

Gotland Runt 2008, Debriefing

Introduktion

Väderläget och den officiella prognosen

Hur fungerar prognosmodellerna?

Kort om fronter

Vad hände?

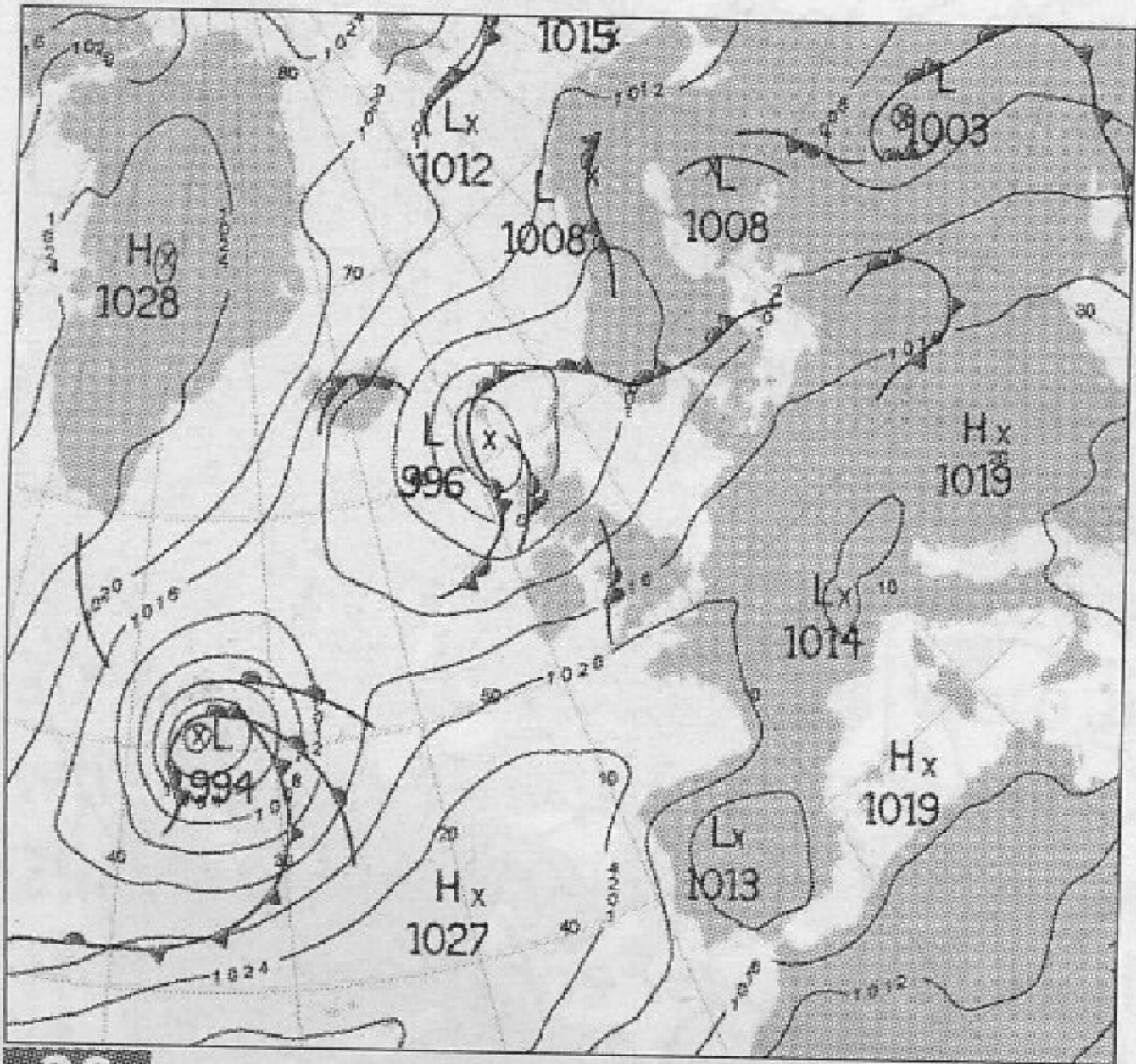
Hur såg modellprognoserna ut?

WeatherTech

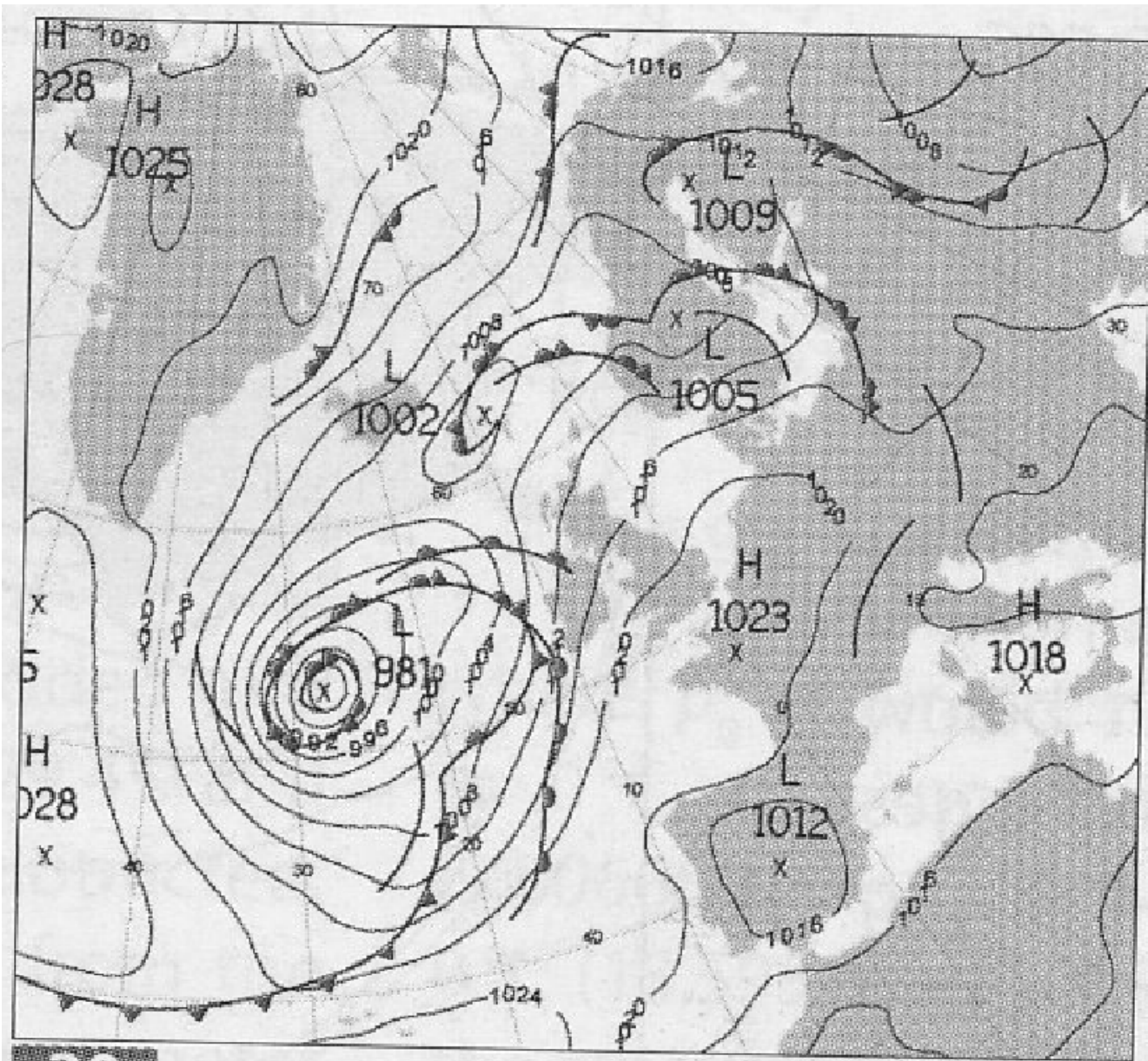


Northloftet 2008-12-02

Söndag 29/6



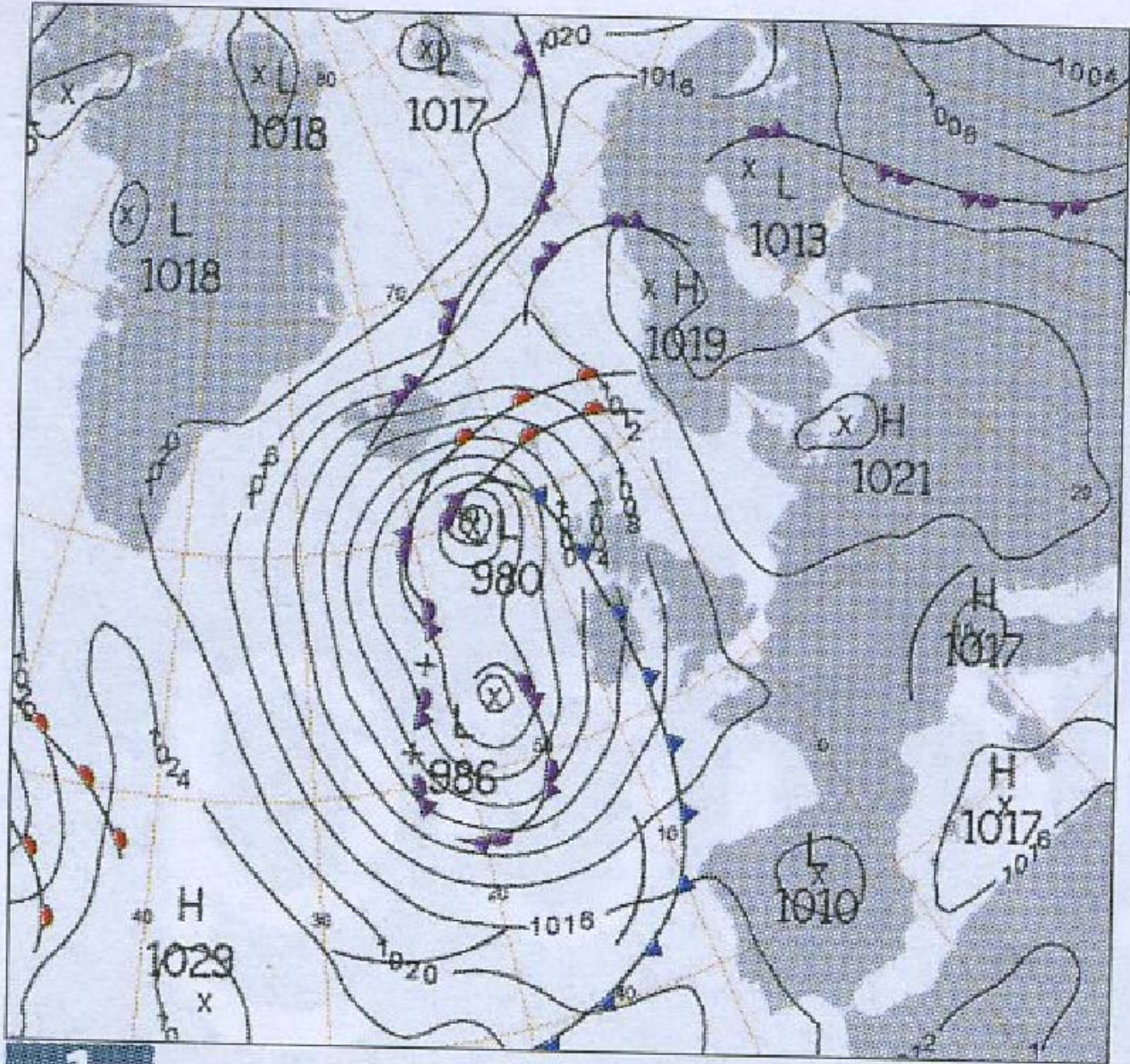
Måndag 30/6



30

Tisdag 1/7

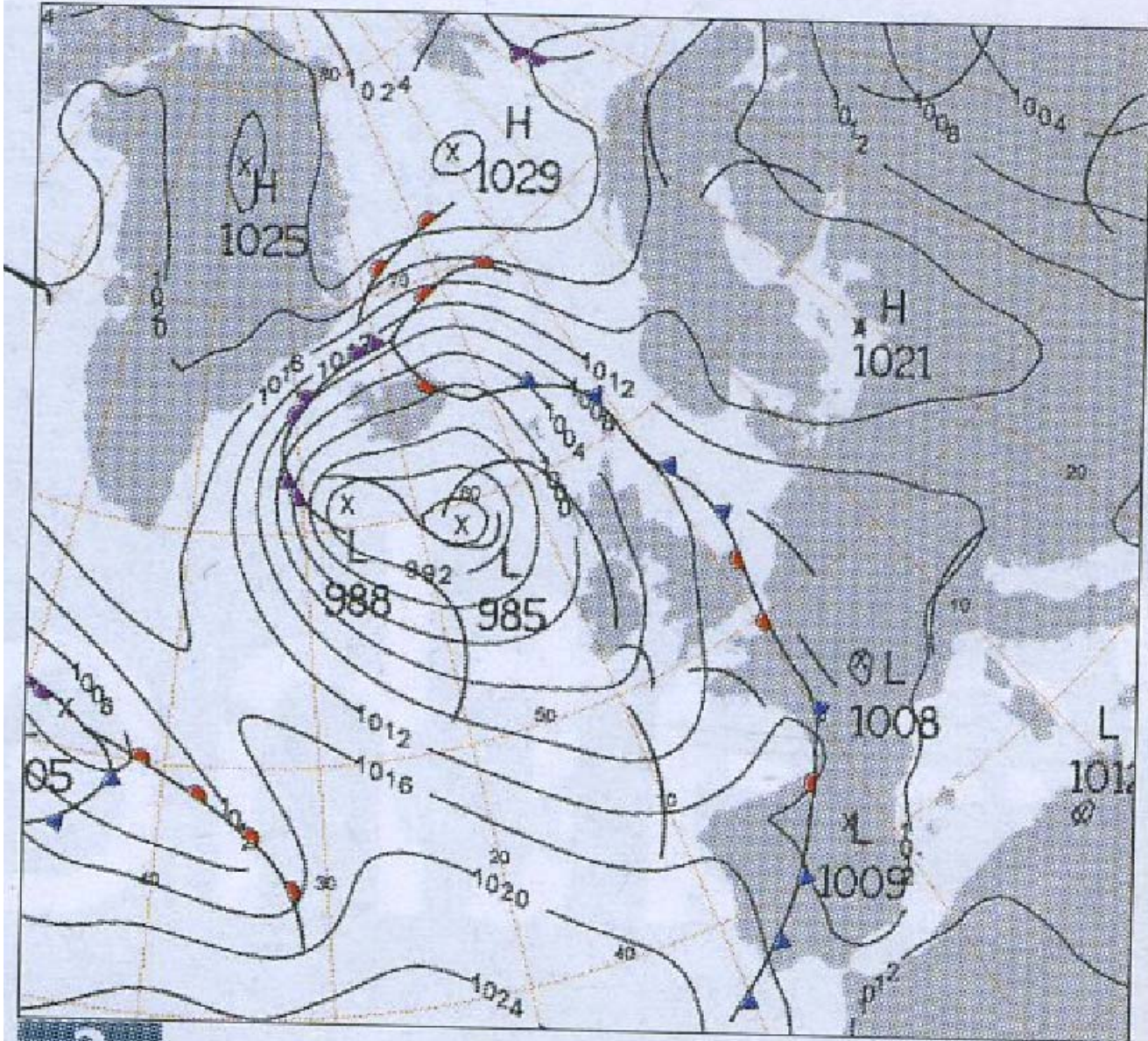
TUESDAY



1

Onsdag 2/7

WEDNESDAY



Officiell prognos (Pia Hultgren, KSSS, SMHI):

- Ett H över Polen -> svag rygg över Östersjön.
- Mindre L finns över Bottenhavet
- Ett L bildas vid Oslofjorden natten mot måndag -> ett par svaga fronter passerar under måndag -> molnigt och tidvis regn
- Måndag kväll: L-centrumet rör sig mot Gävlebukten under utfyllnad
- Därefter förstärkning av H i söder, H-centrum rör sig upp mot Östersjön, tryckgradienten avtar allmänt.
- Vattentemperatur 12-15°C

Prognosmodeller

Meteorologi grundar sig inte på statistik

Meteorologi grundar sig på fysikaliska samband

De styrande ekvationerna (förenklade)

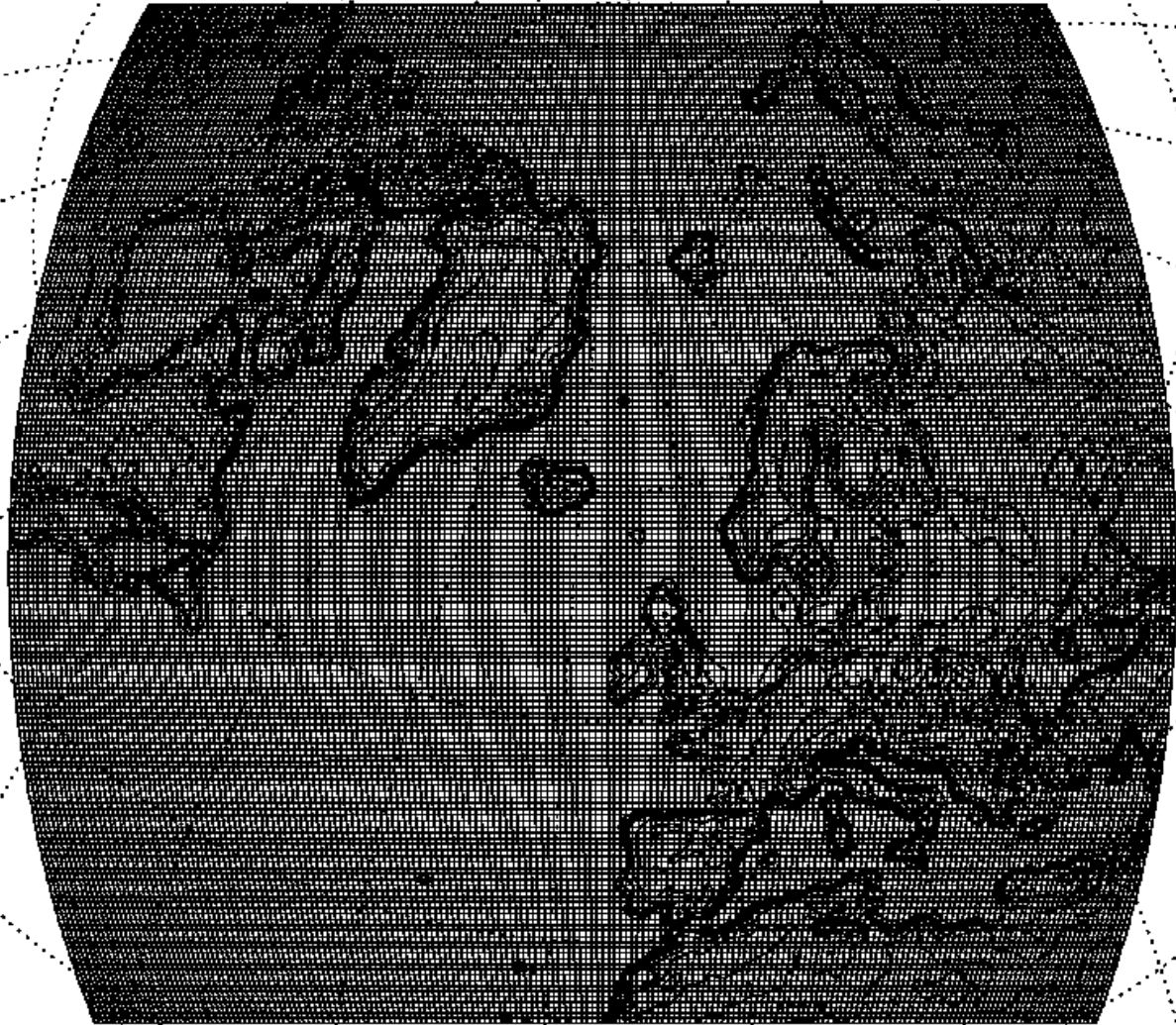
$$\frac{\partial \bar{u}}{\partial t} + \bar{u} \frac{\partial \bar{u}}{\partial x} + \bar{v} \frac{\partial \bar{u}}{\partial y} + \bar{w} \frac{\partial \bar{u}}{\partial z} = -\frac{1}{\rho_0} \frac{\partial \bar{p}}{\partial x} + f \bar{v} - \left[\frac{\partial \overline{u'u'}}{\partial x} + \frac{\partial \overline{u'v'}}{\partial y} + \frac{\partial \overline{u'w'}}{\partial z} \right]$$

$$\frac{\partial \bar{v}}{\partial t} + \bar{u} \frac{\partial \bar{v}}{\partial x} + \bar{v} \frac{\partial \bar{v}}{\partial y} + \bar{w} \frac{\partial \bar{v}}{\partial z} = -\frac{1}{\rho_0} \frac{\partial \bar{p}}{\partial y} - f \bar{u} - \left[\frac{\partial \overline{vu'}}{\partial x} + \frac{\partial \overline{vv'}}{\partial y} + \frac{\partial \overline{vw'}}{\partial z} \right]$$

$$\frac{\partial \bar{w}}{\partial t} + \bar{u} \frac{\partial \bar{w}}{\partial x} + \bar{v} \frac{\partial \bar{w}}{\partial y} + \bar{w} \frac{\partial \bar{w}}{\partial z} = -\frac{1}{\rho_0} \frac{\partial \bar{p}}{\partial z} + g \frac{\bar{\theta}}{\theta_0} - \left[\frac{\partial \overline{wu'}}{\partial x} + \frac{\partial \overline{wv'}}{\partial y} + \frac{\partial \overline{ww'}}{\partial z} \right]$$

$$\frac{\partial \bar{\theta}}{\partial t} + \bar{u} \frac{\partial \bar{\theta}}{\partial x} + \bar{v} \frac{\partial \bar{\theta}}{\partial y} + \bar{w} \frac{\partial \bar{\theta}}{\partial z} = -\bar{w} \frac{\partial \theta_0}{\partial z} - \left[\frac{\partial \overline{\theta'u'}}{\partial x} + \frac{\partial \overline{\theta'v'}}{\partial y} + \frac{\partial \overline{\theta'w'}}{\partial z} \right]$$

