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06.juni 2012.

Emilsen Fisk AS
Lauvøya
7900 Rørвик

Lokaliteten: Ånholmen, Fosnes. Strømmålinger. Overflate- og dimensjoneringsstrøm.

Som avtalt sender vi over strømmålingene fra området ved Ånholmen, i Fosnes kommune. Dette er en oppsummering for å få en oversikt over resultatene av strømmålingene og er bygd på forutsetningen om at du/dere studerer vedlagte data nøye selv. Rådataene finnes oppbevart hos Marin Konsulent i Nord-Trøndelag.

Firmanavn / Lokalitet. Type oppdrett:

Firma : Emilsen Fisk AS Adresse : Lauvøya, 7900 Rørвик
Lokalitet : Ånholmen
Kommune : Fosnes Fylke : Nord-Trøndelag
UTM-koordinater : 64.43.285N 11.27.866Ø
Oppdrettstype : Generelle strømforhold - matfiskanlegg
Hva er vurdert : 5 meters dyp ("overflatestrøm") og 15 meters dyp
("dimensjoneringsstrøm").

Måleperioder / frekvenser.

Målingene er utført med Nortek Doppler MKNr10, 400kHz. Cellestørrelsen er 1.0 meter. Måleren registrerer 1 minutt sammenhengende, hviler i 9 minutter osv. Dybden på lokaliteten er ca. 150 meter


Oppsummering fra målingene.

Se vedlegg.

Kort vurdering:

I denne måleserien er maksimal strømhastighet på 5 meters dyp 59.9 cm/sek og 36.2 cm/sek på 15 meters dyp. Gjennomsnittstrømmen er h.h.v. 10.0 og 9.5 cm/sek. Vannet i hele vannsøylen på denne lokaliteten beveger seg i nordøstlig retning (30-90)° med en svak "returstrøm" i nordvestlig retning (95-270)°. Få målinger med lave strømhastigheter (under 1 cm/sek) i begge dyp.

Med hilsen:



Per Andersen
(Marin Konsulent i Nord-Trøndelag).

Vedlegg og kopi:

Totalvurdering, resultatoversikt
Statistisk behandling av rådata.

SPESIFIKASJONS- OG RESULTATOVERSIKT.

Firma: Emilsen Fisk AS

Lokalitet: Ånholmen, Fosnes kommune.

Generelle spesifikasjoner, periode, frekvens og resultater.

| Tekst | Overflatestrøm | Dimensjoneringsstrøm |
|--|---|---|
| Tidsrom for registreringer | 14.04.2012-31.05.2012 | 14.04.2012-31.05.2012 |
| Dybde på målestedet. Ca. | ca 150 | ca 150 |
| Dybde for registreringer (meter). Ca. | 5 | 15 |
| Måler type - nummer | NortekMKNr10 | NortekMKNr10 |
| Type måling | Kontinuerlig | Kontinuerlig |
| Frekvens – varighet*4 | 1 min/9 min - 47 døgn | 1min/9 min - 47 døgn |
| Adresse for arkiv (data) | C11/64.43.285N 11.27.866Øo | C1/64.43.285N 11.27.866Ød |
| % strøm mindre enn 1 cm/sek.(ca) | 0.8 % | 0.9 % |
| Gjennomsnittsstrøm | 10.0 (6726 målinger) | 9.5 |
| Rest strøm | 0.5 (6726 målinger) | 1.4 |
| Neumanns parameter | 0.054 (6726 målinger) | 0.150 |
| De 4 hyppigst forekommende retningene strømmen beveger seg mot (grader) *1 | 60, 45, 75, 240 | 225, 210, 240, 195 |
| De 4 hyppigst forekommende strømhastighetene (cm /sek) *1 | 10-15, 15-25, 8-10, 6-8 | 10-15, 6-8, 8-10, 15-25 |
| Mest vannutskiftning / retning / 15 graders sektor.*2 | 27481m ³ ved 60-75 grader. 585m ³ /m ² /døgn | 26507m ³ ved 225-240 grader. 564m ³ /m ² /døgn |
| Minst vannutskiftning / retning / 15 graders sektor.*2 | 8301m ³ ved 300-315 grader. 177m ³ /m ² /døgn | 9382m ³ ved 330-345 grader. 200m ³ /m ² /døgn |
| Gjennomsnittelig total vannutskiftning pr.døgn. Alle retninger | 8619m ³ /døgn | 8164m ³ /døgn |
| Maksimum strøm – signifikant maksimum strøm (cm/sek) *3 | 59.8 - 16.7 | 36.2 - 15.3 |

*1: gruppert i synkende rekkefølge

*2: vann som passerer gjennom hver loddrett plassert kvadratmeter.

*3: gjennomsnittet av 1/3 målingene som viser høyest verdi.

Overflatestrøm - 5 meters dyp.

CURRENT SPEED

File name: Ånholm01X-11.SD6

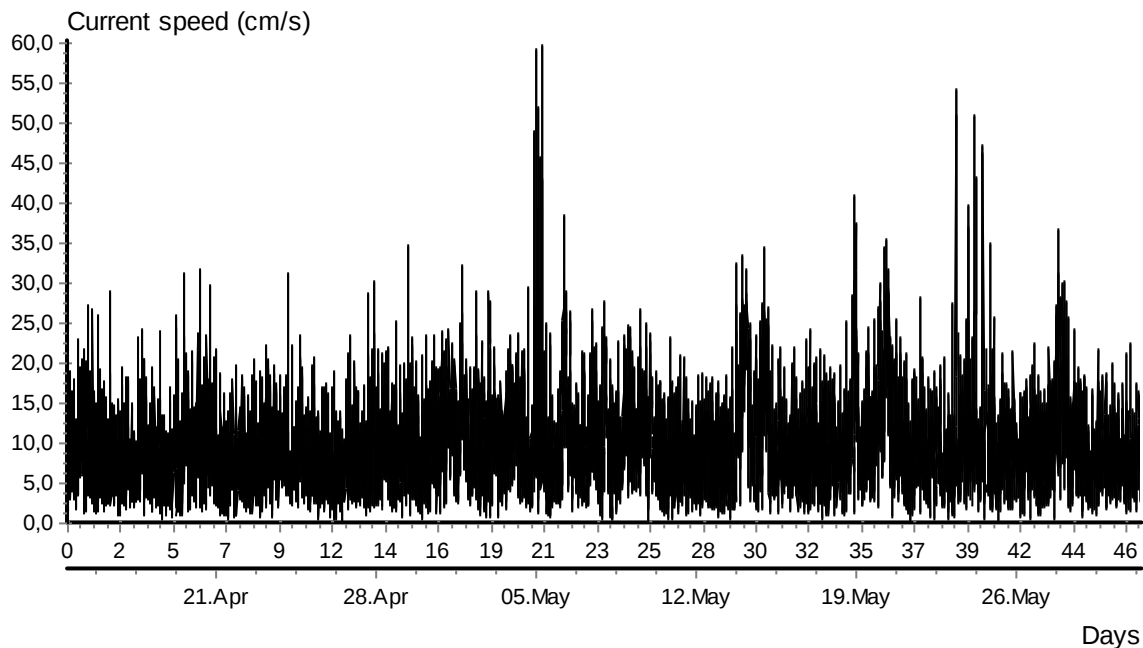
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12



