6

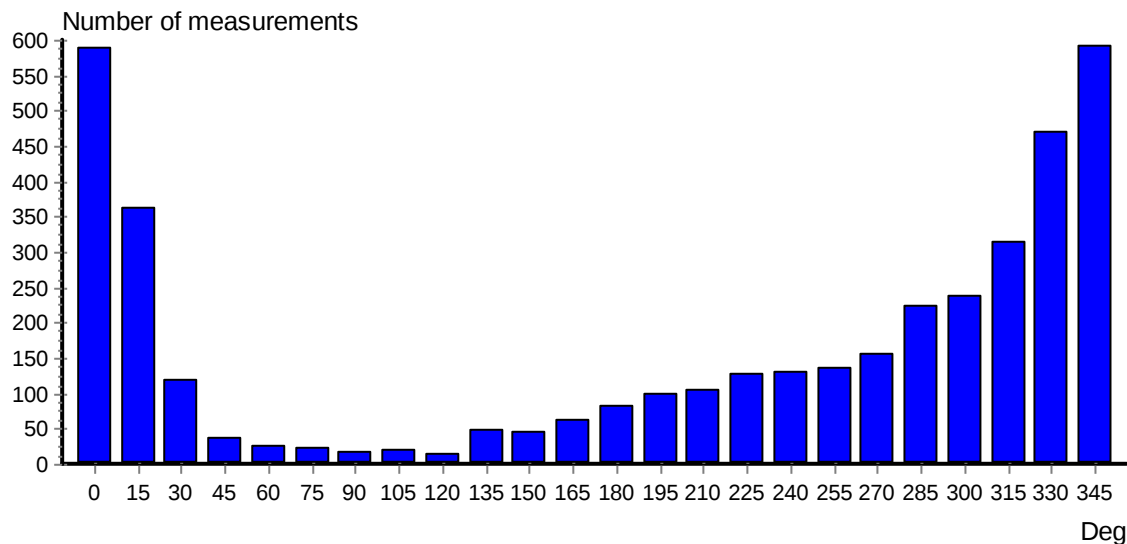
Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15



**PROGRESSIVE VECTOR**

File name: Tittelsnes 15m 1679.SD6

Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

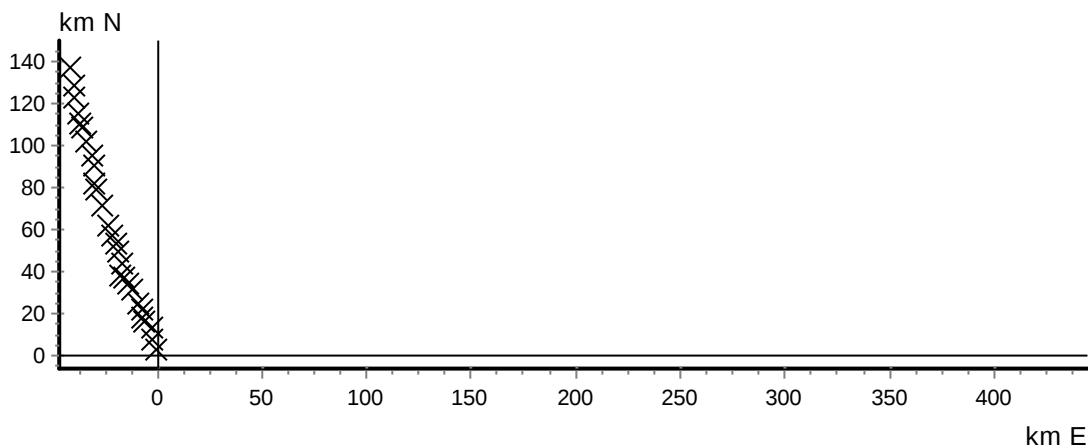
Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15

Neumann parameter: 0.705

Rest speed: 6.2 cm/s

Average speed: 8.7 cm/s

Rest direction: 343 deg.