Grid



Några modeller och deras egenskaper

• **ECMWF** (European Centre for Medium-range Weather Forecasting)

Upplösning: ~25 km, 91 nivåer, Ensemble

Uppdateras 00 & 12 UTC

• **GFS** (Global Forecasting System, NOAA)

Upplösning: 50-110 km, 64-28 nivåer, Ensemble

Uppdateras 00, 06, 12 & 18 UTC

• **UKMO**, UK Met. Office

• **GME**, DWD

• **GEM**, Met. Service Canada

• **JMA**, Japan

• **NOGAPS**, US Navy

Globala

Några modeller och deras egenskaper

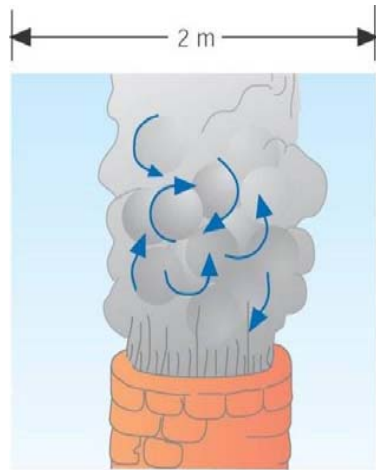
Regionala

- **HIRLAM**, Resolution: 22 (11) km (SMHI, DMI, Met.No, ...)
- **ICM** (Uniwersytet Warszawski)
- **ETA** (ex. Theyr.net, Wejr2)

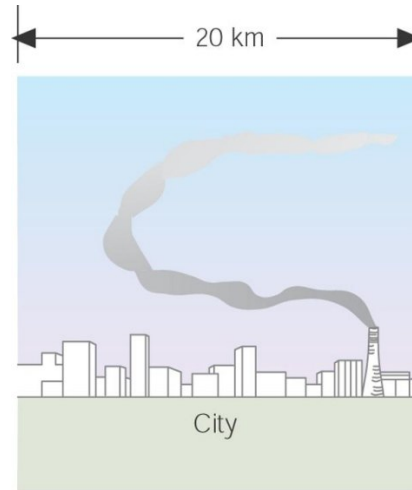
Mesoskaliga

- **MM5** (ex. WeatherTech (Sailplanner))
- **COAMPS** (ex. WeatherTech)
- **WRF** (ex. ProGRIB, Windguru)

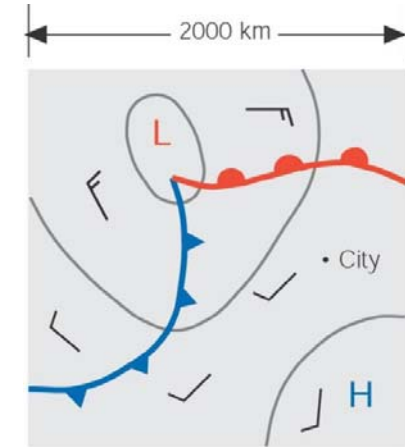
Fysikalisk representation - olika skalor



Microscale



Mesoscale



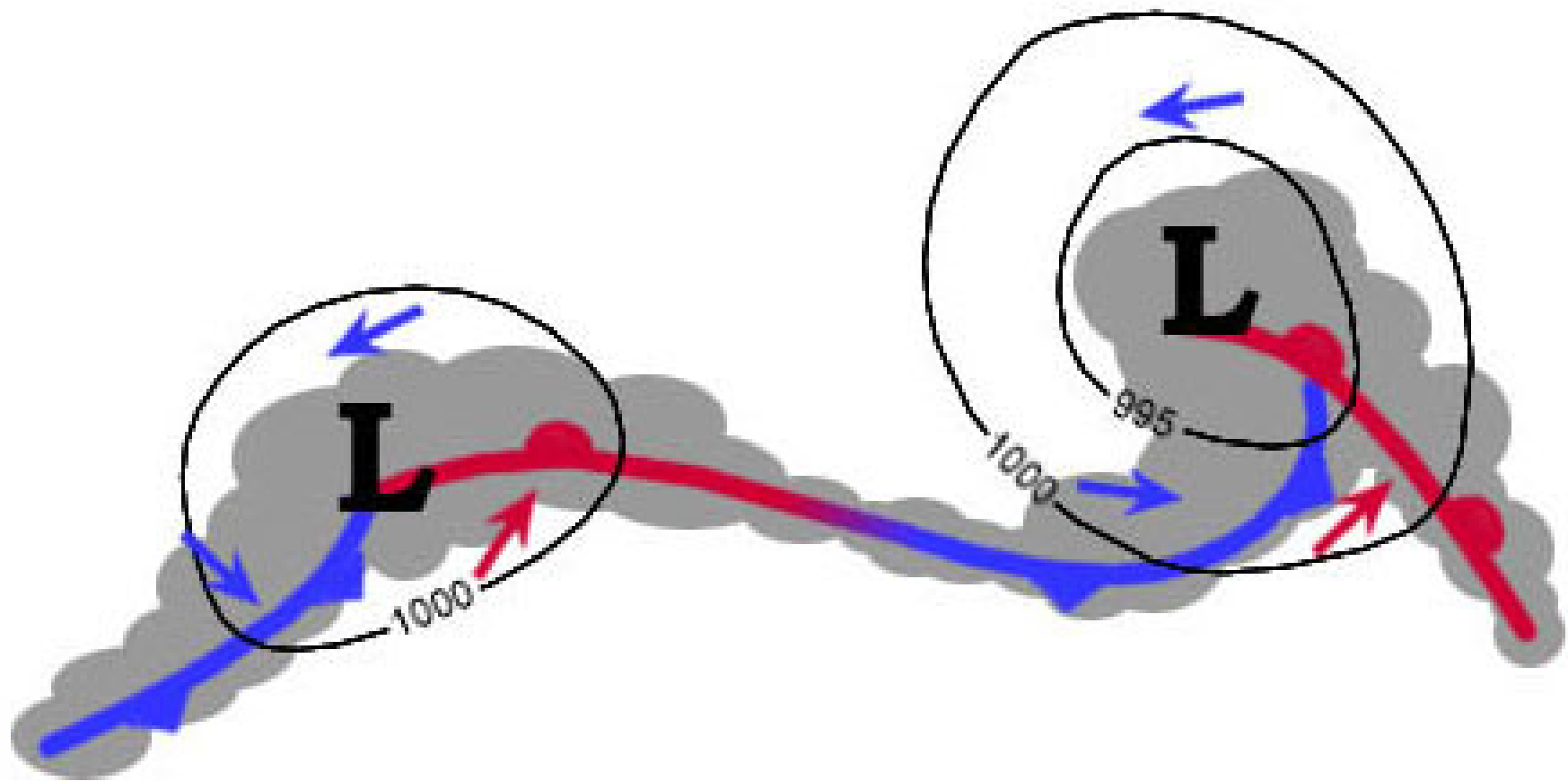
Synoptic scale

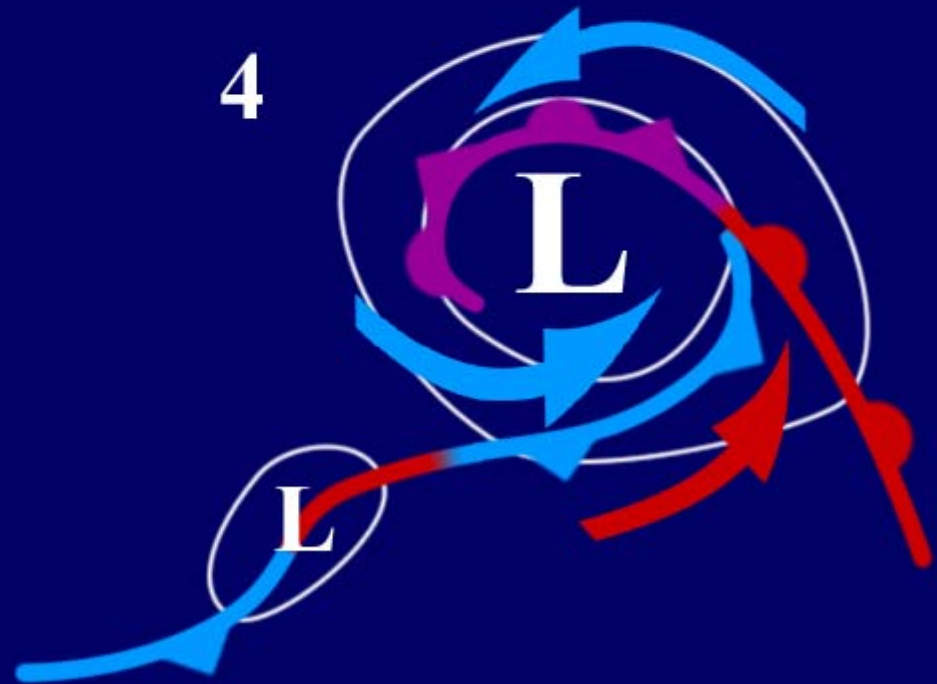
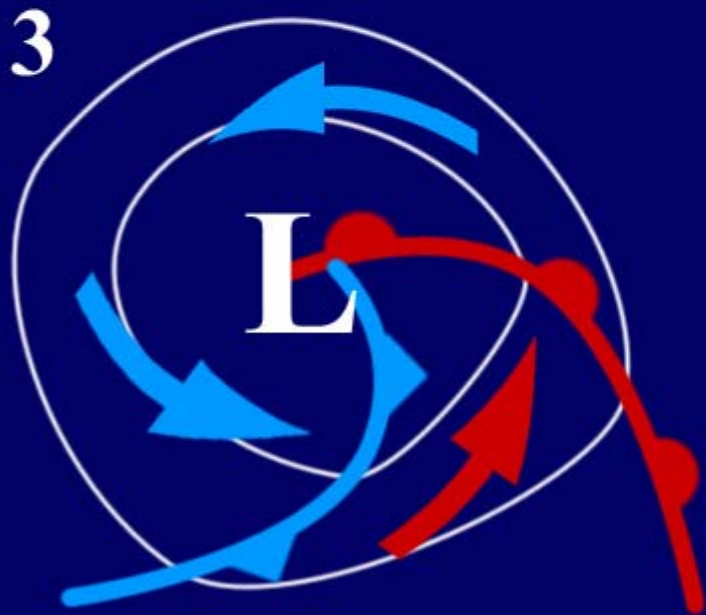
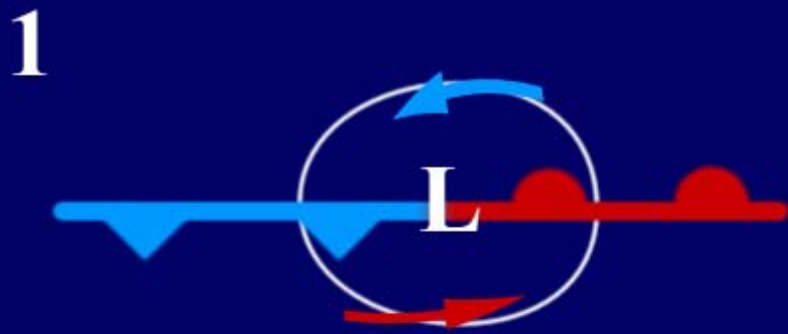
De små **mikroskaliga** rörelserna... är en del av de större **mesoskaliga** rörelserna... vilka in sin tur är en del av de mycket större **synoptiska** rörelserna. När skalan blir större kan man inte längre urskilja rörelserna på en mindre skala.

GRIB (GRIdded Binaries)

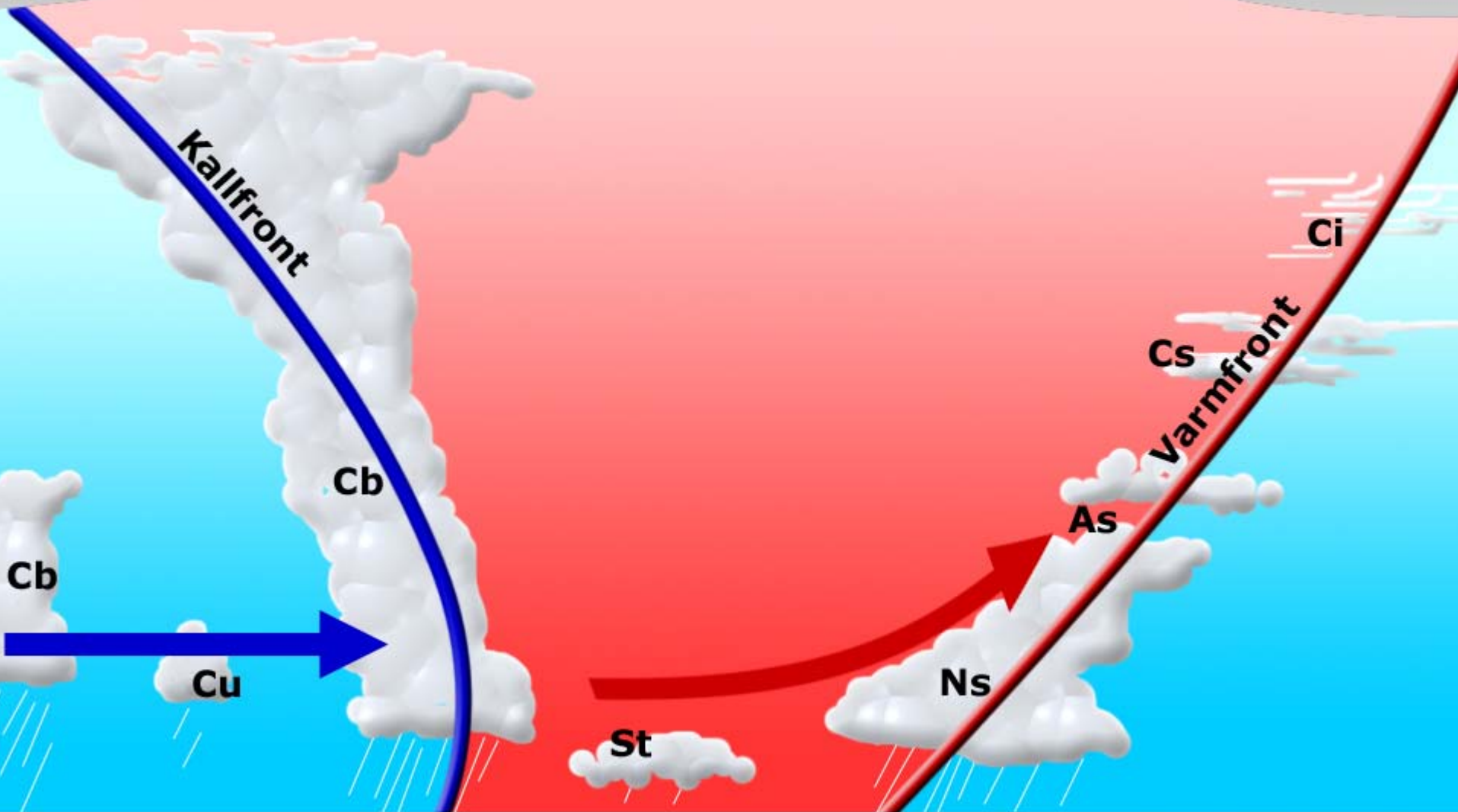
- Standardformat för meteorologiska och oceanografiska (modell-)data
- Packad binärt, visualiseringsprogram (viewer) krävs
- 3D-fält (modell-, tryck- alt. speciella nivåer, ex. vind(10m), T(2m))
- Nedladdning från internet, e-mail, mobil. Gratis/avgift
- Rå eller postprocessad modelldata.
- Viewers med stöd för strategi, polardiagram etc... , tex Expedition
- Sailplanner - slipper fundera över gribbar!