CURRENT SPEED BAR CHART

File name: Ånholm01X-11.SD6

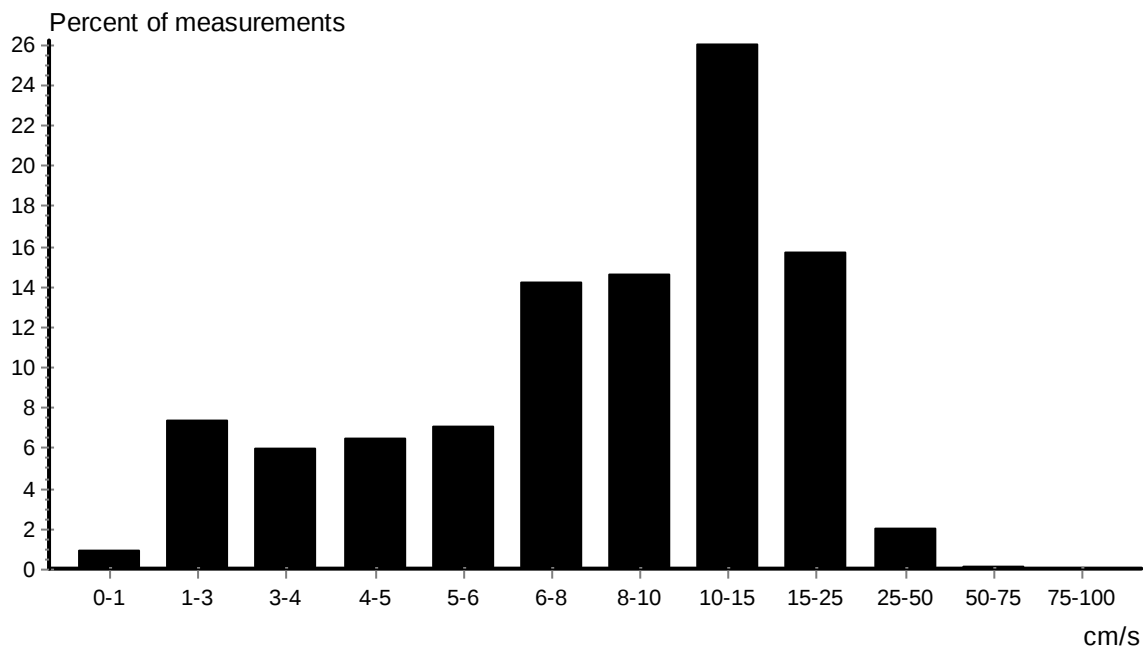
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12



CURRENT DIRECTION BAR CHART

File name: Ånholm01X-11.SD6

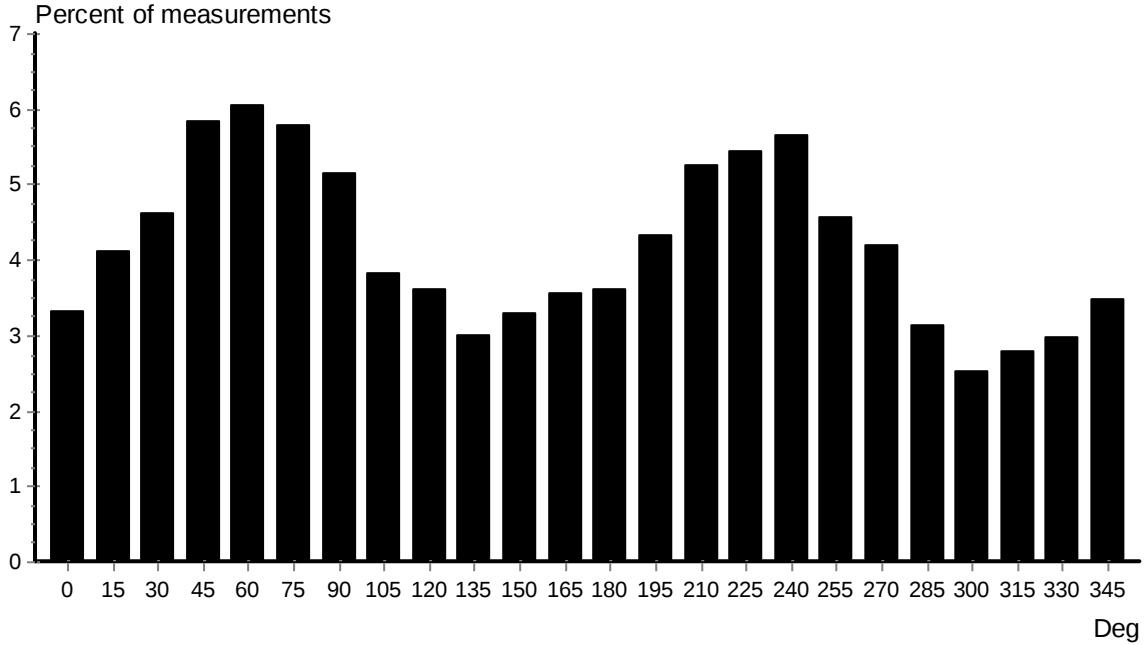
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12