**CURRENT VELOCITY DISTRIBUTION DIAGRAM**

File name: Tittelsnes 15m 1679.SD6

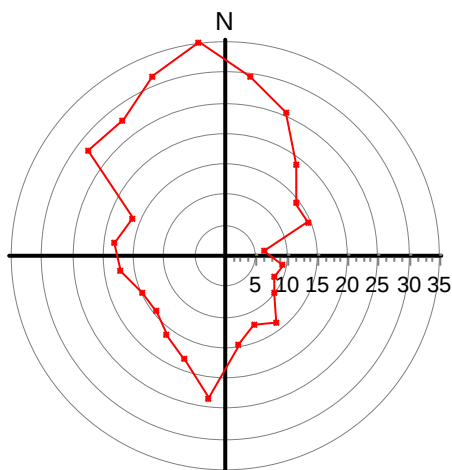
Ref. number: 1679

Series number: 1

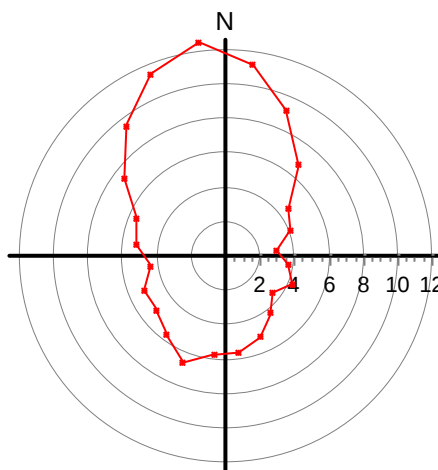
Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 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 15m 1679.SD6

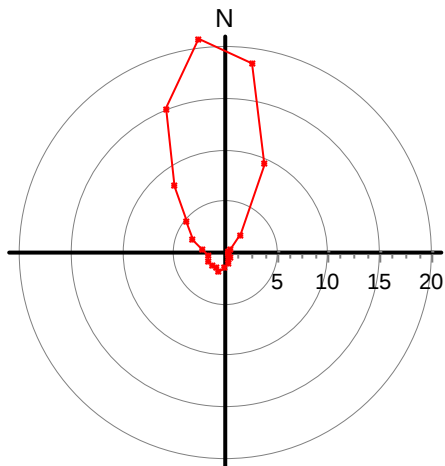
Series number: 1

Number of measurements in data set: 4032

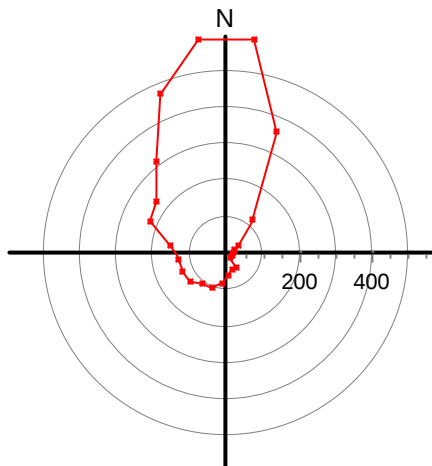
Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15