Lite om fronter



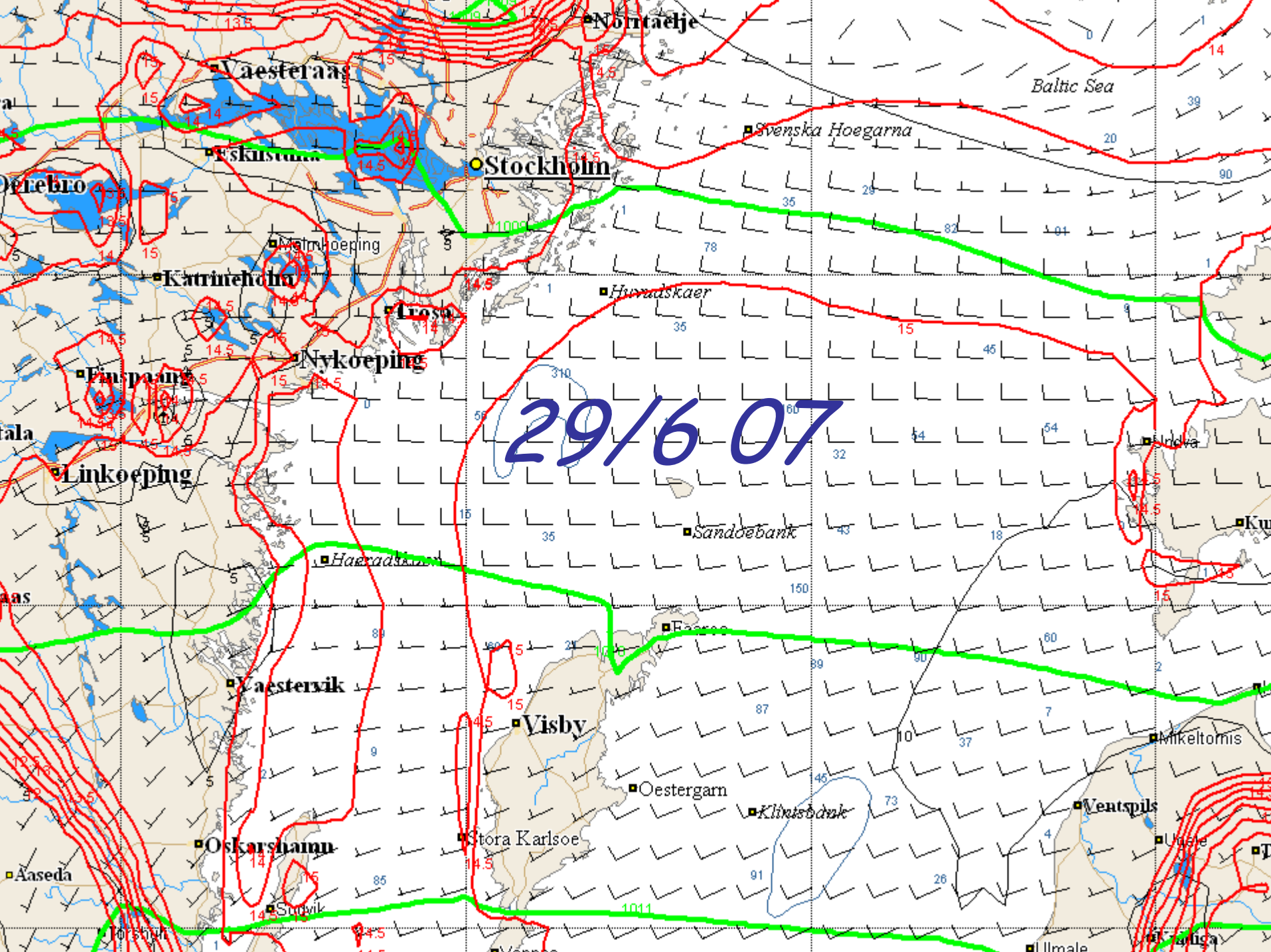


Tropopause

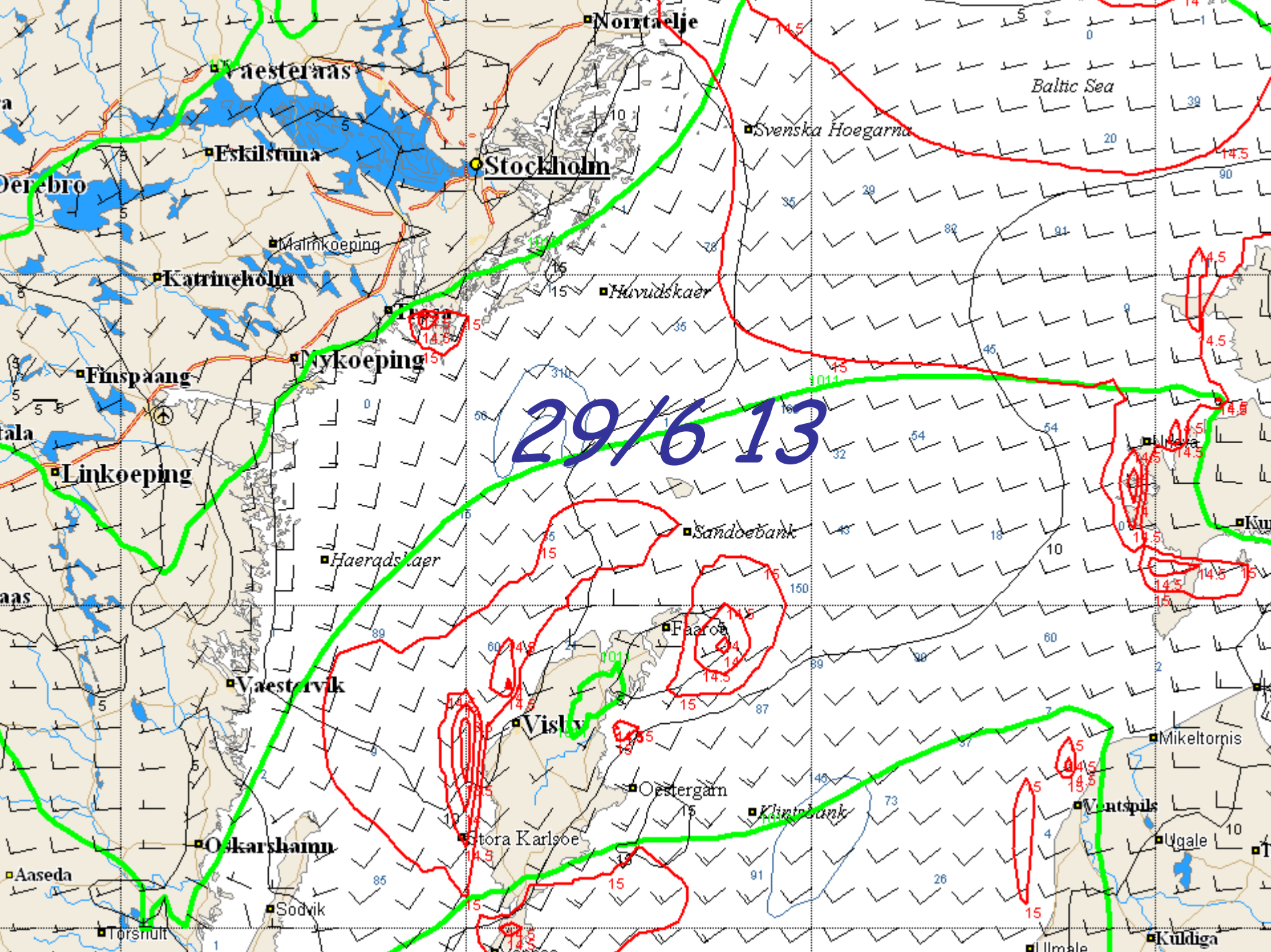


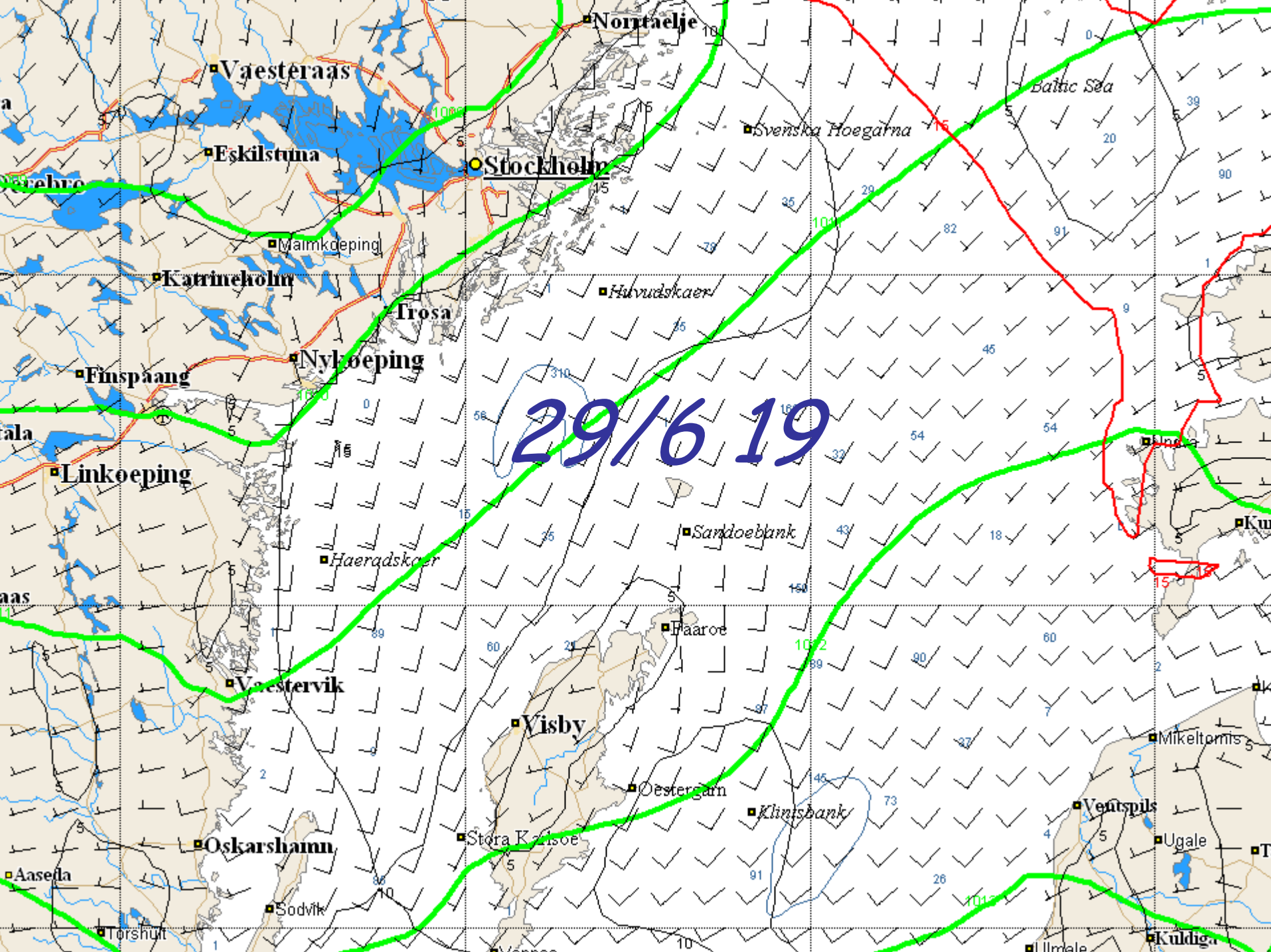
Vad hände?

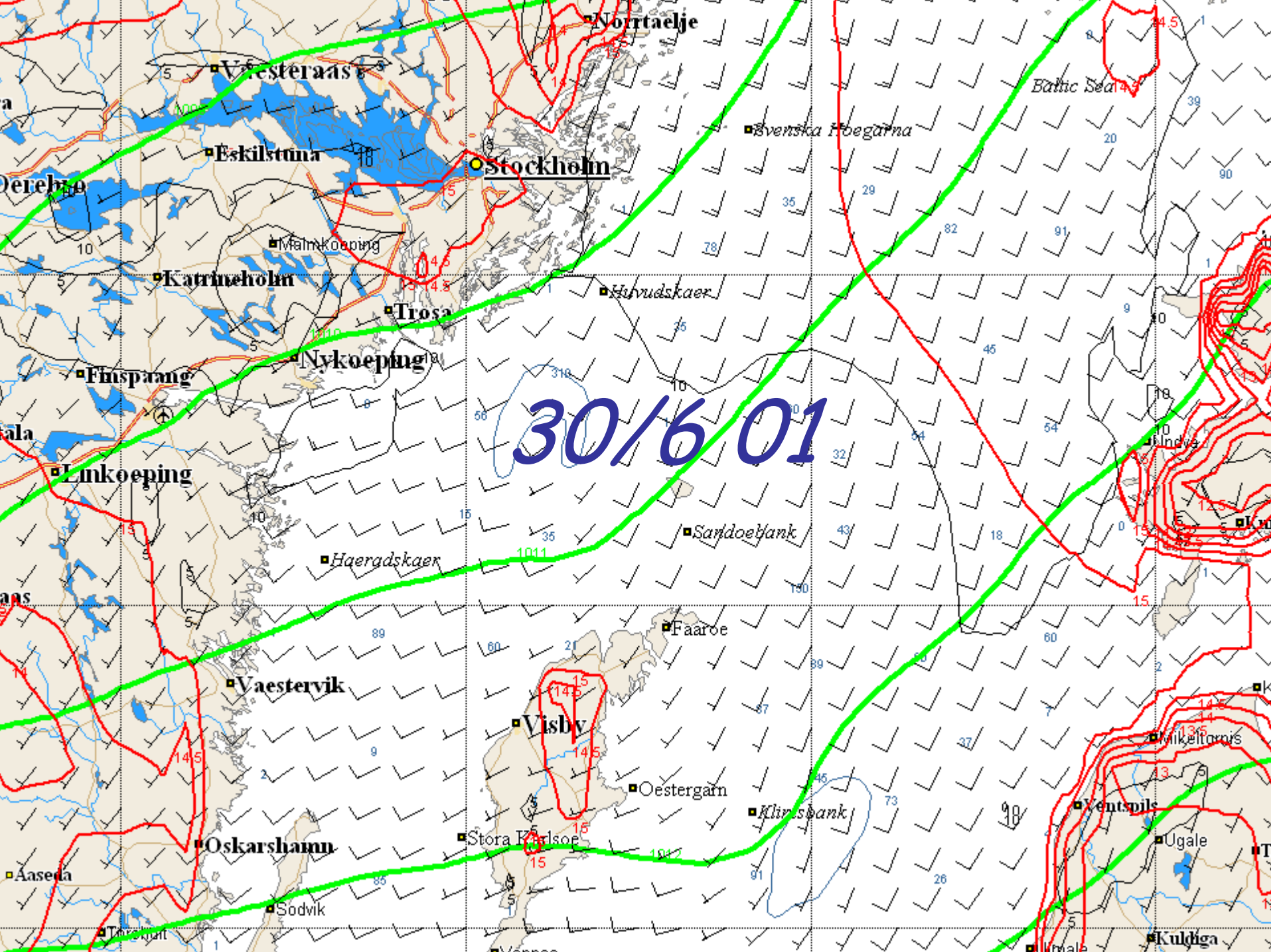
"Analyser" (WeatherTech)