PROGRESSIVE VECTOR

File name: Ånholm01X-11.SD6

Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12

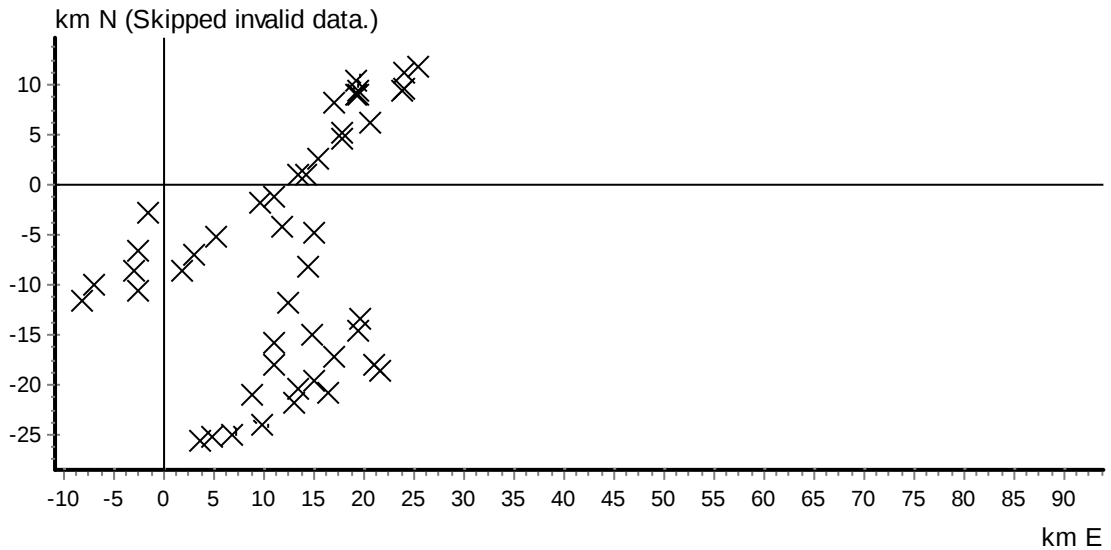
Neumann parameter: 0.054

Rest speed: 0.5 cm/s

Valid data points: 6726

Average speed: 10.0 cm/s

Rest direction: 128 deg.



CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Ånholm01X-11.SD6

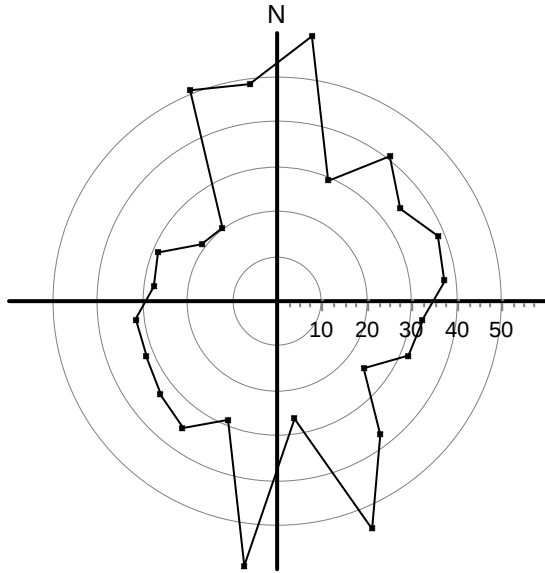
Series number: 1

Number of measurements in data set: 6775

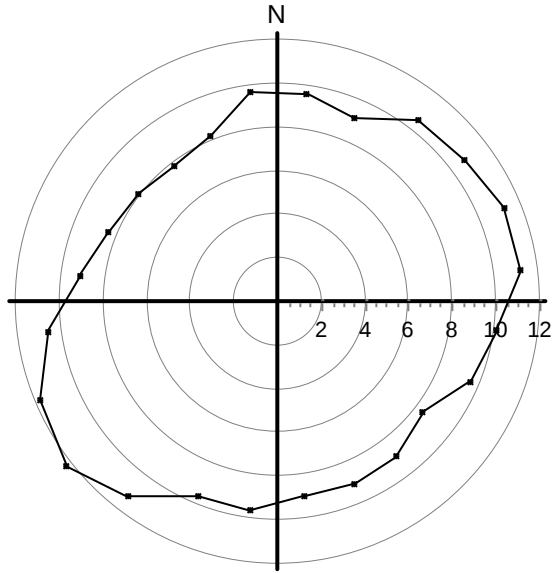
Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12

Ref. number: 0

Interval time: 10 Minutes



Maximum velocity (cm/s)
per 15 deg sector



Mean velocity (cm/s)
per 15 deg sector

CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Ånholm01X-11.SD6

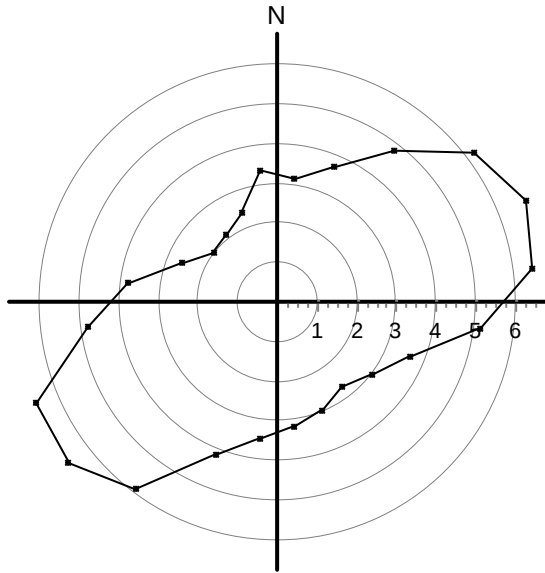
Series number: 1

Number of measurements in data set: 6775

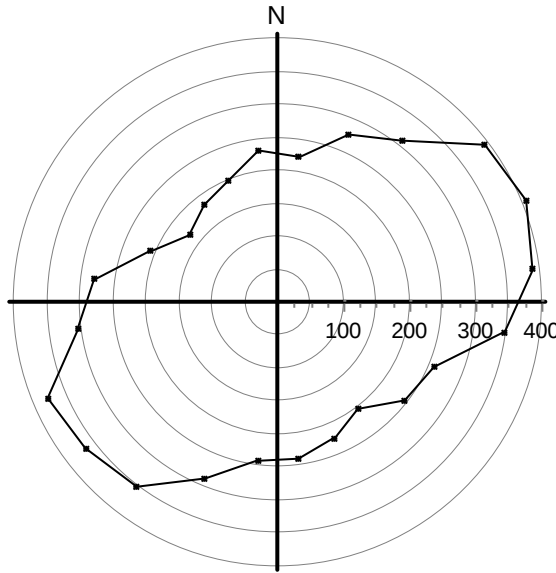
Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12