Ref. number: 1679

Interval time: 10 Minutes



Relative water flux (%)  
per 15 deg sector



Number of measurements  
per 15 deg sector

**STICK DIAGRAM**

File name: Tittelsnes 15m 1679.SD6

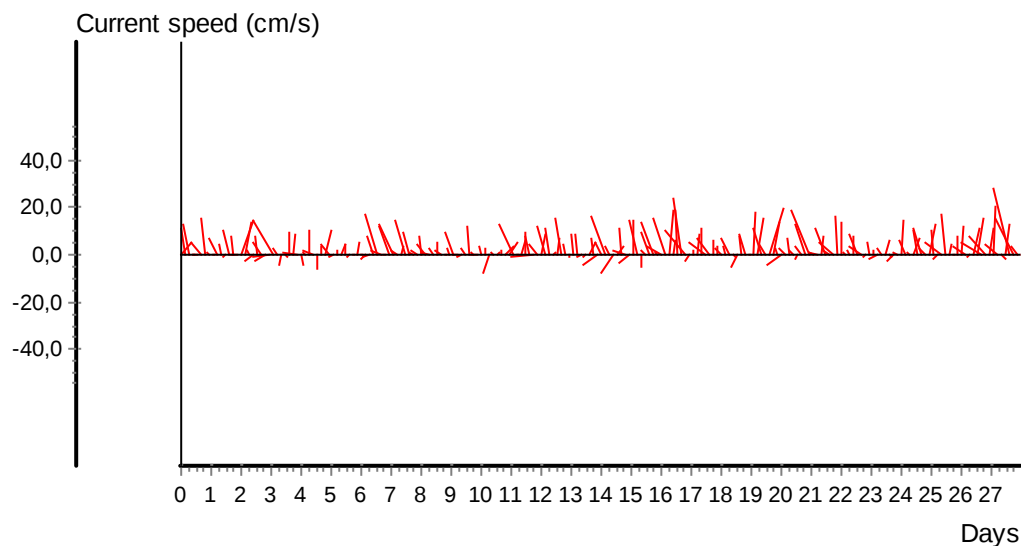
Series number: 1

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 26.Nov-15

Ref. number: 1679

Interval time: 10 Minutes



**CURRENT SPEED / DIRECTION MATRIX**

File name: Tittelsnes 15m 1679.SD6

Ref. number: 1679

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 4032

Data displayed from: 13:14 - 29.Oct-15 To: 13:04 - 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	5	45	39	23	30	72	88	128	149	11	0	0	14.6	39595	18.7	29.6
15	0	44	23	29	33	59	43	72	58	1	0	0	9.0	19999	9.5	25.6
30	1	19	16	12	13	18	17	17	5	0	0	0	2.9	4806	2.3	19.0
45	1	10	12	6	3	1	1	4	0	0	0	0	0.9	1050	0.5	14.4
60	0	10	8	4	1	1	0	1	0	0	0	0	0.6	594	0.3	14.4
75	1	14	5	3	0	1	0	0	0	0	0	0	0.6	418	0.2	6.4
90	1	6	7	1	0	2	1	0	0	0	0	0	0.4	391	0.2	9.2
105	0	9	2	2	1	4	1	0	0	0	0	0	0.5	468	0.2	8.6
120	1	9	0	1	1	1	1	0	0	0	0	0	0.3	284	0.1	9.8
135	2	18	9	7	2	8	2	1	0	0	0	0	1.2	1222	0.6	13.6
150	0	17	6	4	3	6	4	5	0	0	0	0	1.1	1363	0.6	12.2
165	1	17	8	8	7	8	2	11	0	0	0	0	1.5	2090	1.0	14.4
180	2	25	14	10	6	8	3	11	3	0	0	0	2.0	2837	1.3	23.4
195	3	29	5	8	12	10	7	18	6	0	0	0	2.4	3920	1.9	18.0
210	3	34	10	10	12	14	6	10	5	0	0	0	2.6	3548	1.7	16.0
225	8	42	12	14	13	7	16	14	0	0	0	0	3.1	3845	1.8	14.4
240	2	47	18	13	7	22	10	12	0	0	0	0	3.2	4002	1.9	15.0
255	3	56	22	18	9	14	4	4	5	0	0	0	3.3	3569	1.7	17.6
270	5	46	26	18	7	26	12	11	4	0	0	0	3.8	4861	2.3	18.6
285	6	58	40	27	13	22	23	32	2	0	0	0	5.5	7595	3.6	16.6
300	0	51	29	17	19	39	30	32	20	1	0	0	5.9	10591	5.0	28.4
315	2	37	34	33	14	28	39	64	61	2	0	0	7.8	17844	8.4	28.2
330	3	43	34	30	26	37	36	121	126	15	0	0	11.7	32244	15.2	32.0
345	4	46	28	29	20	51	59	140	186	28	0	0	14.7	44455	21.0	35.4
Sum%	1.3	18.2	10.1	8.1	6.3	11.4	10.0	17.6	15.6	1.4	0.0	0.0		211592		35.4

**STATISTICAL SUMMARY**

	Total	East / west	North / south
Mean current speed (cm/s)	8,7	3,4	7,4
Variance (cm/s) <sup>2</sup>	38,230	8,705	39,927
Standard deviation (cm/s)	6,183	2,950	6,319
Mean standard deviation	0,707	0,878	0,853
Maximum current velocity	35,4		
Minimum current velocity	0,6		
Significant max velocity	16,1		
Significant min velocity	2,8		