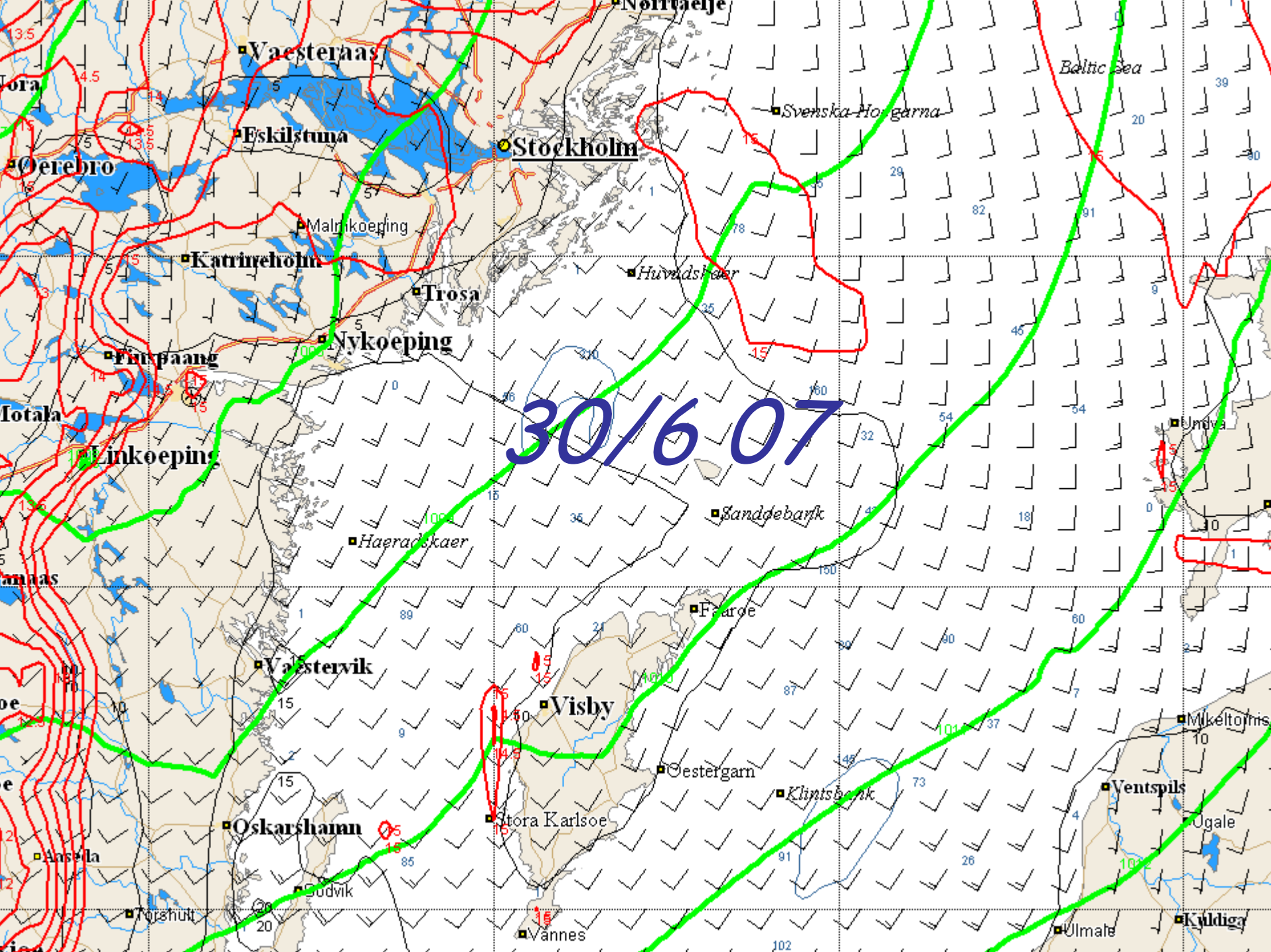
29/6 07







30/6 01



30/6 07

Vaesterås

Eskilstuna

Stockholm

Svenska Högarna

Baltic Sea

Orebro

Malmskoeping

Katrineholm

Trosa

Huvadshaer

Furupaang

Nykoeping

Totala

Linkoeping

Haeradskaer

Sanddebarck

anaas

Faeroe

Vaestervik

Visby

oe

Oestergarn

Klintsbank

e

Oskarshamn

Stora Karlsoe

Ventspils

Ogale

Ansela

Sudvik

Vannes

Ulmale

Kuldiga

riis

Torshtutt

102

20

20

15

15

89

100

36

76

5

5

5

5

100

60

35

1

1

1

150

60

15

78

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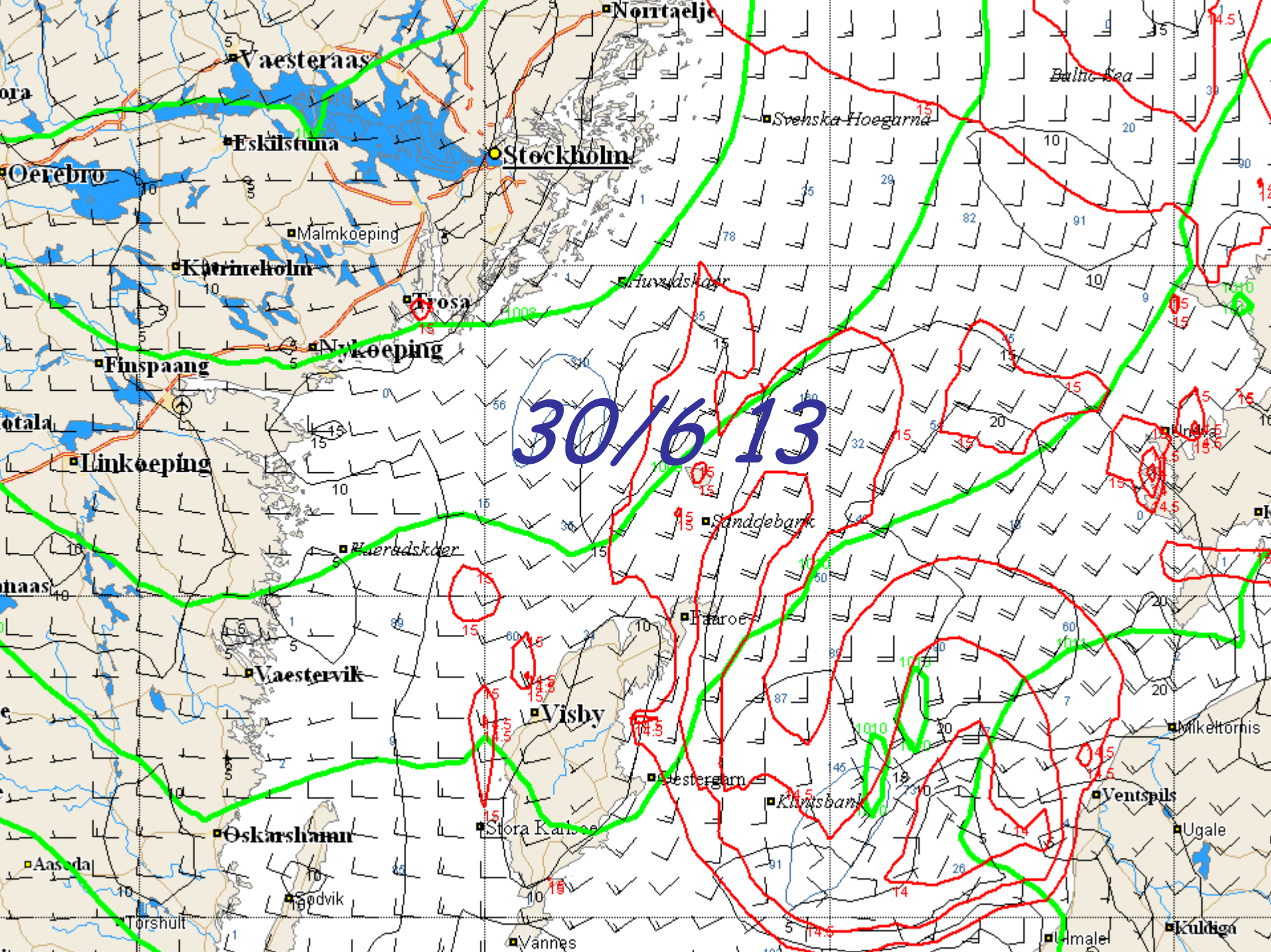
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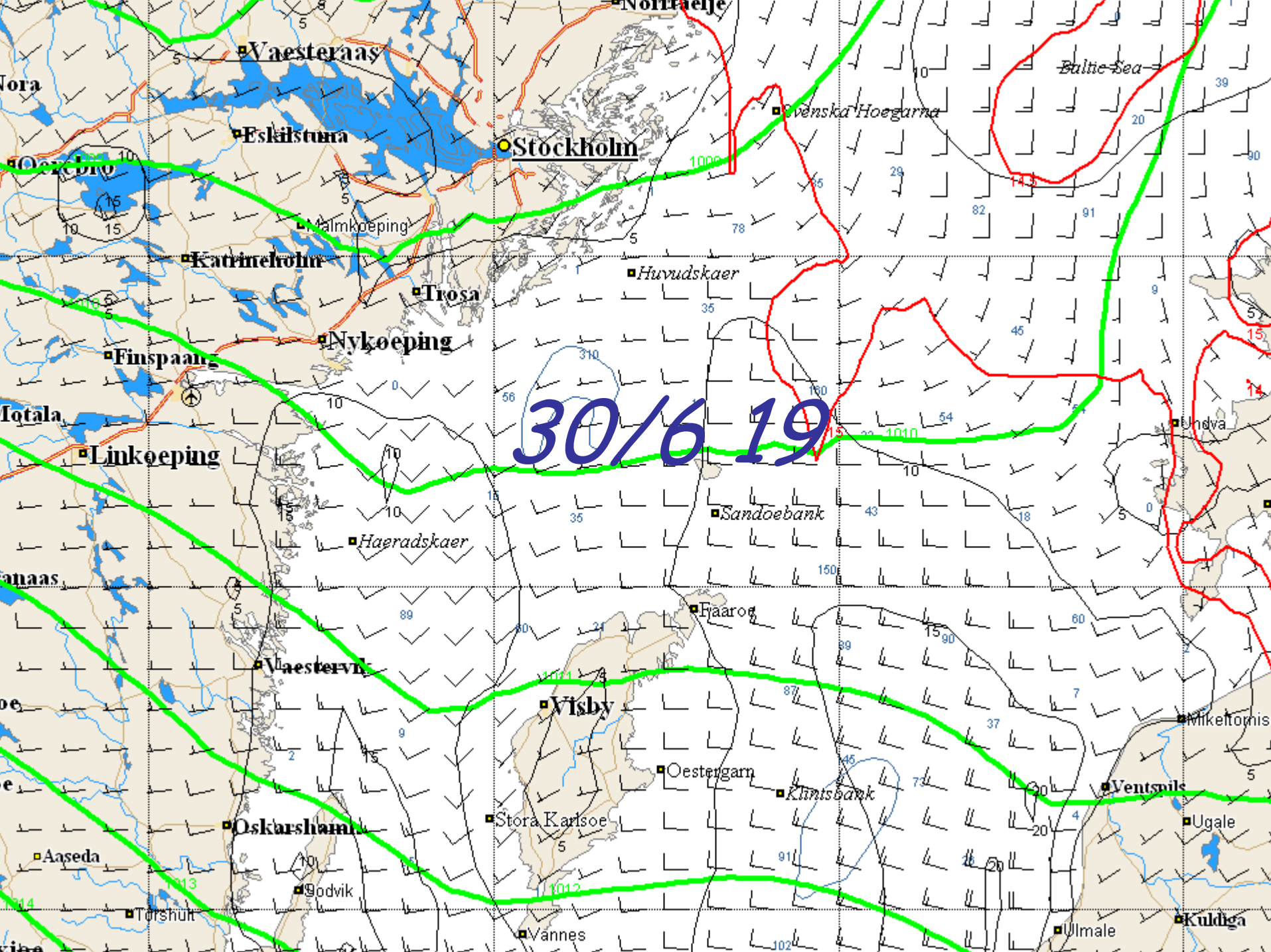
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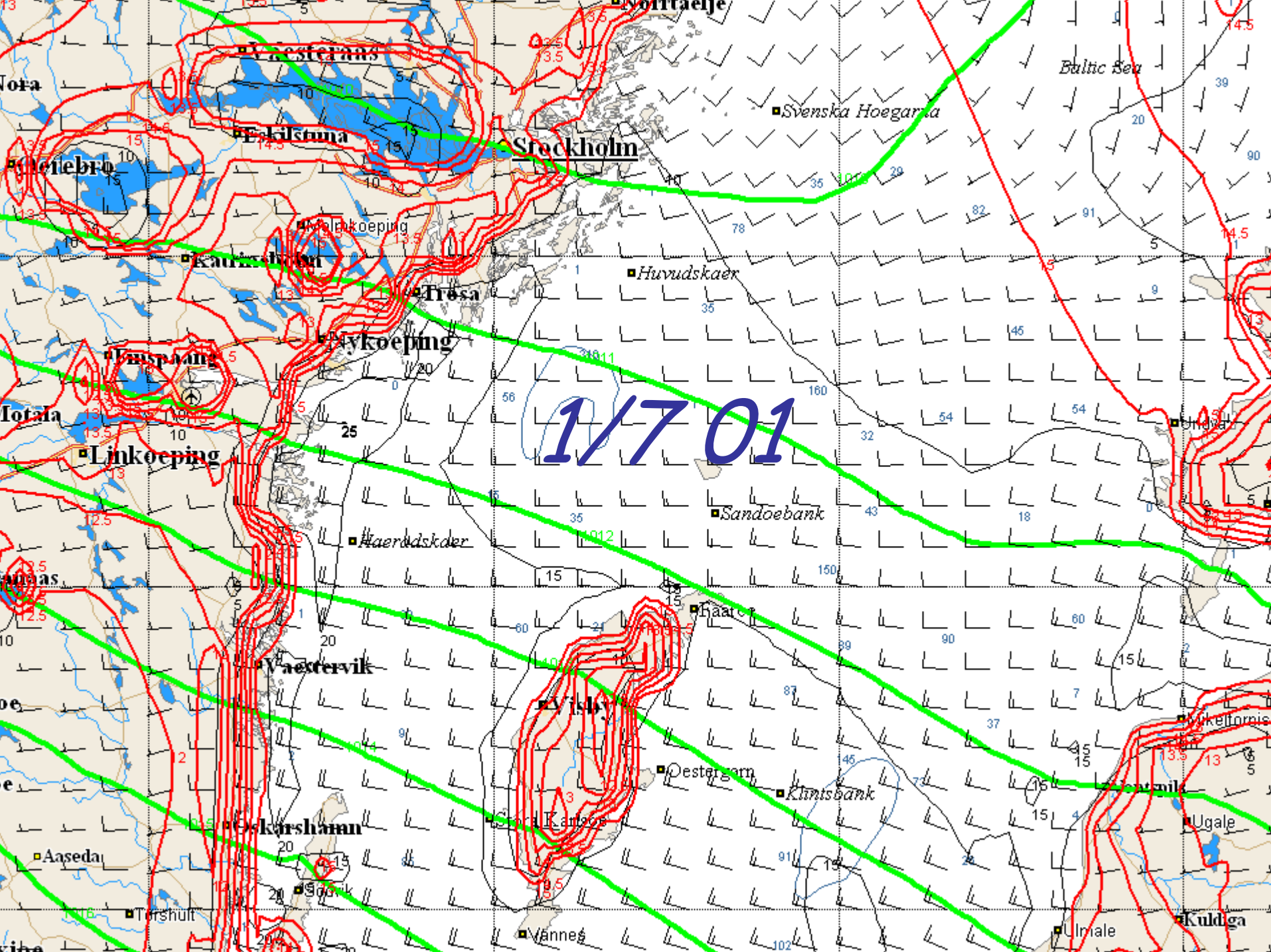
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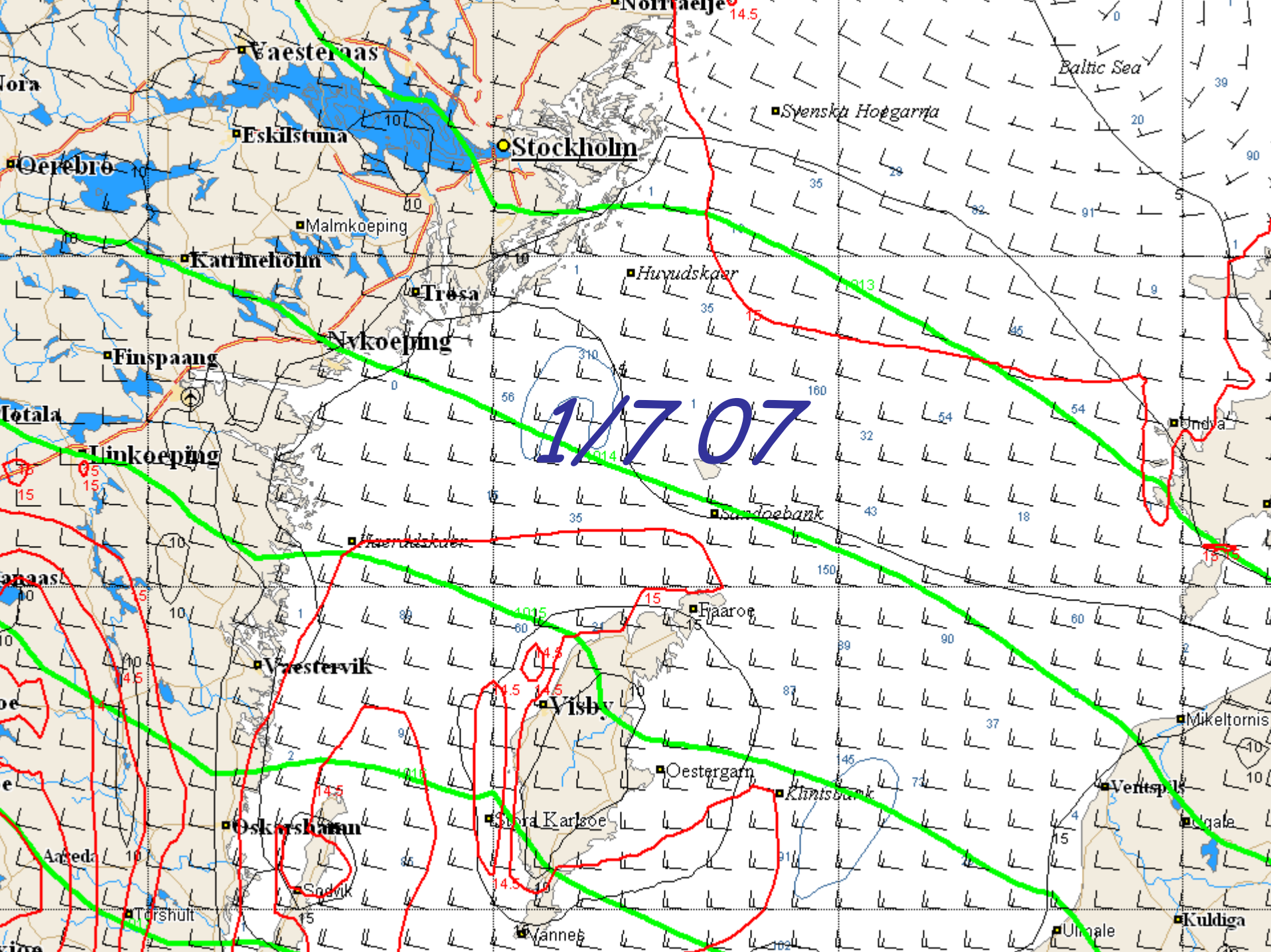