Ref. number: 0

Interval time: 10 Minutes



Relative water flux (%)
per 15 deg sector



Number of measurements
per 15 deg sector

STICK DIAGRAM

File name: Ånholm01X-11.SD6

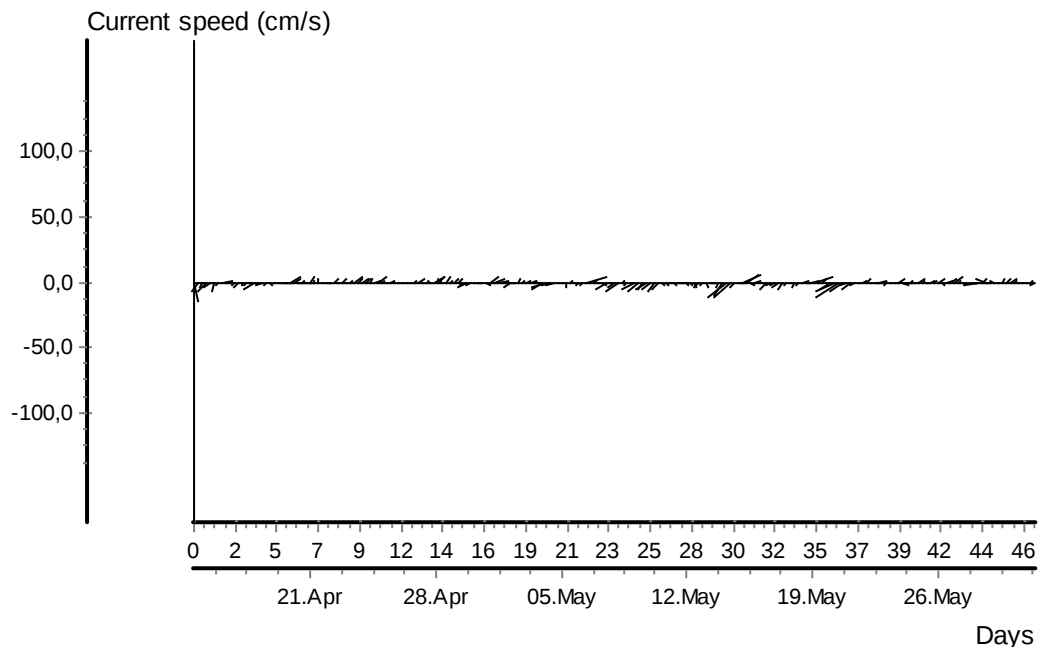
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12



CURRENT SPEED / DIRECTION MATRIX

File name: Ånholm01X-11.SD6

Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6775

Data displayed from: 12:00 - 14.Apr-12 To: 13:00 - 31.May-12

| | Current speed groups | | | | | | | | | | | | Total flow | | Max curr | |
|-------------|----------------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------|---------------|----------|-------------|
| | 1 | 3 | 4 | 5 | 6 | 8 | 10 | 15 | 25 | 50 | 75 | 100 | Sum% | m³/m² | | % |
| 0 | 2 | 16 | 21 | 10 | 24 | 33 | 30 | 57 | 25 | 3 | 2 | 0 | 3.3 | 12871 | 3.2 | 59.8 |
| 15 | 1 | 30 | 19 | 12 | 24 | 38 | 51 | 59 | 40 | 2 | 0 | 0 | 4.1 | 15179 | 3.7 | 29.7 |
| 30 | 3 | 18 | 15 | 15 | 30 | 36 | 45 | 80 | 64 | 5 | 0 | 0 | 4.6 | 19655 | 4.9 | 41.1 |
| 45 | 2 | 22 | 16 | 20 | 27 | 40 | 73 | 112 | 73 | 8 | 0 | 0 | 5.8 | 25279 | 6.2 | 34.6 |
| 60 | 3 | 21 | 23 | 20 | 17 | 56 | 49 | 121 | 86 | 11 | 0 | 0 | 6.1 | 27481 | 6.8 | 38.5 |
| 75 | 4 | 28 | 15 | 16 | 19 | 39 | 60 | 117 | 80 | 11 | 0 | 0 | 5.8 | 26213 | 6.5 | 37.5 |
| 90 | 1 | 29 | 17 | 24 | 24 | 48 | 51 | 92 | 51 | 9 | 0 | 0 | 5.1 | 20888 | 5.2 | 32.2 |
| 105 | 0 | 15 | 11 | 16 | 29 | 47 | 39 | 67 | 30 | 3 | 0 | 0 | 3.8 | 14672 | 3.6 | 31.3 |
| 120 | 3 | 25 | 13 | 23 | 21 | 45 | 39 | 49 | 24 | 0 | 0 | 0 | 3.6 | 12085 | 3.0 | 24.3 |
| 135 | 1 | 7 | 27 | 15 | 21 | 32 | 26 | 50 | 20 | 3 | 0 | 0 | 3.0 | 10817 | 2.7 | 37.1 |
| 150 | 2 | 24 | 17 | 18 | 13 | 32 | 34 | 57 | 21 | 3 | 1 | 0 | 3.3 | 12048 | 3.0 | 54.4 |
| 165 | 0 | 15 | 20 | 13 | 22 | 35 | 54 | 55 | 24 | 1 | 0 | 0 | 3.6 | 12829 | 3.2 | 26.0 |
| 180 | 6 | 27 | 15 | 22 | 12 | 36 | 31 | 59 | 28 | 5 | 2 | 0 | 3.6 | 14069 | 3.5 | 59.4 |
| 195 | 3 | 25 | 20 | 20 | 12 | 52 | 45 | 56 | 54 | 3 | 0 | 0 | 4.3 | 16836 | 4.2 | 28.7 |
| 210 | 1 | 13 | 19 | 16 | 20 | 44 | 49 | 114 | 68 | 10 | 0 | 0 | 5.3 | 23950 | 5.9 | 35.6 |
| 225 | 2 | 19 | 12 | 15 | 19 | 39 | 43 | 106 | 92 | 19 | 0 | 0 | 5.4 | 27038 | 6.7 | 33.4 |
| 240 | 2 | 17 | 19 | 17 | 20 | 51 | 30 | 110 | 100 | 13 | 0 | 0 | 5.6 | 26843 | 6.6 | 31.8 |
| 255 | 0 | 21 | 19 | 12 | 18 | 47 | 42 | 79 | 61 | 7 | 0 | 0 | 4.5 | 19555 | 4.8 | 31.8 |
| 270 | 5 | 31 | 18 | 28 | 13 | 29 | 40 | 73 | 41 | 3 | 0 | 0 | 4.2 | 15491 | 3.8 | 27.8 |
| 285 | 3 | 22 | 11 | 21 | 16 | 34 | 26 | 58 | 18 | 1 | 0 | 0 | 3.1 | 10683 | 2.6 | 29.0 |
| 300 | 3 | 10 | 14 | 20 | 12 | 32 | 28 | 41 | 10 | 0 | 0 | 0 | 2.5 | 8301 | 2.0 | 21.4 |
| 315 | 6 | 19 | 15 | 17 | 13 | 30 | 30 | 48 | 9 | 0 | 0 | 0 | 2.8 | 8780 | 2.2 | 20.8 |
| 330 | 0 | 24 | 17 | 15 | 25 | 37 | 29 | 35 | 12 | 4 | 1 | 0 | 3.0 | 9884 | 2.4 | 51.1 |
| 345 | 4 | 18 | 9 | 25 | 20 | 38 | 36 | 51 | 24 | 9 | 0 | 0 | 3.5 | 13648 | 3.4 | 49.1 |
| Sum% | 0.8 | 7.4 | 6.0 | 6.4 | 7.0 | 14.1 | 14.6 | 26.0 | 15.7 | 2.0 | 0.1 | 0.0 | | 405096 | | 59.8 |

STATISTICAL SUMMARY

| | Total | East / west | North / south |
|------------------------------|--------|-------------|---------------|
| Mean current speed (cm/s) | 10,0 | 6,9 | 5,9 |
| Variance (cm/s) ² | 36,327 | 29,403 | 25,600 |
| Standard deviation (cm/s) | 6,027 | 5,422 | 5,060 |
| Mean standard deviation | 0,600 | 0,787 | 0,860 |
| Maximum current velocity | 59,8 | | |
| Minimum current velocity | 0,2 | | |
| Significant max velocity | 16,7 | | |
| Significant min velocity | 4,3 | | |

| | Velocity | Dir | Temp |
|--------------------|----------|------|------|
| Valid measurements | 6726 | 6726 | 6775 |

Dimensjoneringsstrøm – 15 meters dyp.

TEMPERATURE

File name: Ånholm01X-1.SD6

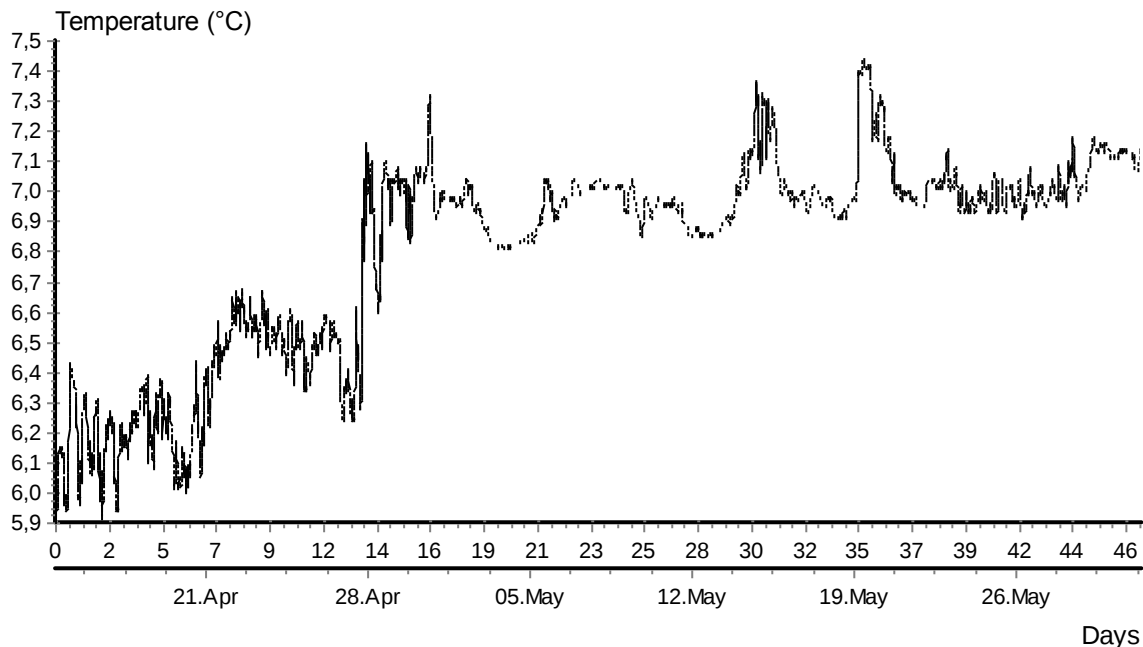
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12



CURRENT SPEED

File name: Ånholm01X-1.SD6

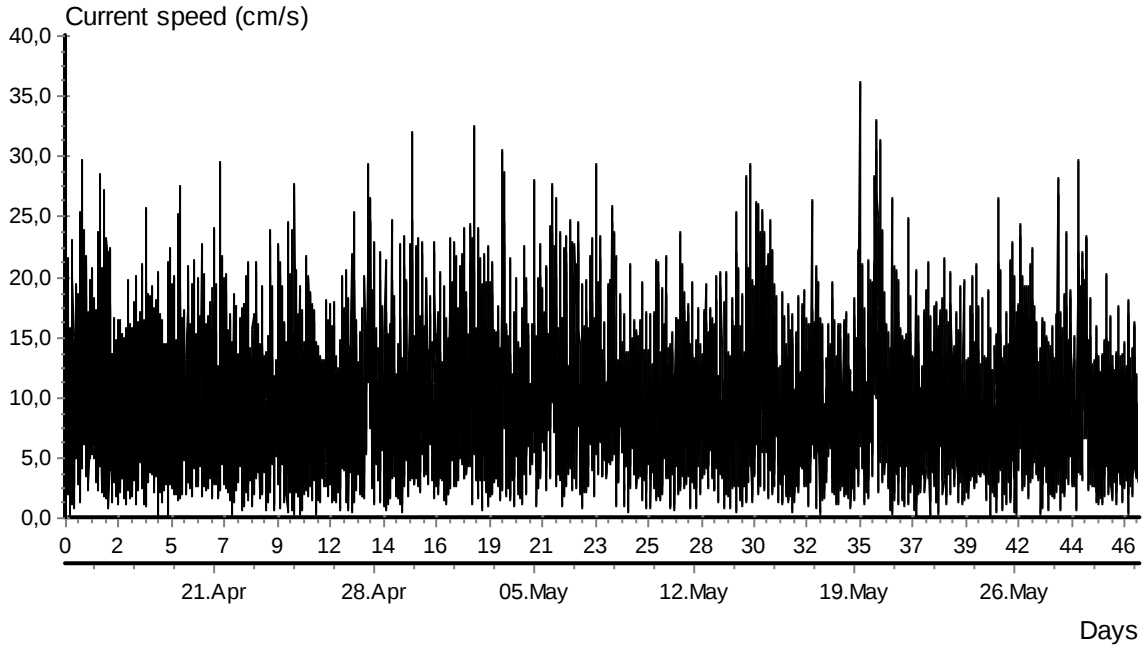
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12