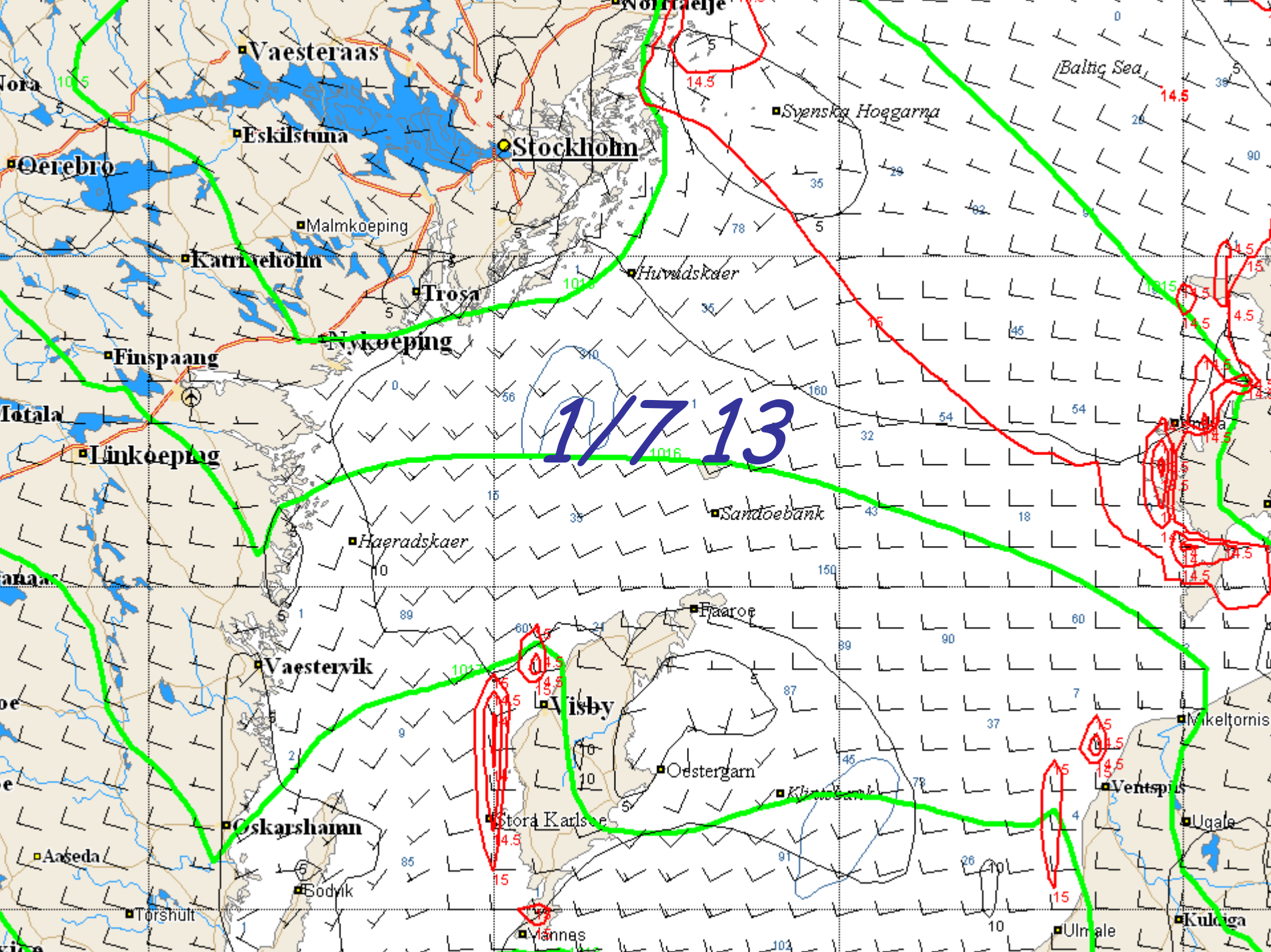
30/6 13



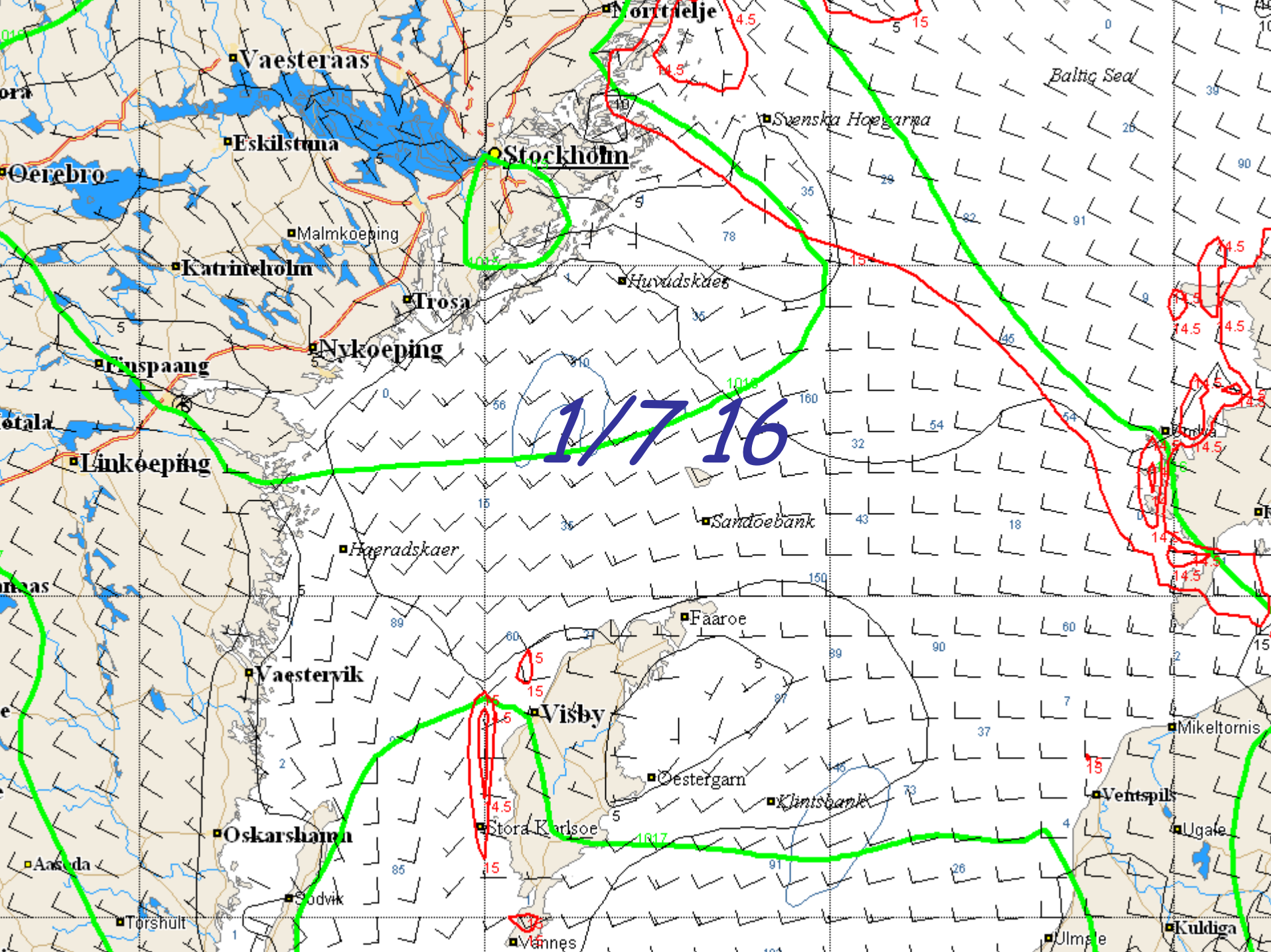
30/6 19



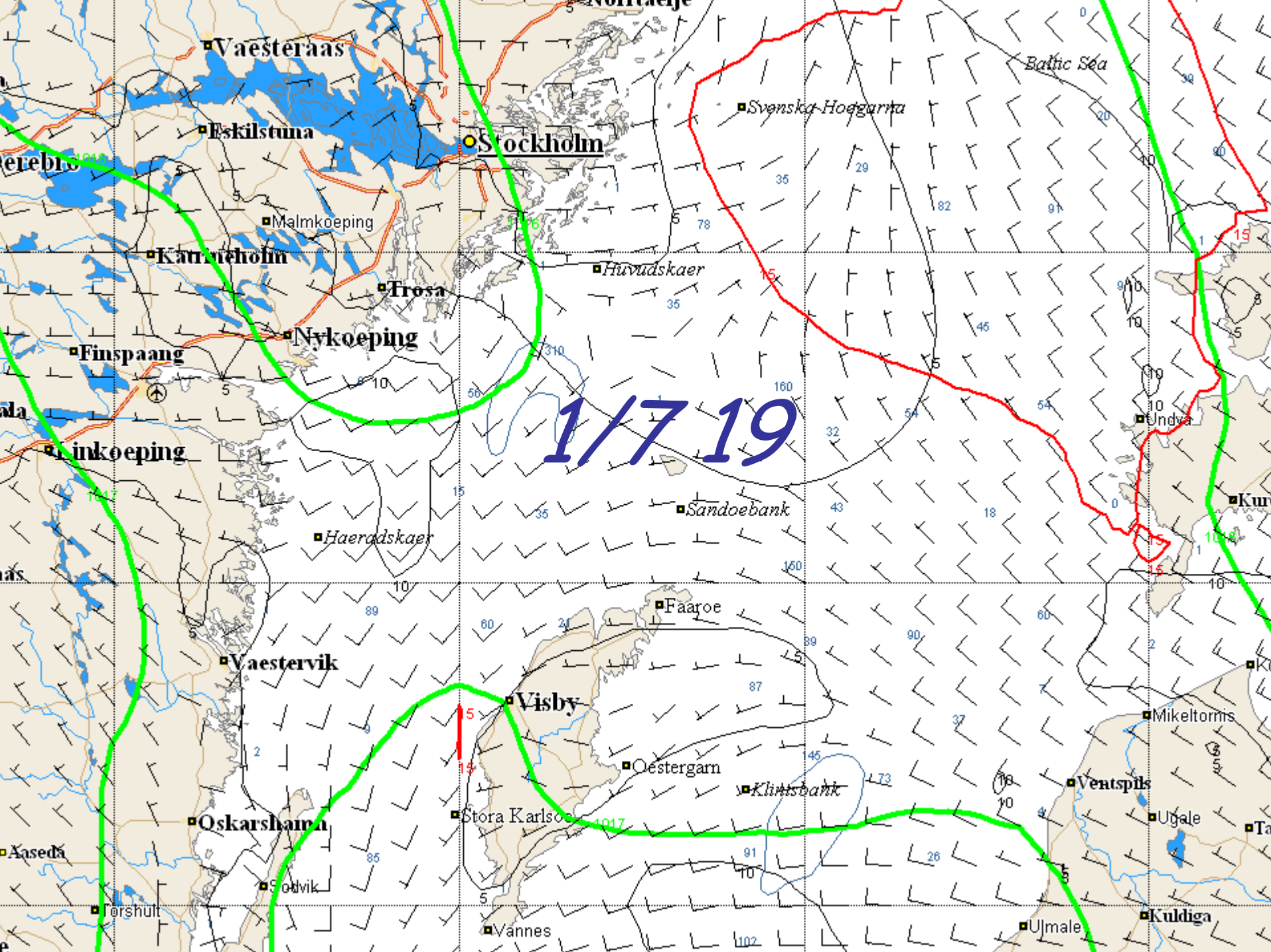


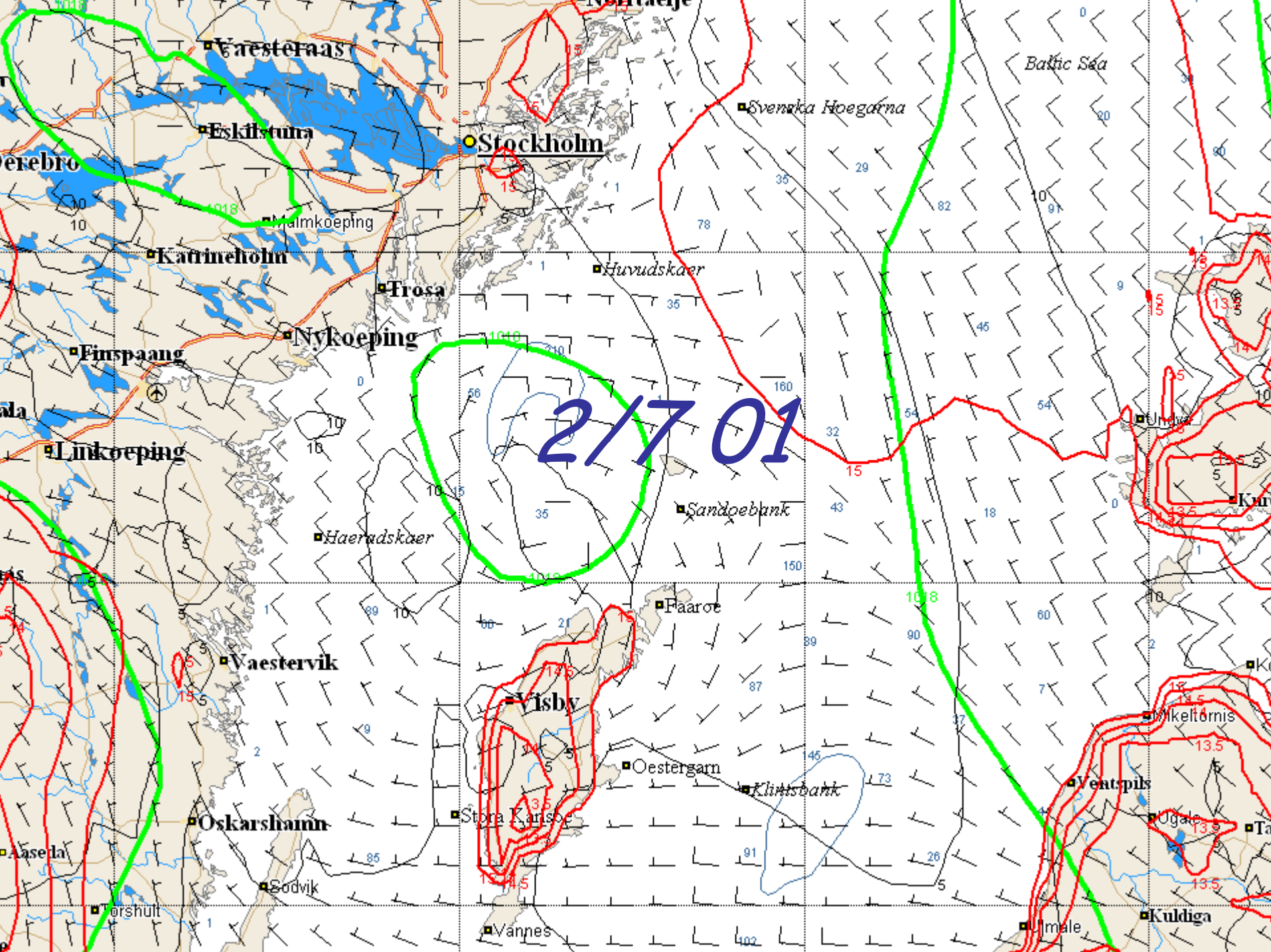


1/7 13



1/7 16





21701

Vaesteraas

Eskilstuna

Stockholm

Svenska Hoegarna

Baltic Sea

Malmkoeping

Katrineholm

Trosa

Huvudskaer

Finspaang

Nykoeping

Linkoeping

Sandoebank

Haerudskaer

Vaestervik

Visby

Paaroe

Oestergarn

Klintsbank

Oskarshamn

Stora Karlsö

Ventspils

Mikeltornis

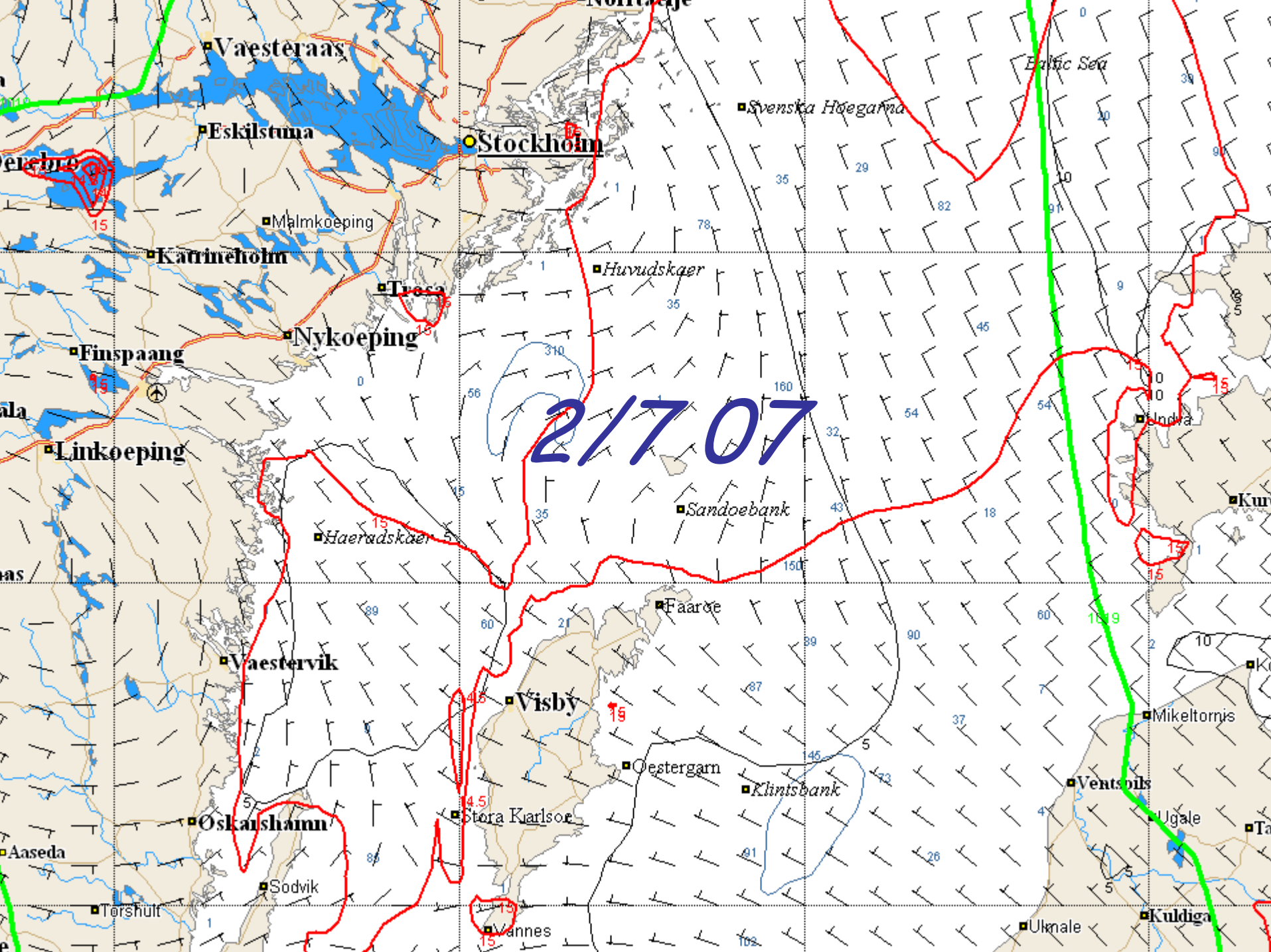
Aase la

Sodvik

Vannes

Umale

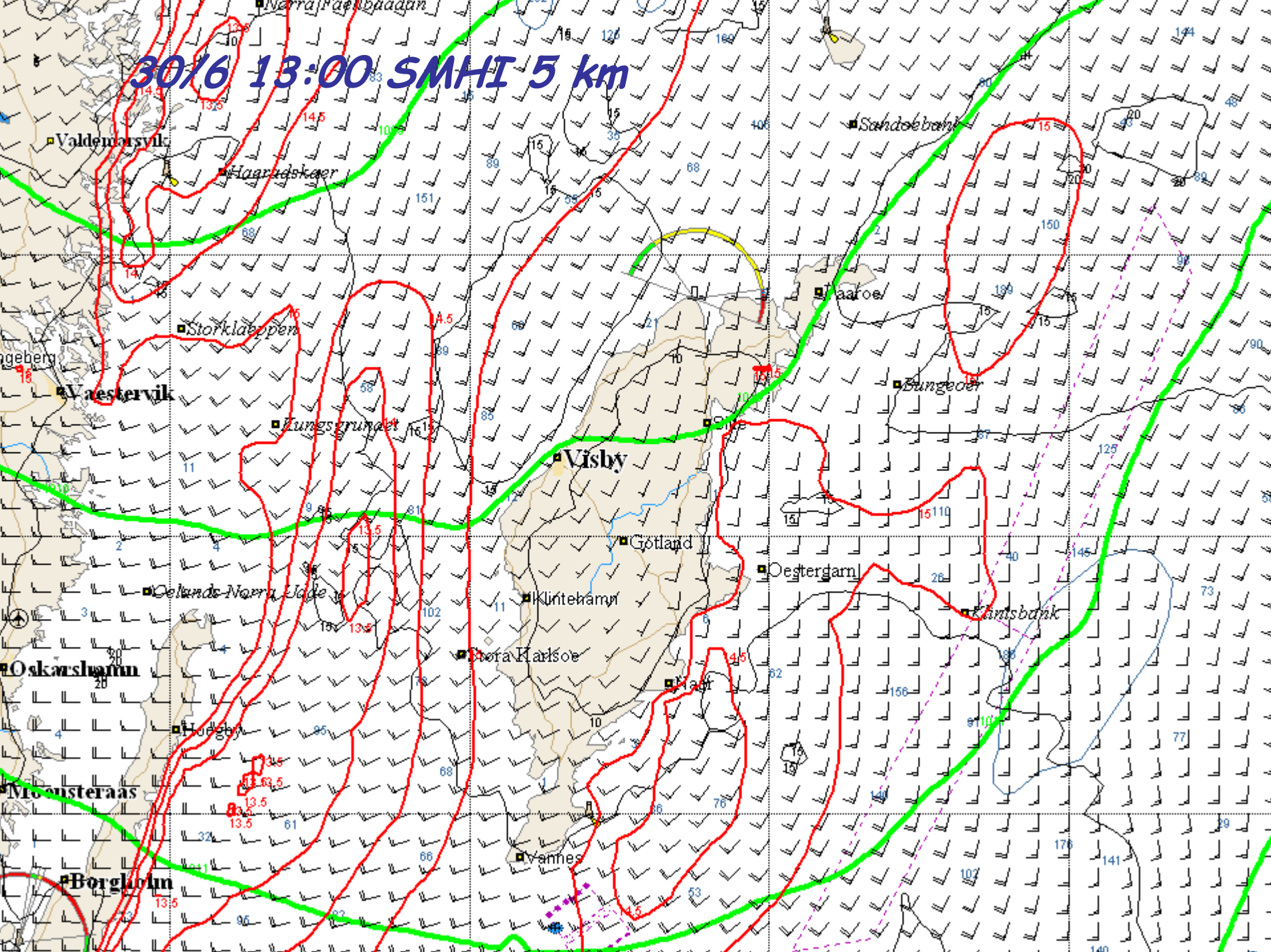
Kuldiga



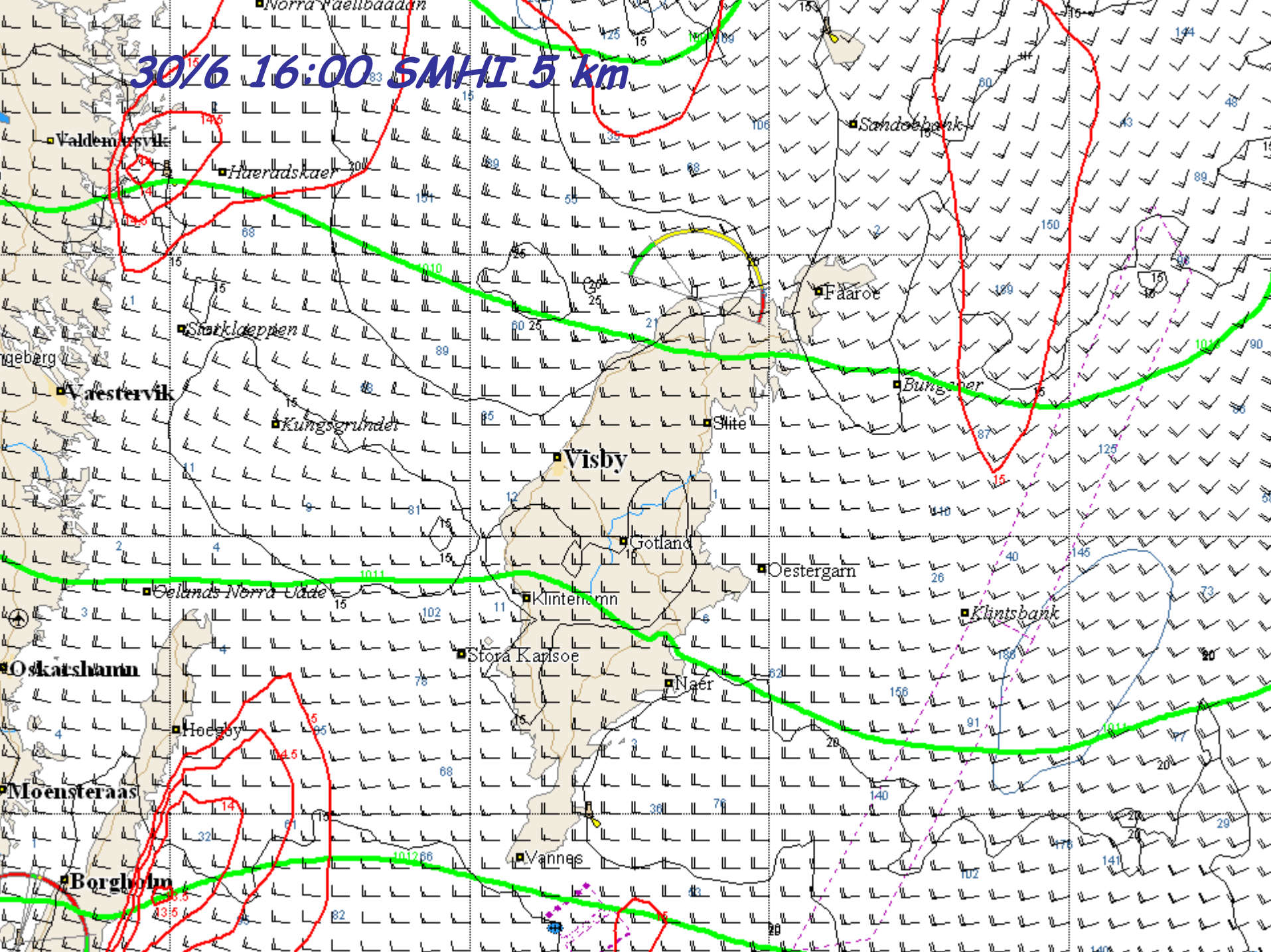
21707

Vrid på Gotlands ostsida...