CURRENT SPEED BAR CHART

File name: Ånholm01X-1.SD6

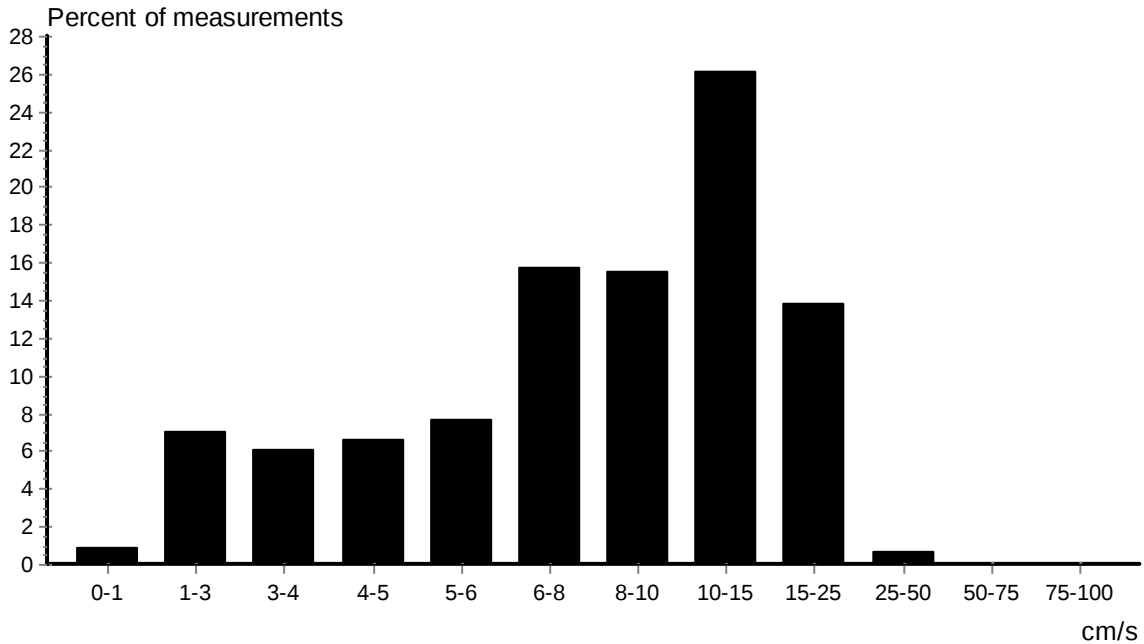
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12



CURRENT DIRECTION BAR CHART

File name: Ånholm01X-1.SD6

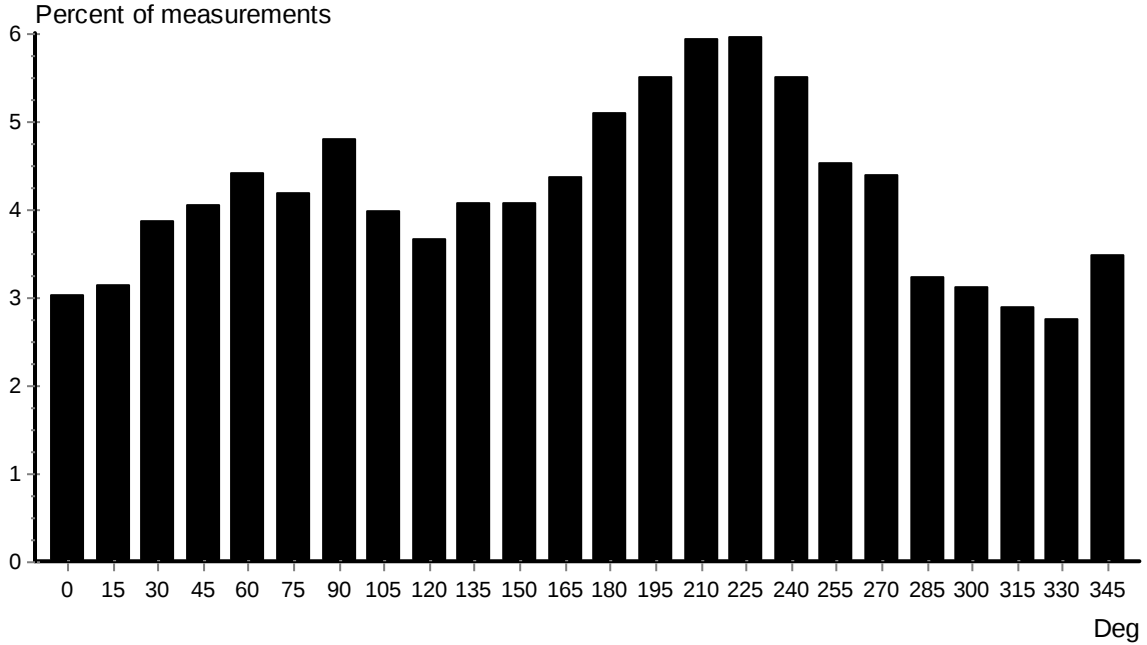
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12



PROGRESSIVE VECTOR

File name: Ånholm01X-1.SD6

Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

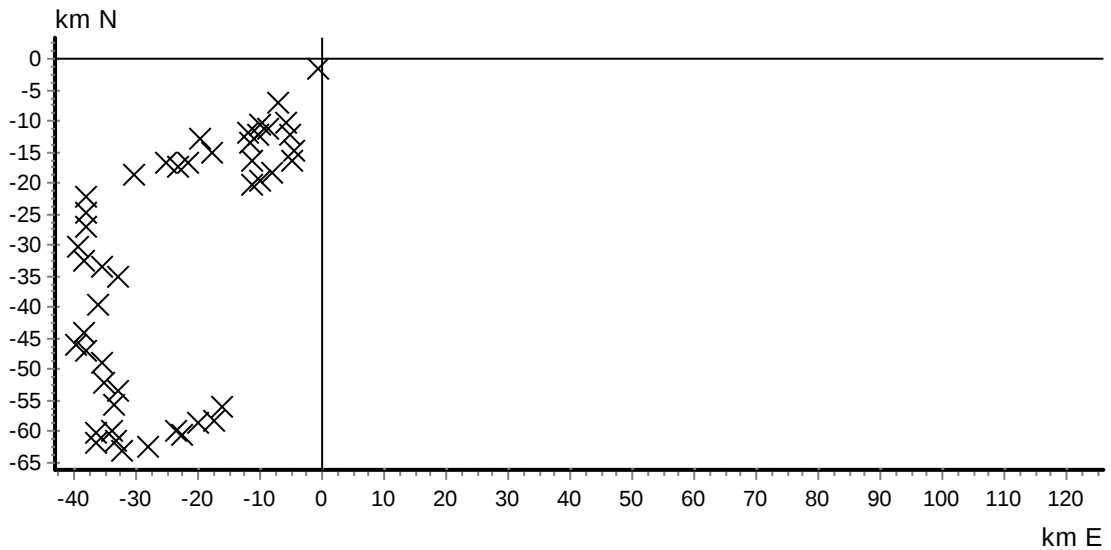
Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12

Neumann parameter: 0.150

Rest speed: 1.4 cm/s

Average speed: 9.5 cm/s

Rest direction: 195 deg.



CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Ånholm01X-1.SD6

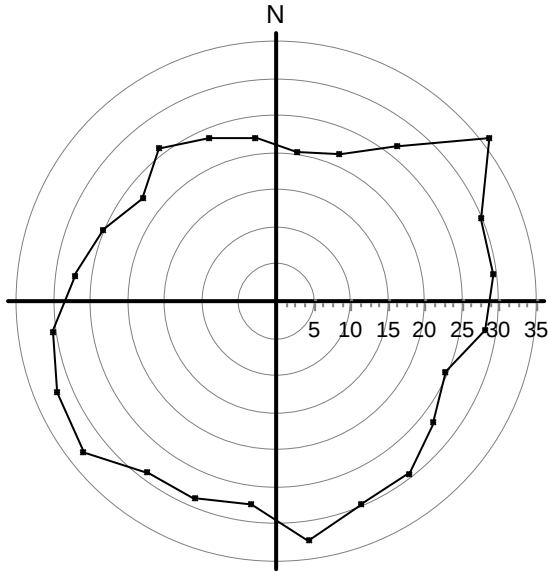
Series number: 1

Number of measurements in data set: 6765

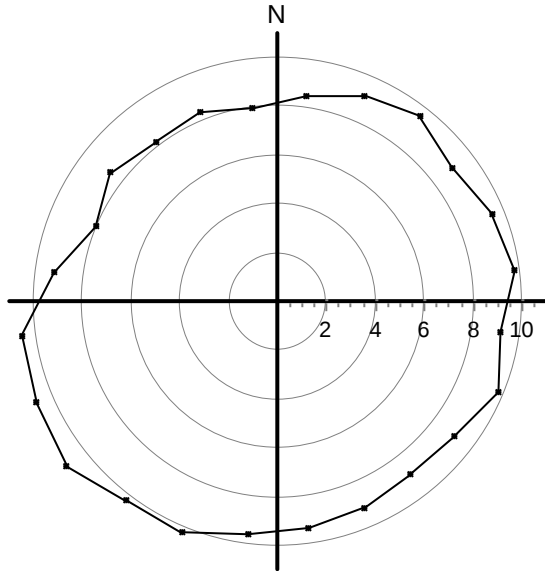
Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12

Ref. number: 0

Interval time: 10 Minutes



Maximum velocity (cm/s)
per 15 deg sector



Mean velocity (cm/s)
per 15 deg sector

CURRENT VELOCITY DISTRIBUTION DIAGRAM

File name: Ånholm01X-1.SD6

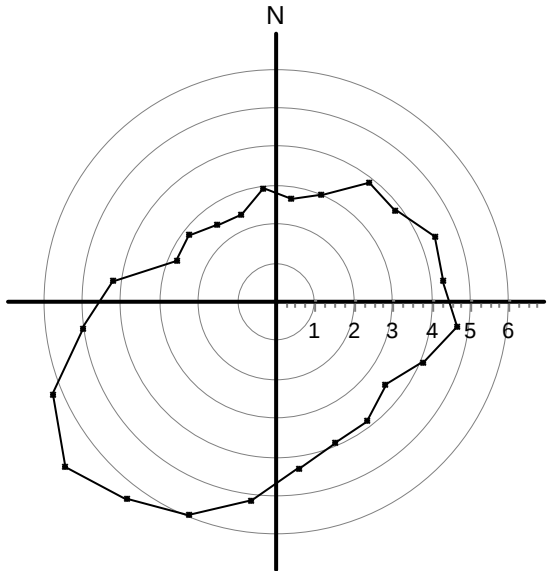
Series number: 1

Number of measurements in data set: 6765

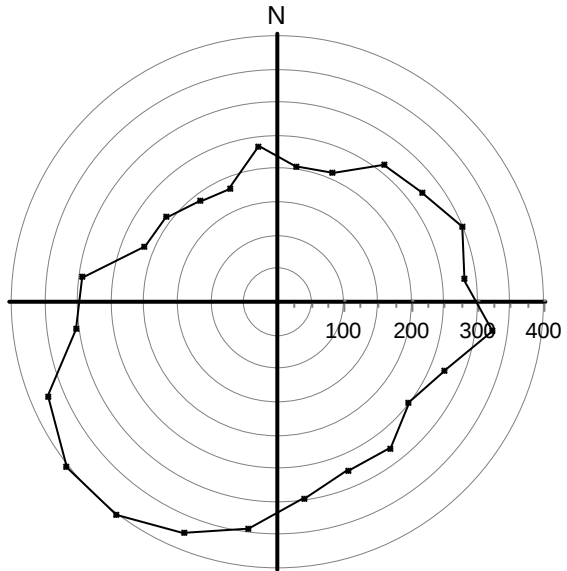
Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12

Ref. number: 0

Interval time: 10 Minutes



Relative water flux (%)
per 15 deg sector



Number of measurements
per 15 deg sector

STICK DIAGRAM

File name: Ånholm01X-1.SD6

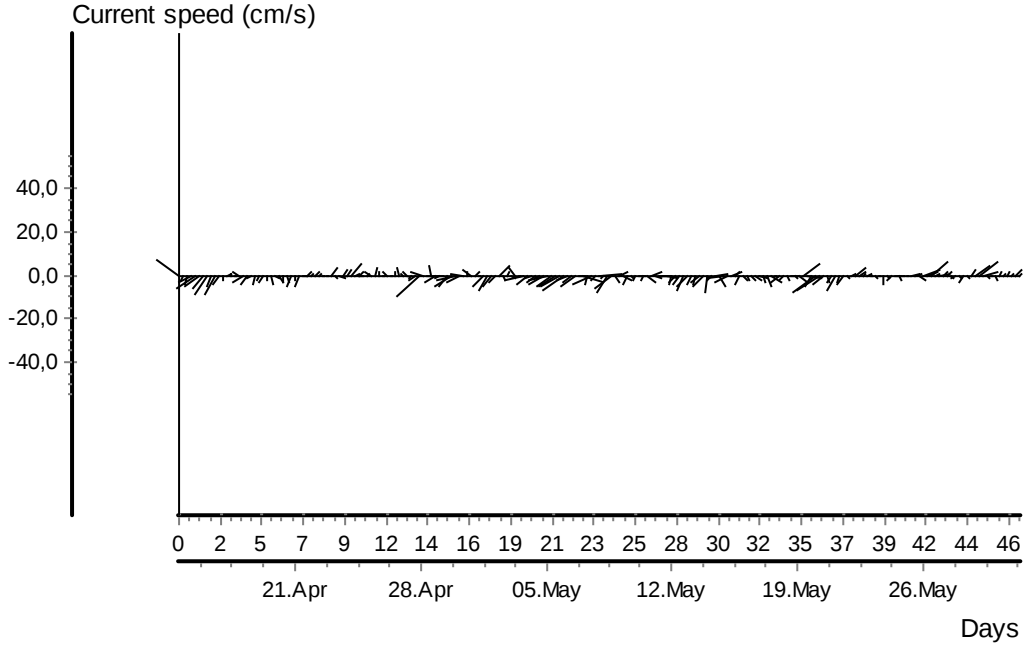
Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-12