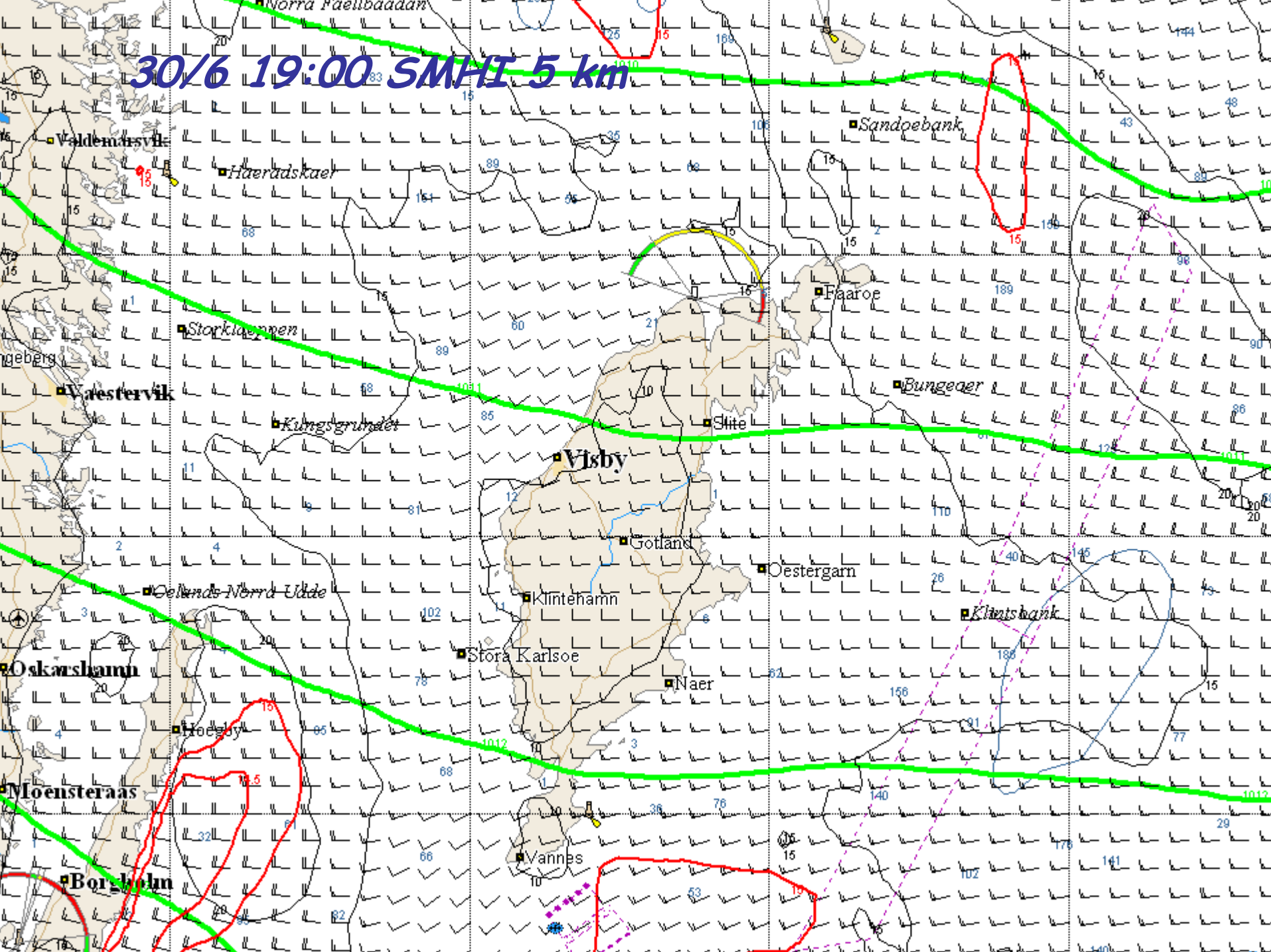
30/6 13:00 SMHI 5 km



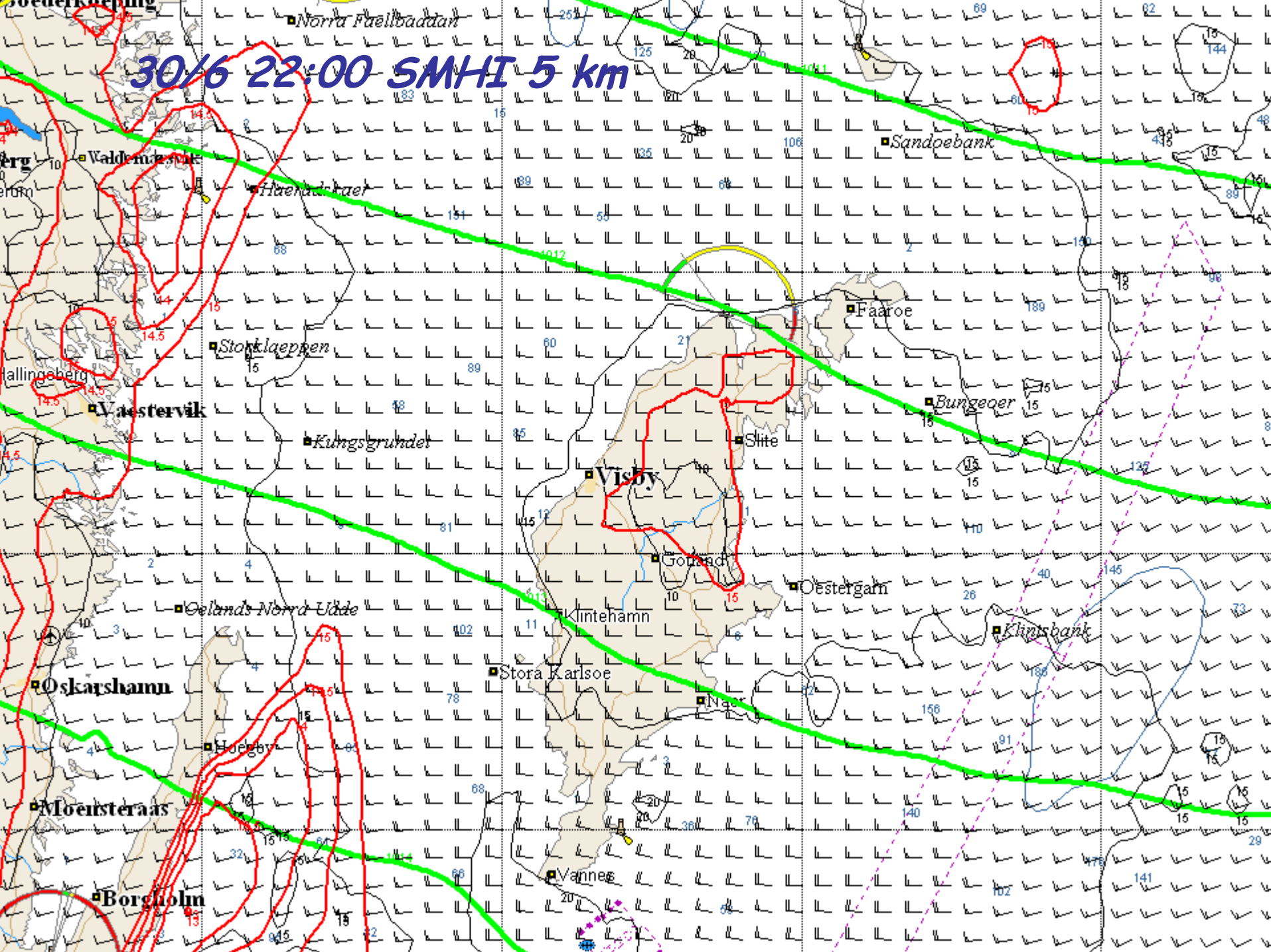
30/6 16:00 SMHI 5 km



30/6 19:00 SMPI 5 km

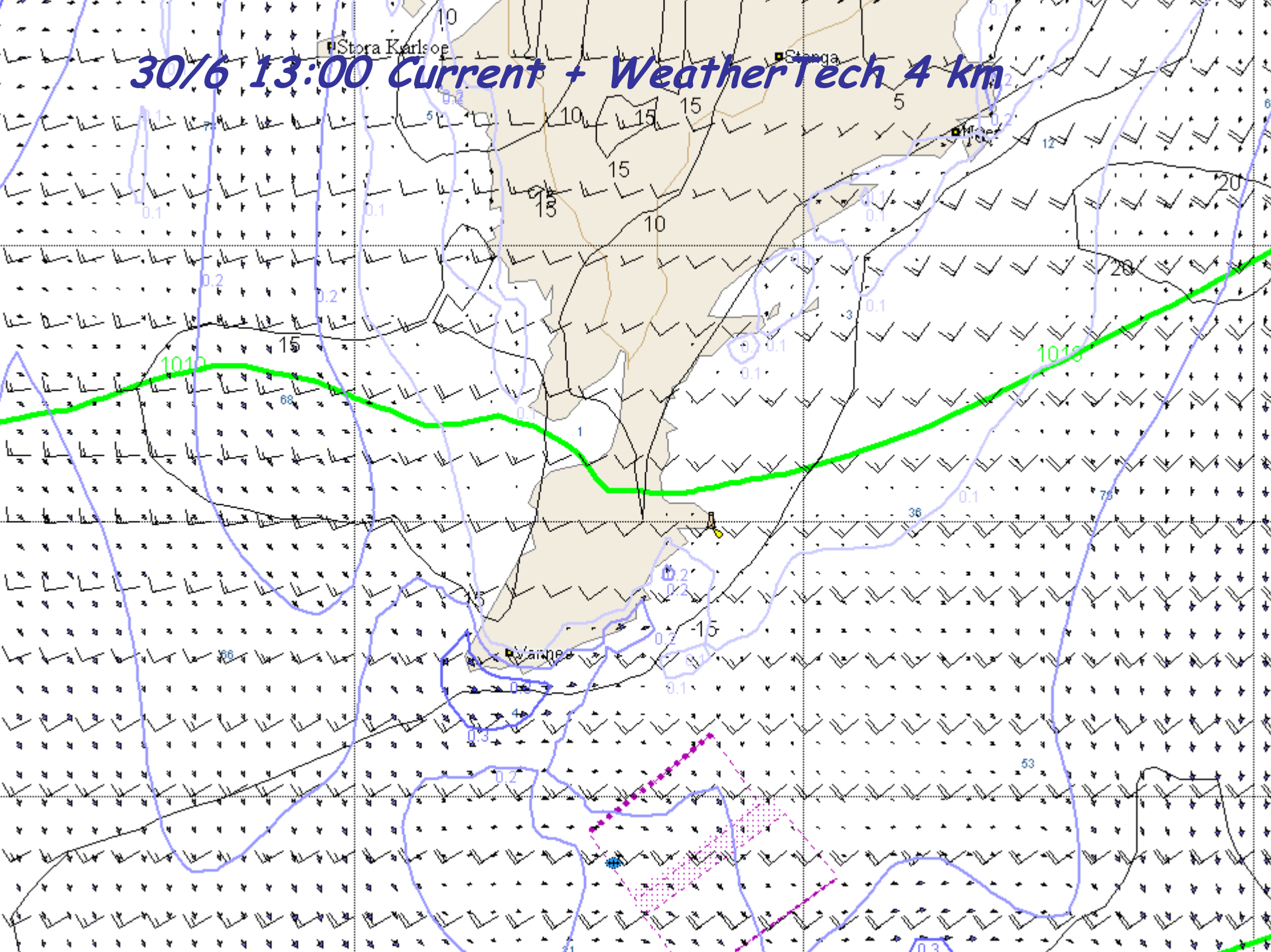


30/6 22:00 SMHI 5 km

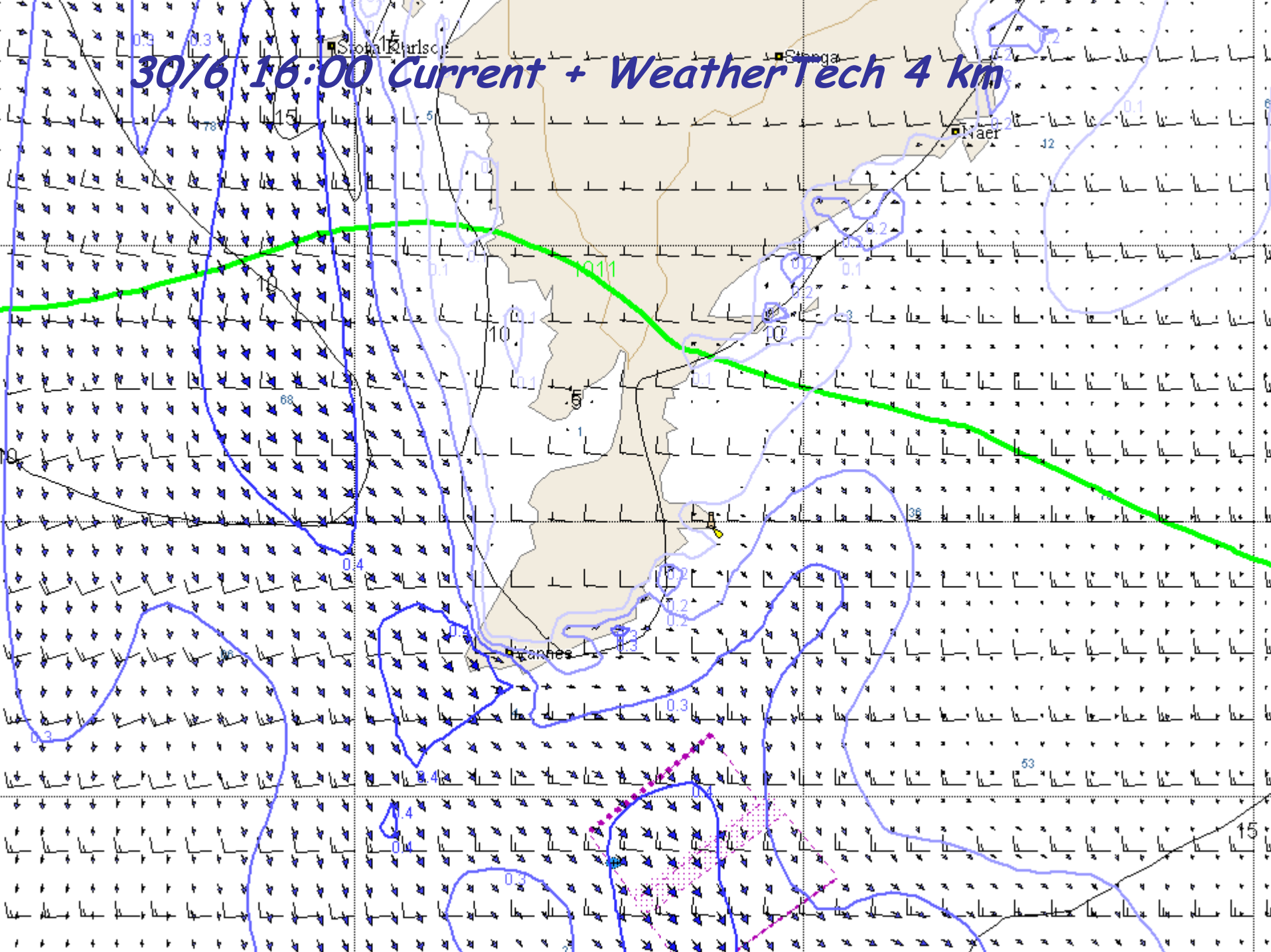


Strömmar vid Hoburgen...

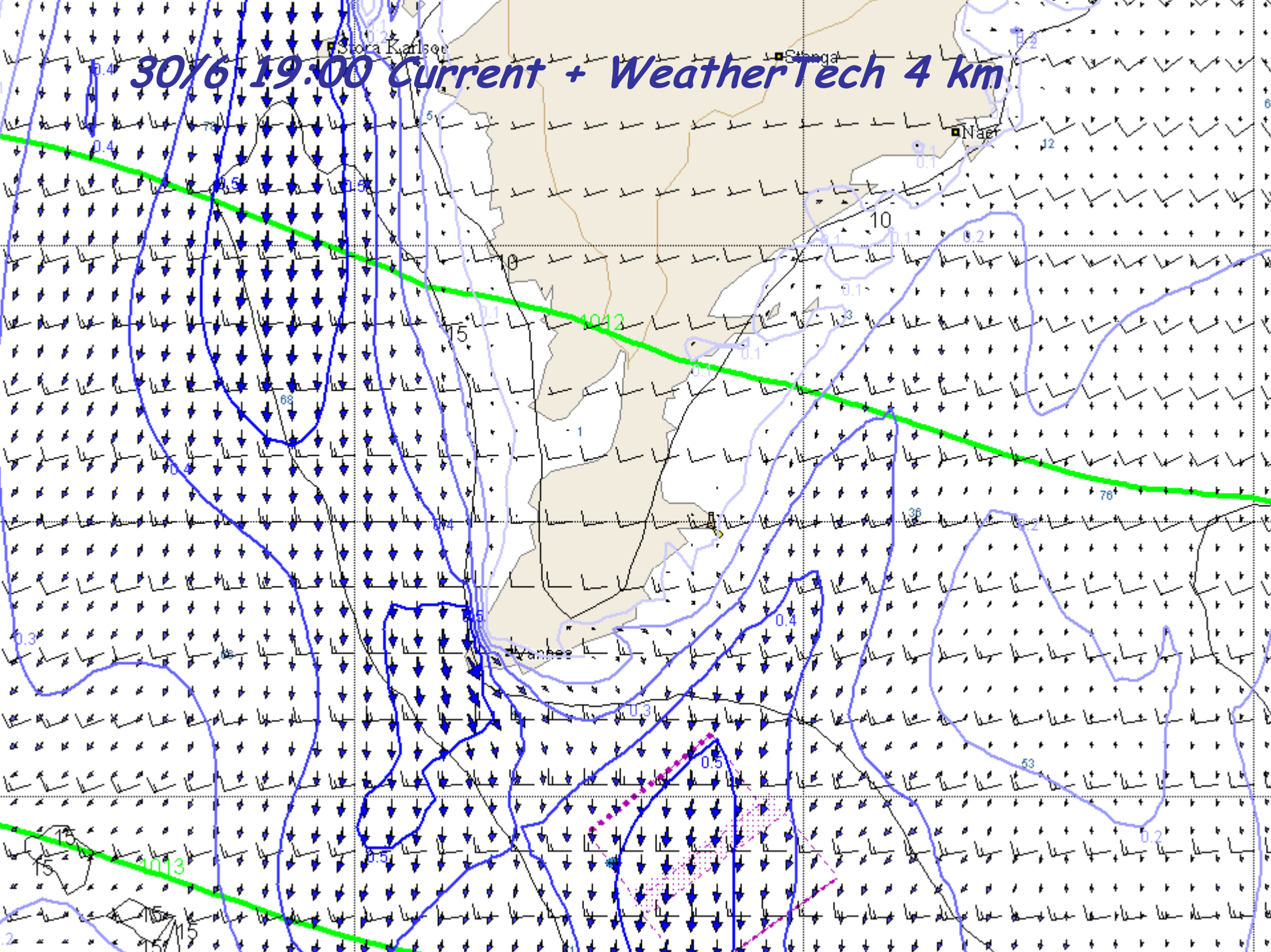
30/6 13:00 Current + WeatherTech 4 km



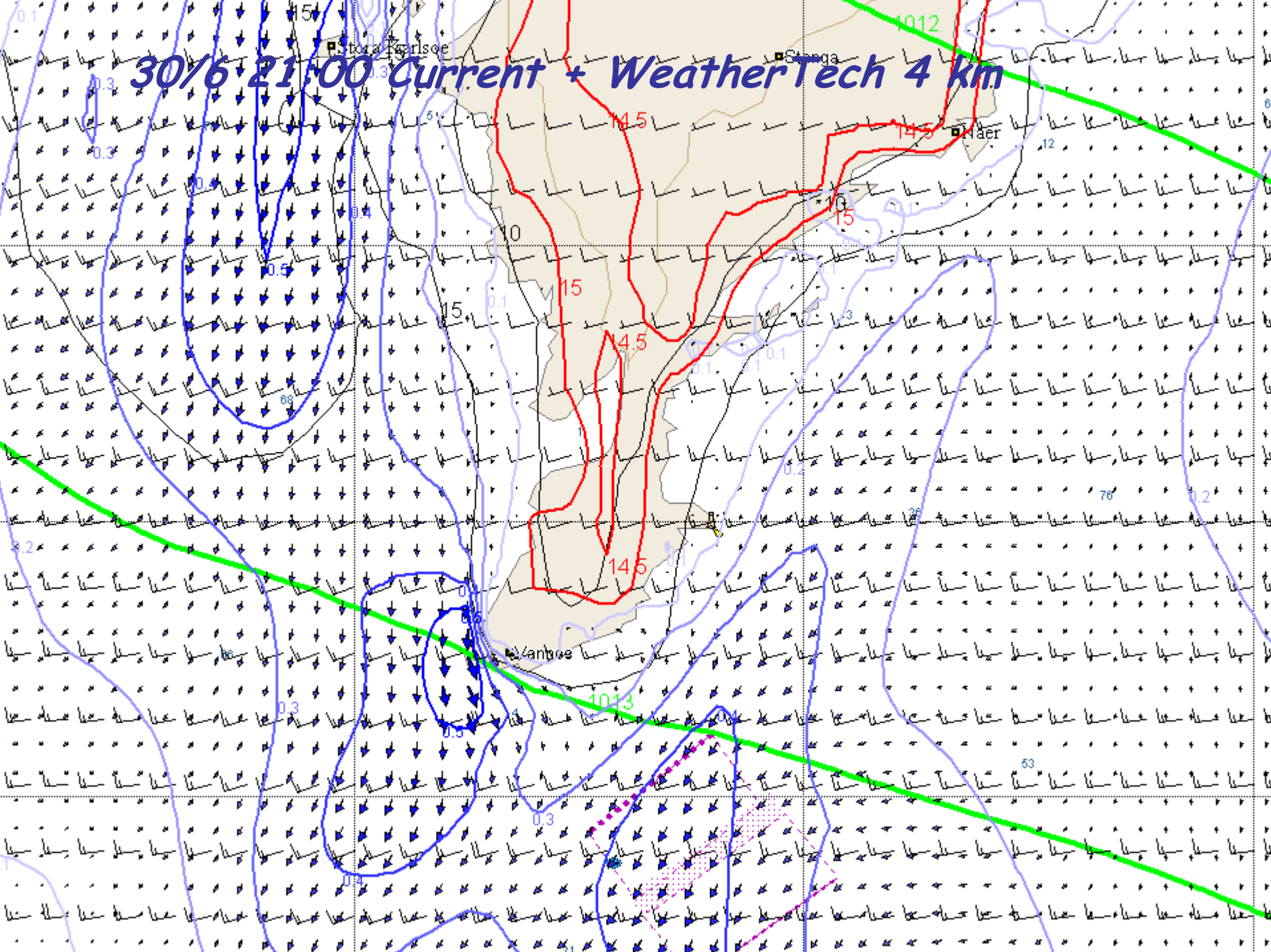
30/6 16:00 Current + WeatherTech 4 km



30/6 19:00 Current + WeatherTech 4 km

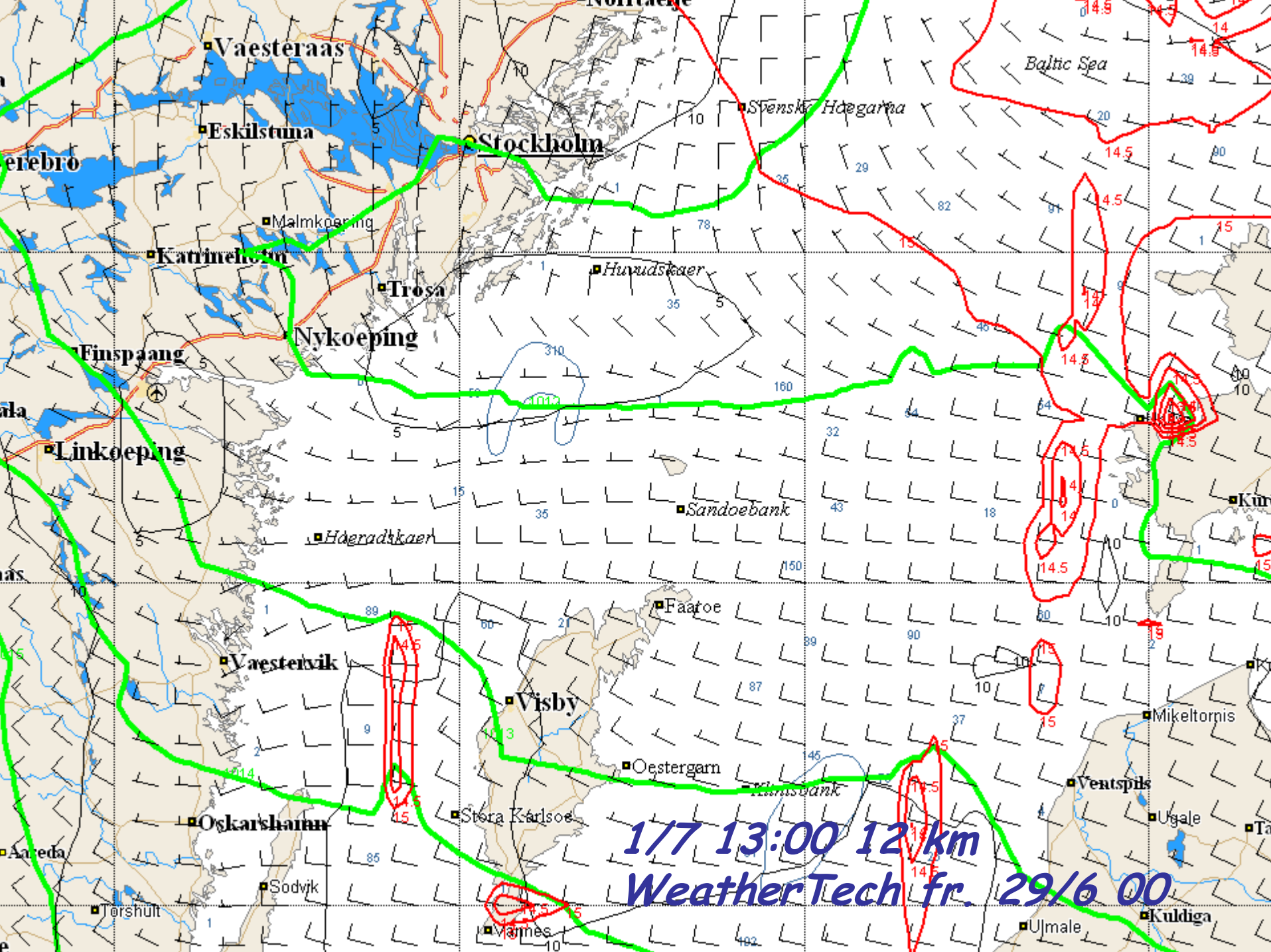


30/6 21:00 Current + WeatherTech 4 km

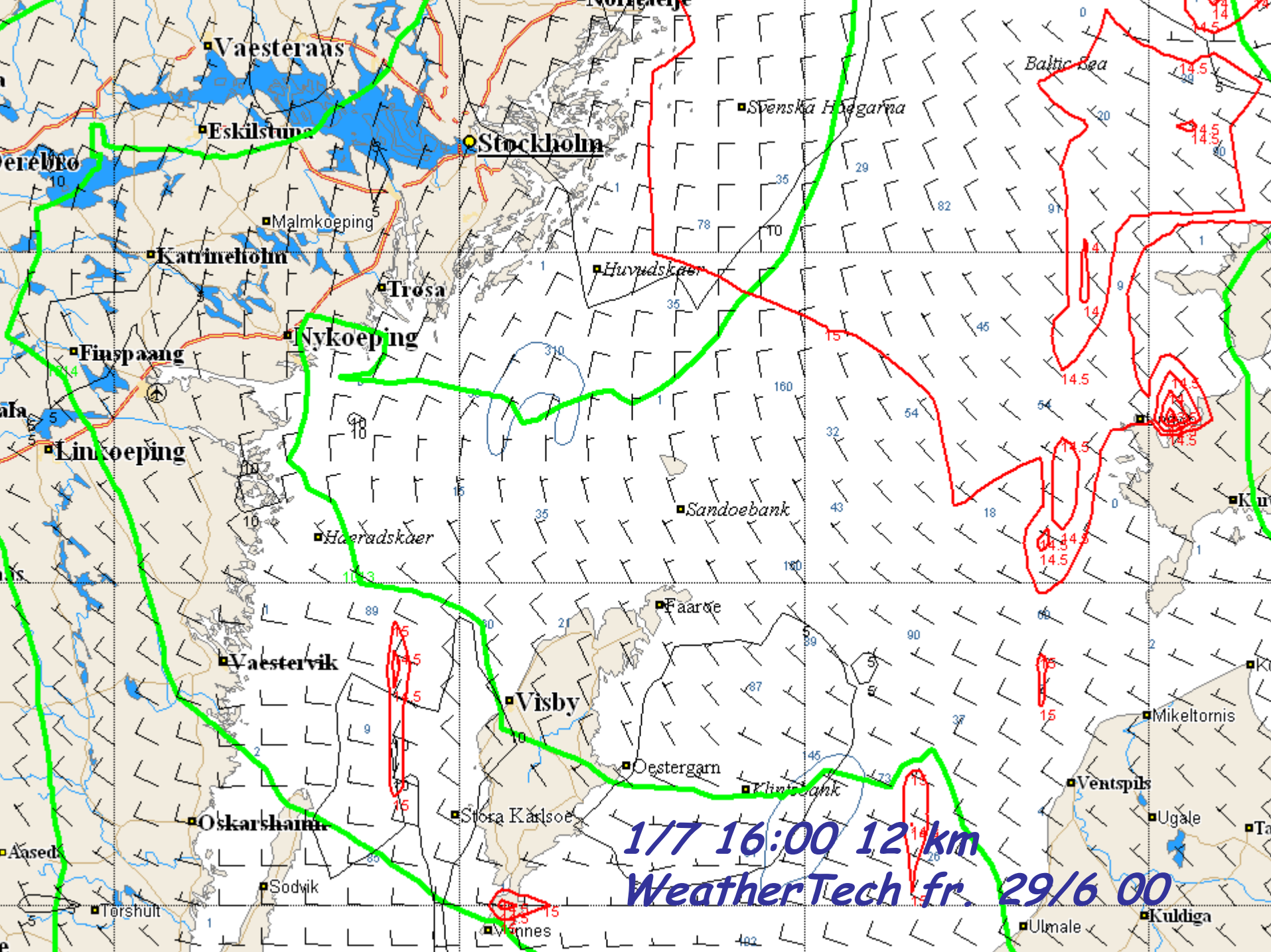


Nordostvridet på hemvägen...

WeatherTech 12 km fr. 29/6 00



1/7 13:00 12 km
WeatherTech fr. 29/6 00



Vaesteraas

Eskilstuna

Stockholm

Svenska Högarna

Baltic Sea

Malmköping

Katrineholm

Trosa

Huvudskär

Finspaang

Nyköping

Sandöebank

Linköping

Haeradskaer

Vaestervik

Faarøe

Visby

Oestergarn

Hintebank

Mikeltornis

Oskarshamn

Stora Karlsö

Ventspils

Ugale

Aased

Sodvik

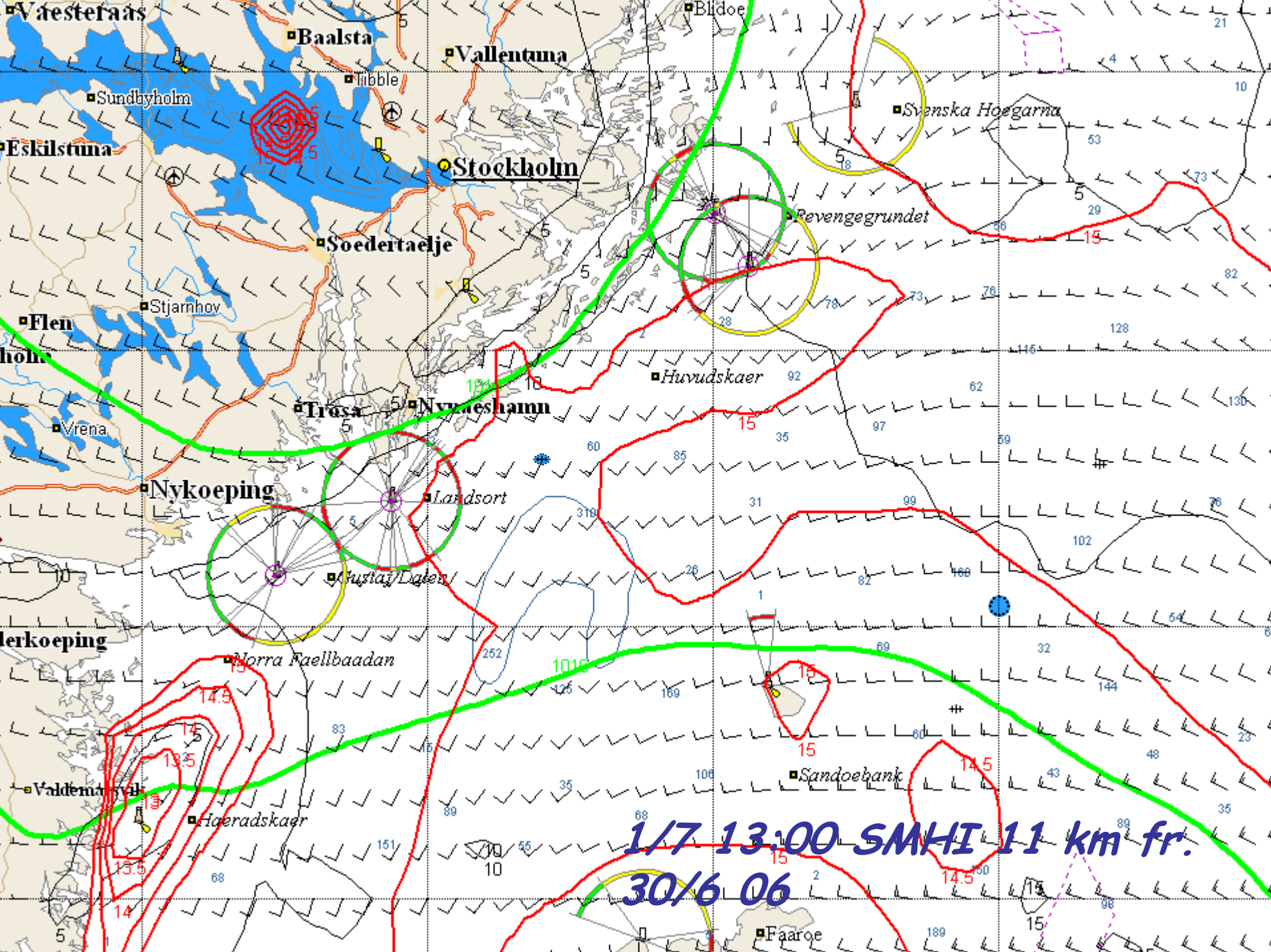
Vennes

Ulmale

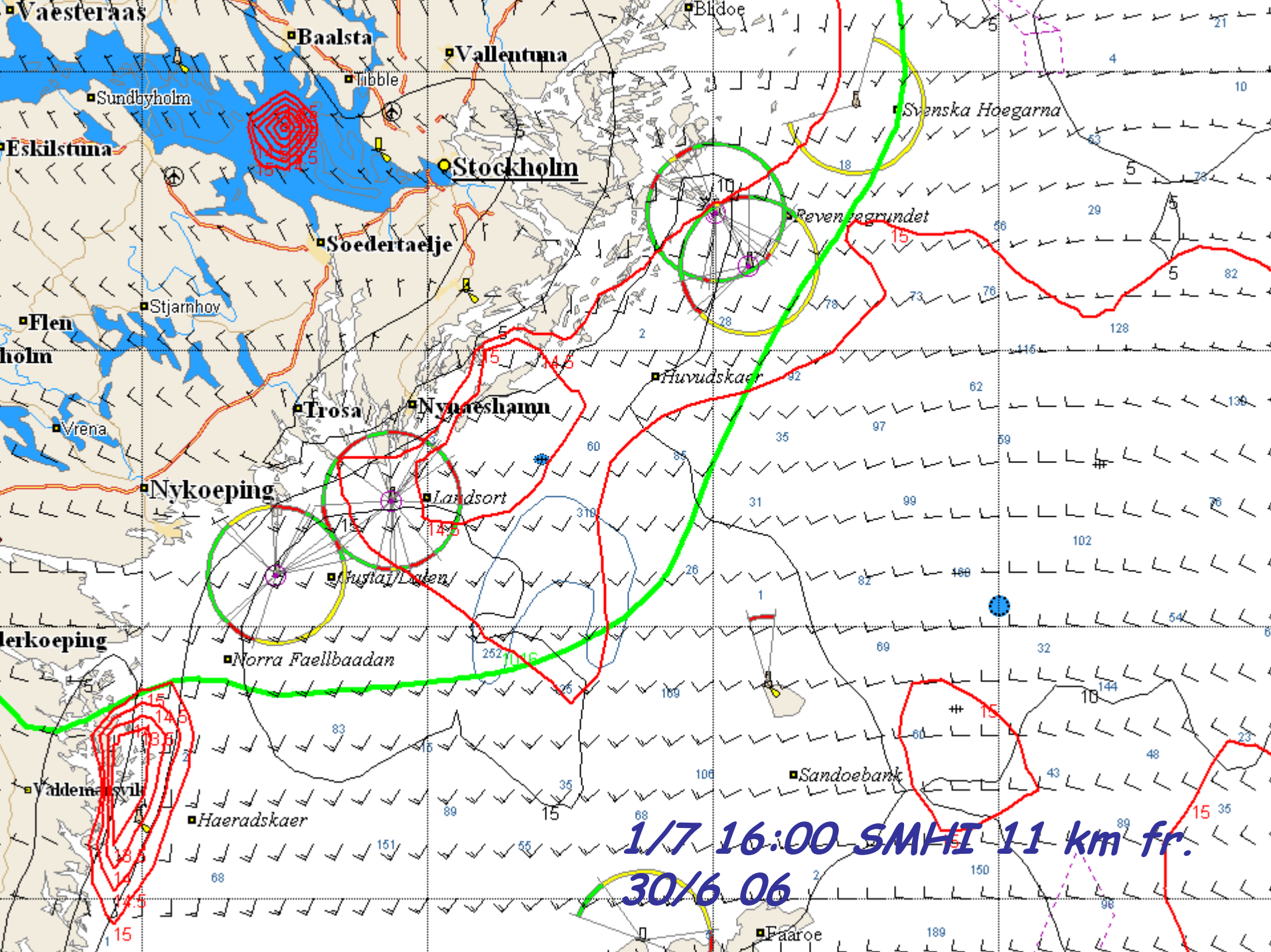
Kuldiga

1/7 16:00 12 km
WeatherTech fr. 29/6 00

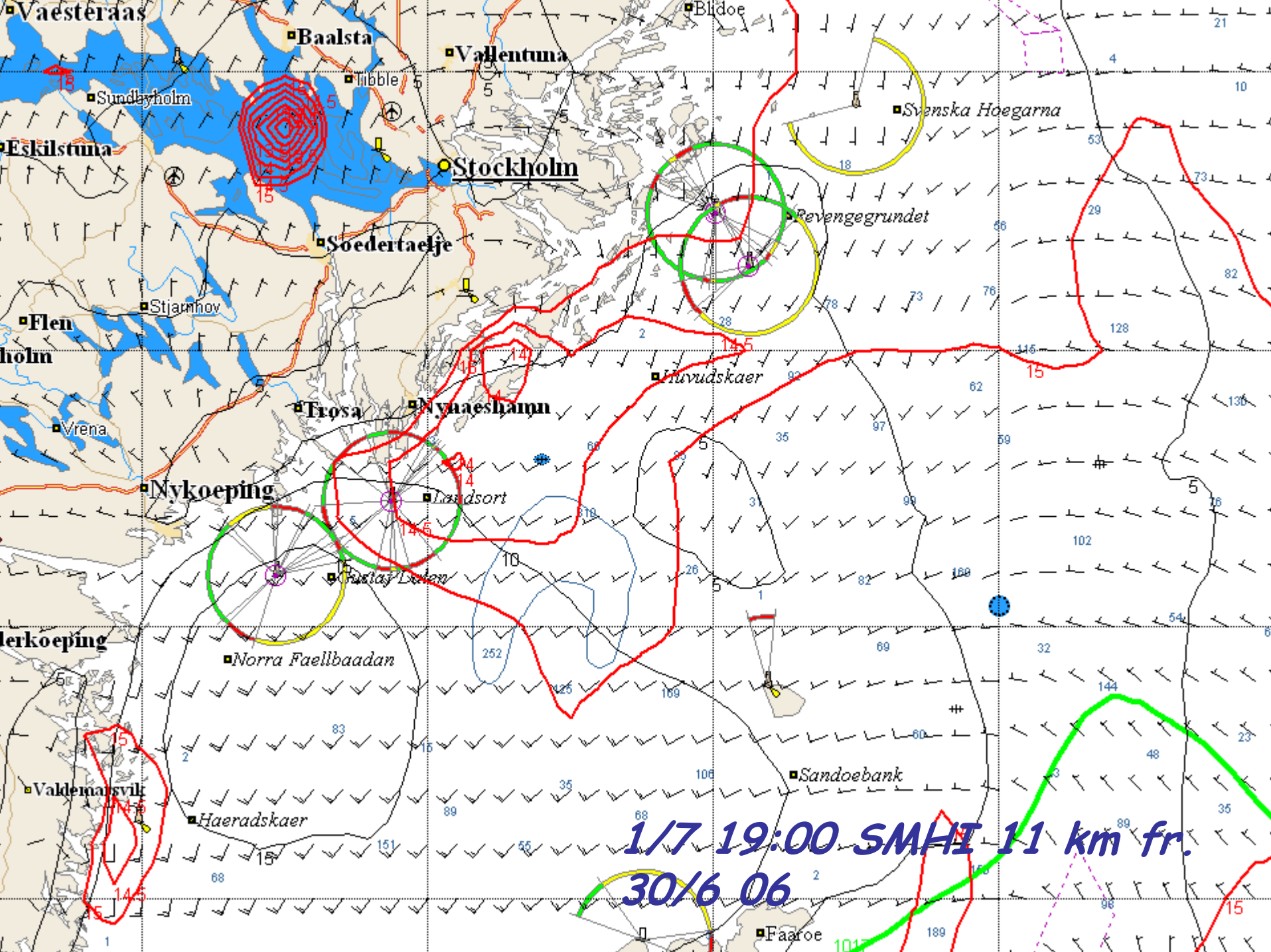
SMHI 11 km fr. 30/6 06



1/7 13:00 SMHI 11 km fr.
30/6 06

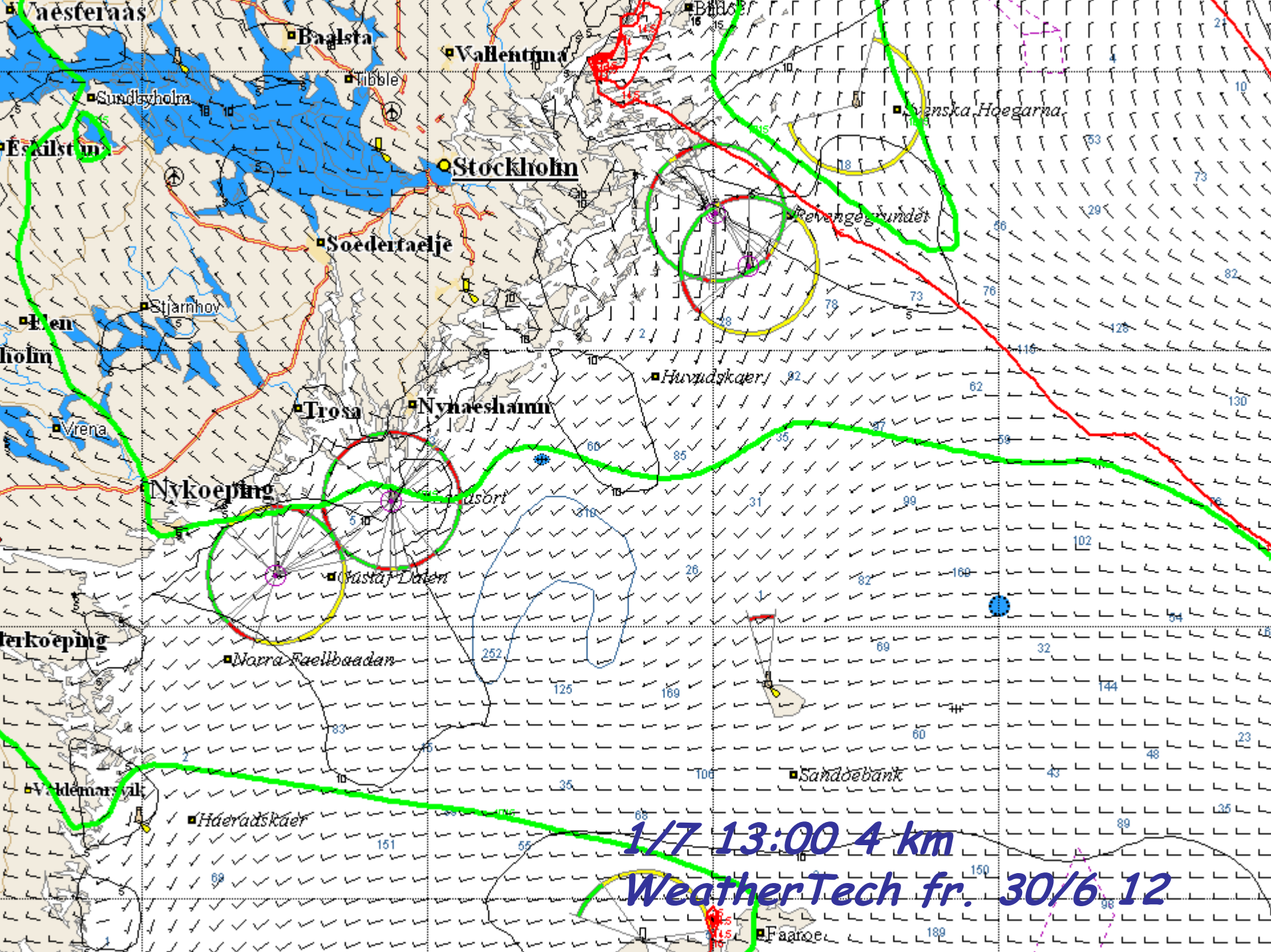


*1/7 16:00 SMHI 11 km fr.
30/6 06*



*1/7 19:00 SMHI 11 km fr.
30/6 06*

WeatherTech 4 km fr. 30/6 12



Åresterås