CURRENT SPEED / DIRECTION MATRIX

File name: Ånholm01X-1.SD6

Ref. number: 0

Series number: 1

Interval time: 10 Minutes

Number of measurements in data set: 6765

Data displayed from: 12:00 - 14.Apr-12 To: 11:20 - 31.May-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 | 2 | 26 | 11 | 5 | 23 | 35 | 36 | 48 | 19 | 0 | 0 | 0 | 3.0 | 10441 | 2.7 | 20.4 |
| 15 | 4 | 15 | 11 | 18 | 14 | 29 | 42 | 51 | 28 | 0 | 0 | 0 | 3.1 | 11589 | 3.0 | 21.7 |
| 30 | 1 | 17 | 13 | 17 | 15 | 49 | 40 | 74 | 35 | 1 | 0 | 0 | 3.9 | 15082 | 3.9 | 26.5 |
| 45 | 2 | 18 | 26 | 24 | 17 | 48 | 43 | 63 | 32 | 1 | 0 | 0 | 4.1 | 14832 | 3.9 | 36.2 |
| 60 | 2 | 20 | 15 | 17 | 29 | 43 | 52 | 81 | 38 | 1 | 0 | 0 | 4.4 | 16905 | 4.4 | 29.7 |
| 75 | 1 | 19 | 11 | 13 | 21 | 51 | 57 | 65 | 43 | 2 | 0 | 0 | 4.2 | 16506 | 4.3 | 29.3 |
| 90 | 3 | 26 | 21 | 19 | 27 | 53 | 48 | 85 | 41 | 2 | 0 | 0 | 4.8 | 17905 | 4.7 | 28.2 |
| 105 | 3 | 20 | 13 | 14 | 25 | 36 | 42 | 71 | 45 | 0 | 0 | 0 | 4.0 | 15659 | 4.1 | 24.5 |
| 120 | 0 | 18 | 17 | 20 | 19 | 42 | 37 | 63 | 30 | 1 | 0 | 0 | 3.7 | 13432 | 3.5 | 26.6 |
| 135 | 4 | 19 | 20 | 29 | 20 | 45 | 33 | 75 | 27 | 3 | 0 | 0 | 4.1 | 14623 | 3.8 | 29.4 |
| 150 | 0 | 21 | 14 | 16 | 22 | 53 | 47 | 72 | 29 | 1 | 0 | 0 | 4.1 | 14991 | 3.9 | 29.5 |
| 165 | 2 | 21 | 20 | 18 | 24 | 45 | 47 | 82 | 36 | 1 | 0 | 0 | 4.4 | 16555 | 4.3 | 32.5 |
| 180 | 5 | 18 | 14 | 24 | 33 | 55 | 47 | 103 | 42 | 3 | 0 | 0 | 5.1 | 19699 | 5.1 | 27.5 |
| 195 | 3 | 20 | 18 | 18 | 24 | 58 | 55 | 112 | 63 | 2 | 0 | 0 | 5.5 | 22776 | 5.9 | 28.6 |
| 210 | 2 | 23 | 22 | 28 | 30 | 55 | 55 | 109 | 72 | 5 | 0 | 0 | 5.9 | 24498 | 6.4 | 28.8 |
| 225 | 6 | 15 | 19 | 21 | 26 | 49 | 65 | 99 | 95 | 8 | 0 | 0 | 6.0 | 26507 | 6.9 | 33.1 |
| 240 | 2 | 19 | 16 | 24 | 24 | 47 | 56 | 109 | 71 | 5 | 0 | 0 | 5.5 | 23911 | 6.2 | 32.1 |
| 255 | 0 | 15 | 15 | 11 | 19 | 49 | 48 | 85 | 61 | 3 | 0 | 0 | 4.5 | 19435 | 5.1 | 30.5 |
| 270 | 3 | 29 | 24 | 17 | 14 | 50 | 40 | 77 | 42 | 1 | 0 | 0 | 4.4 | 16414 | 4.3 | 27.6 |
| 285 | 3 | 23 | 22 | 23 | 21 | 28 | 32 | 45 | 21 | 1 | 0 | 0 | 3.2 | 10600 | 2.8 | 25.3 |
| 300 | 0 | 19 | 14 | 17 | 15 | 41 | 30 | 56 | 19 | 0 | 0 | 0 | 3.1 | 10981 | 2.9 | 22.9 |
| 315 | 1 | 19 | 18 | 20 | 20 | 28 | 29 | 45 | 13 | 2 | 0 | 0 | 2.9 | 9649 | 2.5 | 26.1 |
| 330 | 3 | 17 | 12 | 10 | 18 | 37 | 31 | 39 | 19 | 0 | 0 | 0 | 2.7 | 9382 | 2.4 | 24.0 |
| 345 | 8 | 15 | 21 | 22 | 20 | 38 | 39 | 58 | 15 | 0 | 0 | 0 | 3.5 | 11340 | 3.0 | 22.2 |
| Sum% | 0.9 | 7.0 | 6.0 | 6.6 | 7.7 | 15.7 | 15.5 | 26.1 | 13.8 | 0.6 | 0.0 | 0.0 | | 383711 | | 36.2 |

STATISTICAL SUMMARY

| | Total | East / west | North / south |
|------------------------------------|--------------|--------------------|----------------------|
| Mean current speed (cm/s) | 9,5 | 6,2 | 5,8 |
| Variance (cm/s)² | 26,391 | 23,147 | 20,108 |
| Standard deviation (cm/s) | 5,137 | 4,811 | 4,484 |
| Mean standard deviation | 0,543 | 0,777 | 0,768 |
| Maximum current velocity | 36,2 | | |
| Minimum current velocity | 0,2 | | |
| Significant max velocity | 15,3 | | |
| Significant min velocity | 4,2 | | |