Baalsta

Vallentuna

Bålsta

Sundbyholm

Libble

Stenska Högdarna

Eskilstorp

Stockholm

Revningsundet

Soedertälje

Flen

Stjärnhov

holm

Vrena

Trosa

Nynäshamn

Huvudskaer

Nyköping

Lasört

Pastaf-Liden

terköping

Norra Fällibödan

Valkemarsvik

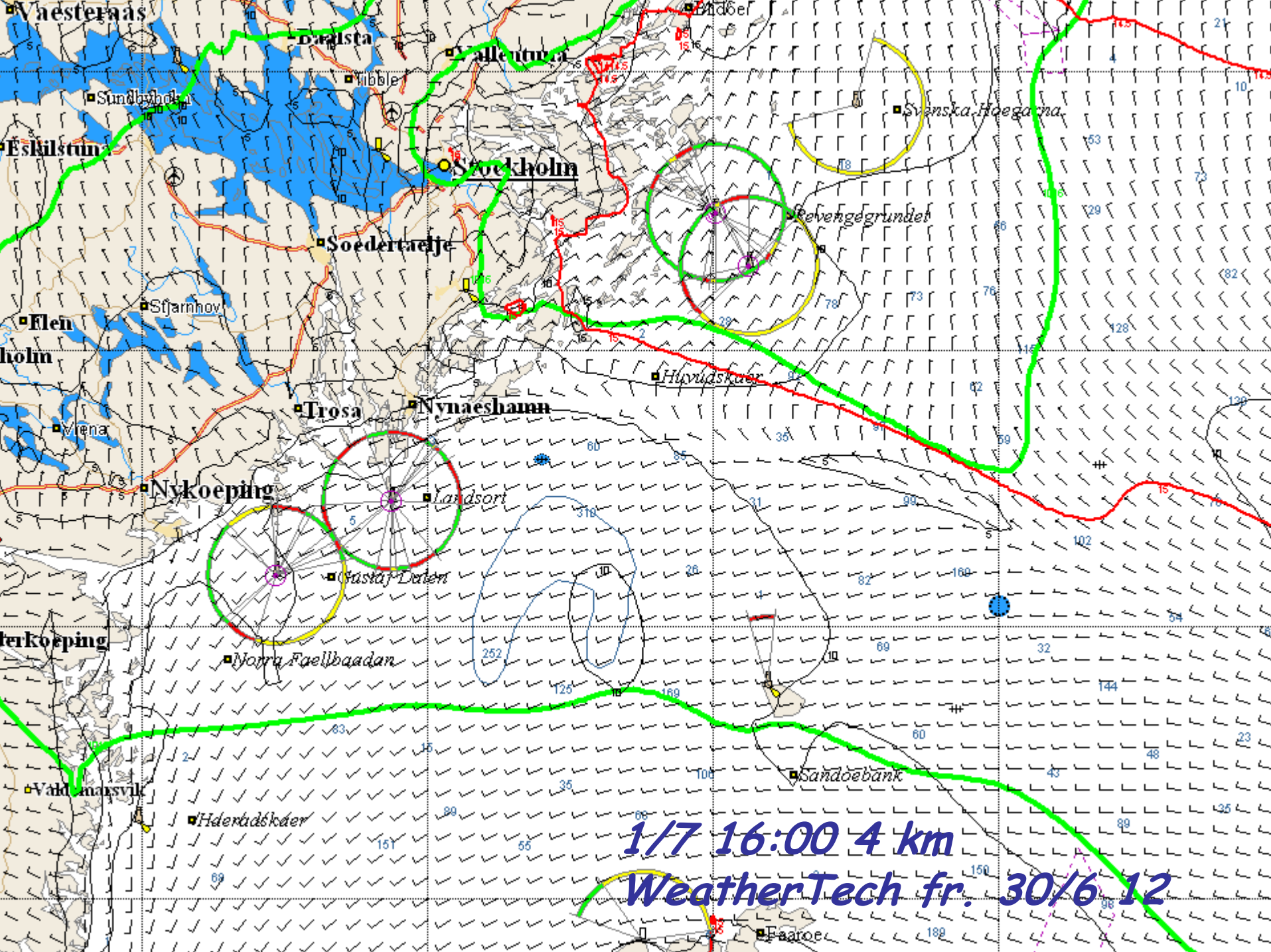
Häradskaer

Sandöebank

1/7 13:00 4 km

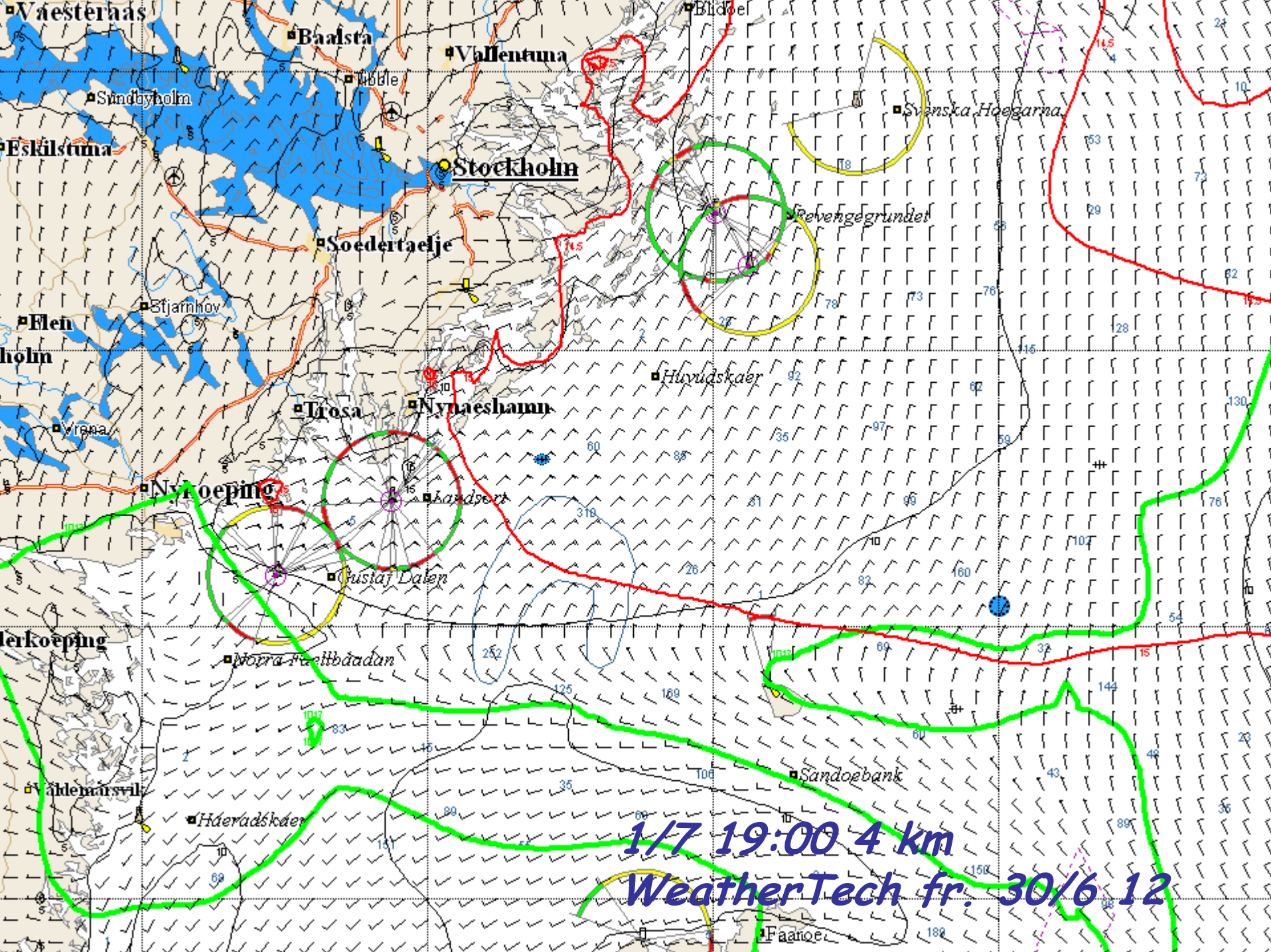
WeatherTech fr. 30/6 12

Faarooe



1/7 16:00 4 km

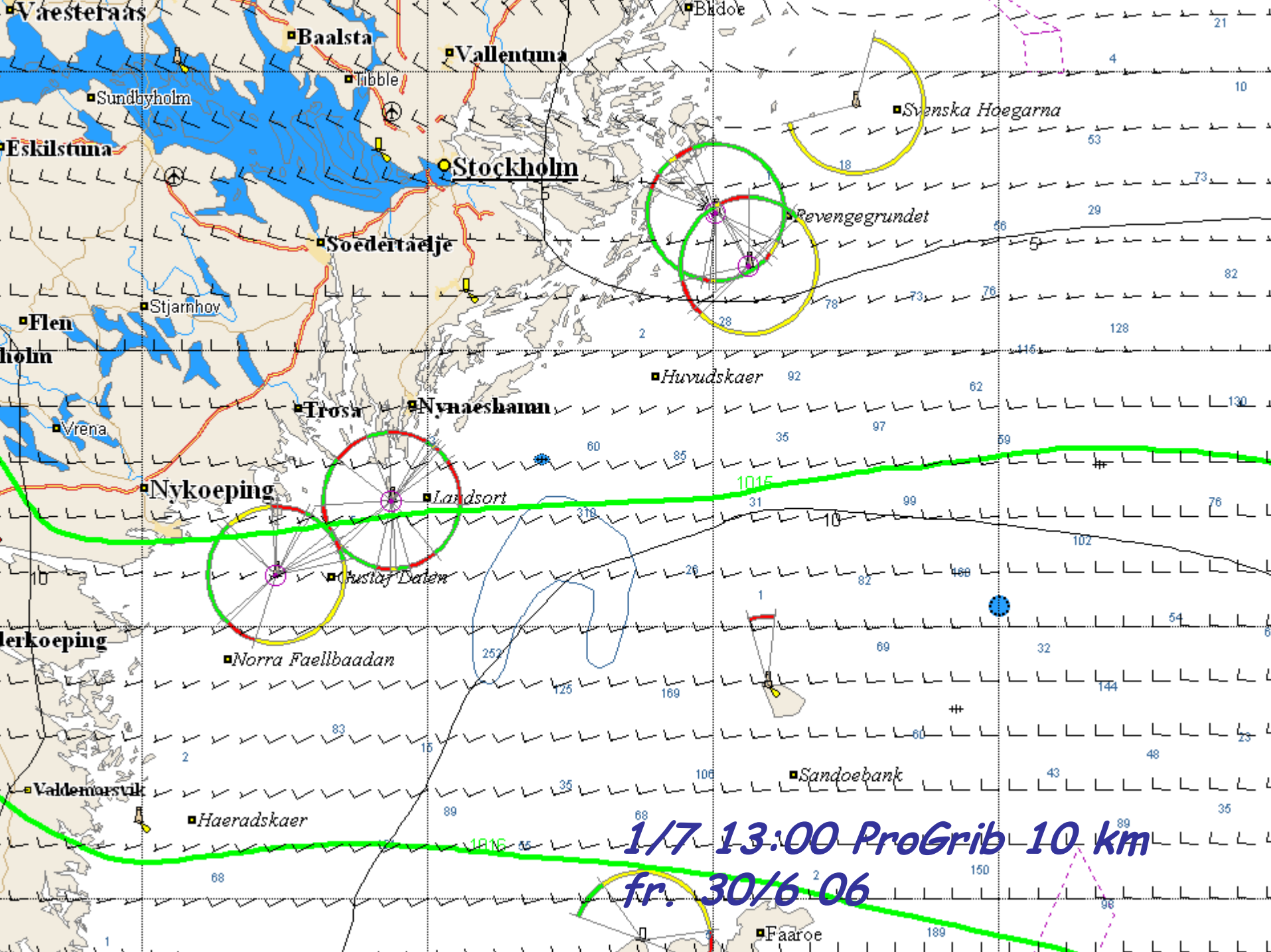
WeatherTech fr. 30/6 12



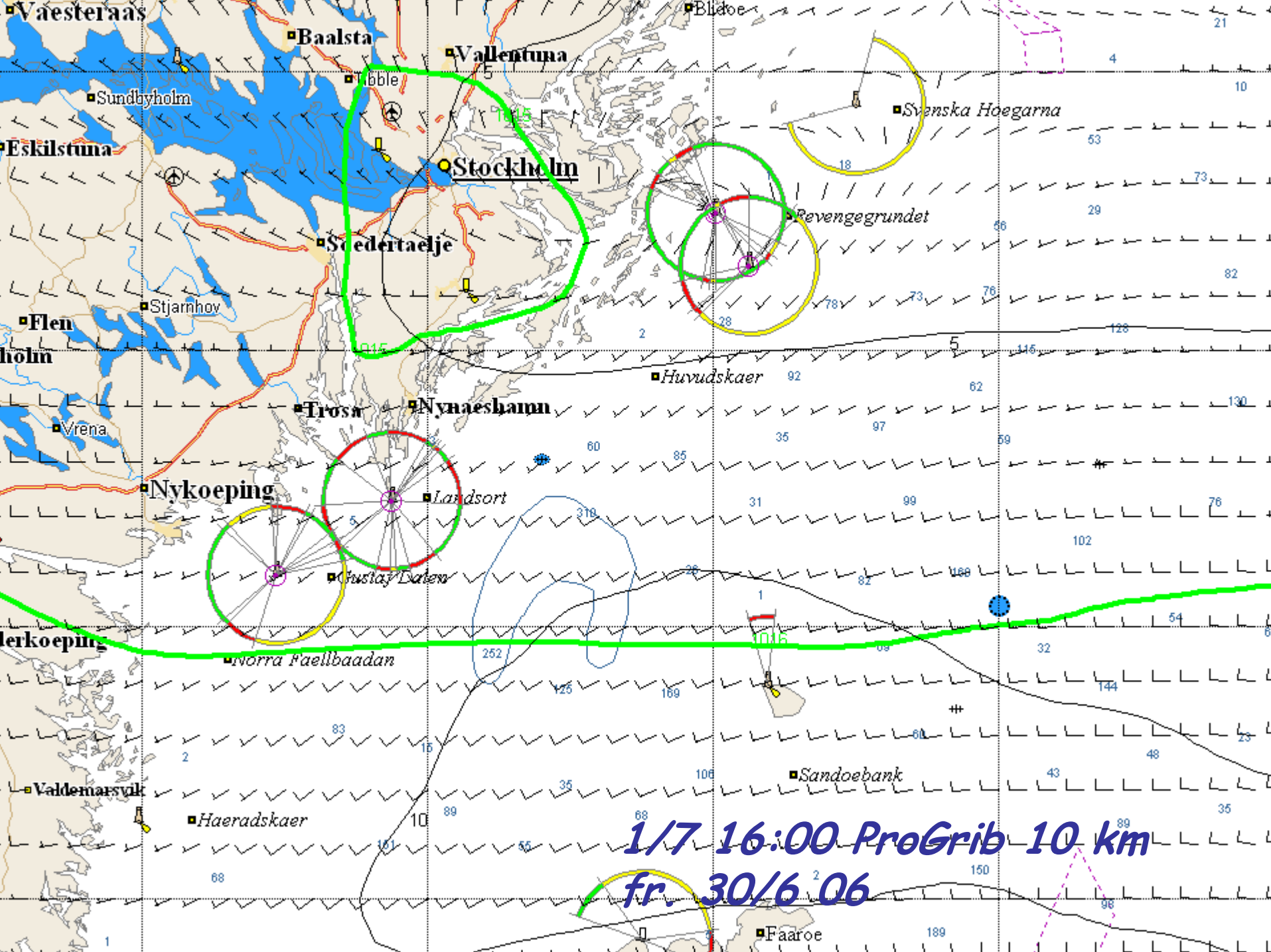
1/7 19:00 4 km

WeatherTech fr. 30/6 12

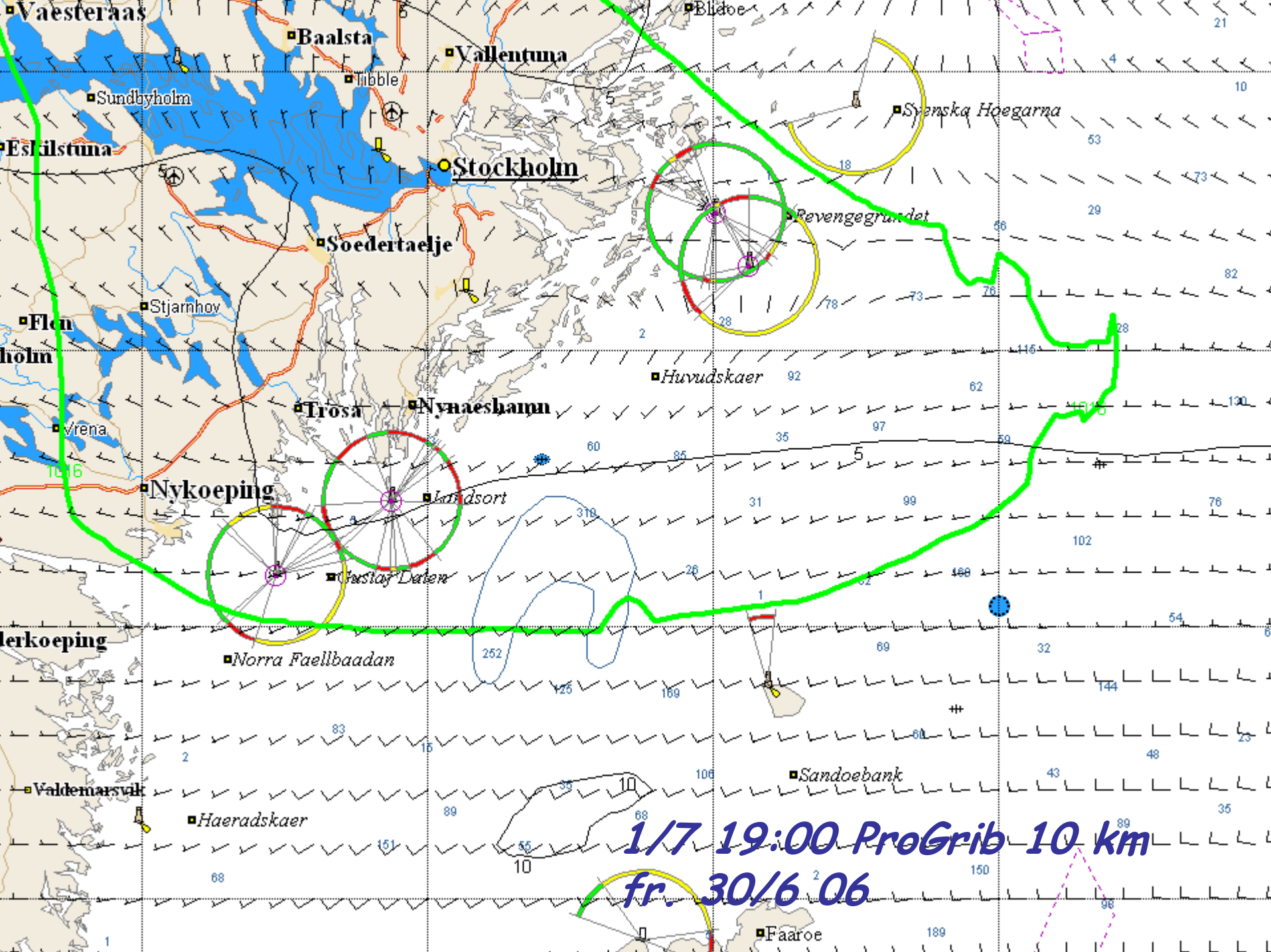
Progrib 10 km fr. 30/6 06



1/7 13:00 ProGrib 10 km
fr. 30/6 06

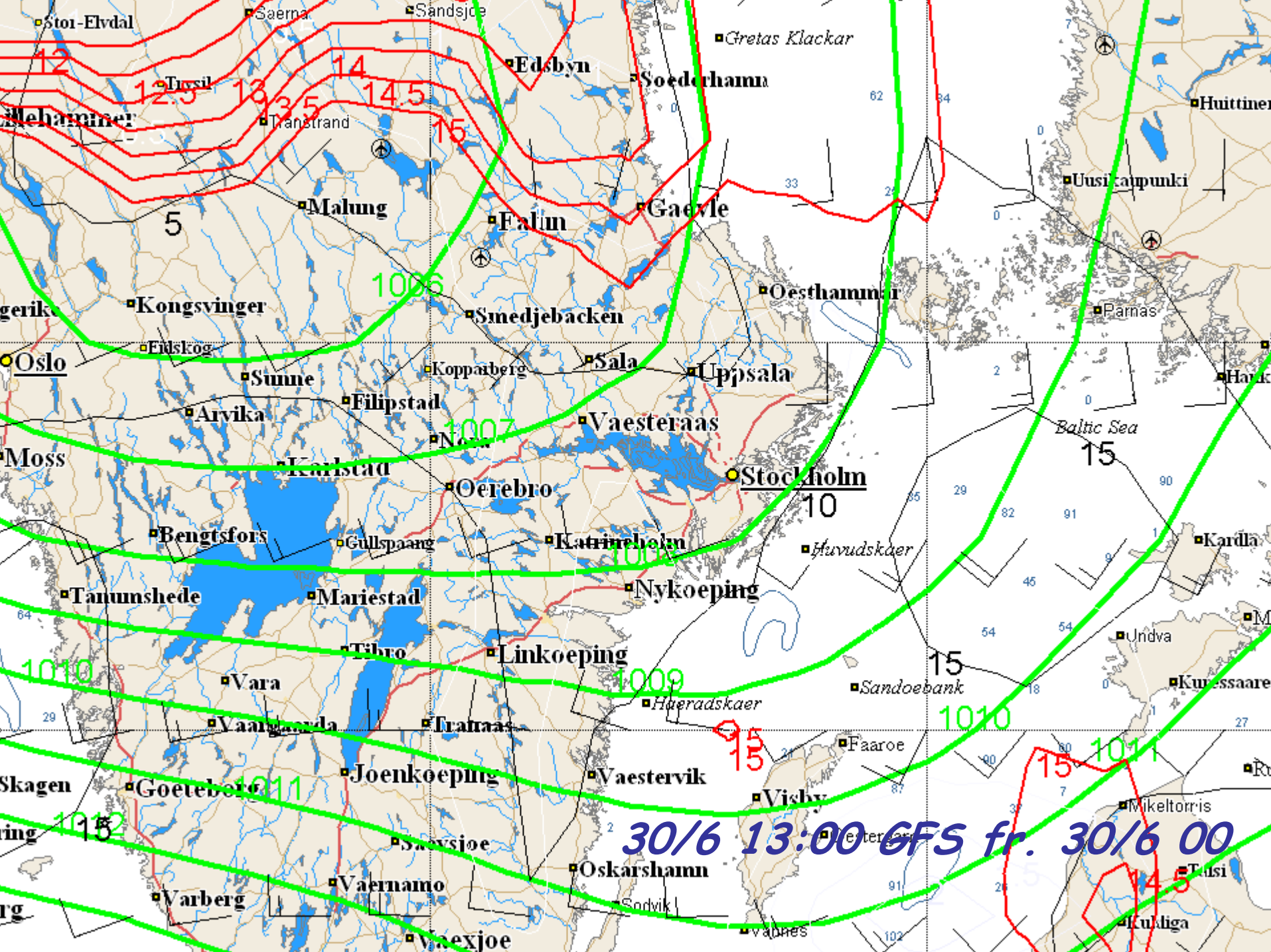


1/7 16:00 ProGrib 10 km
fr. 30/6 06

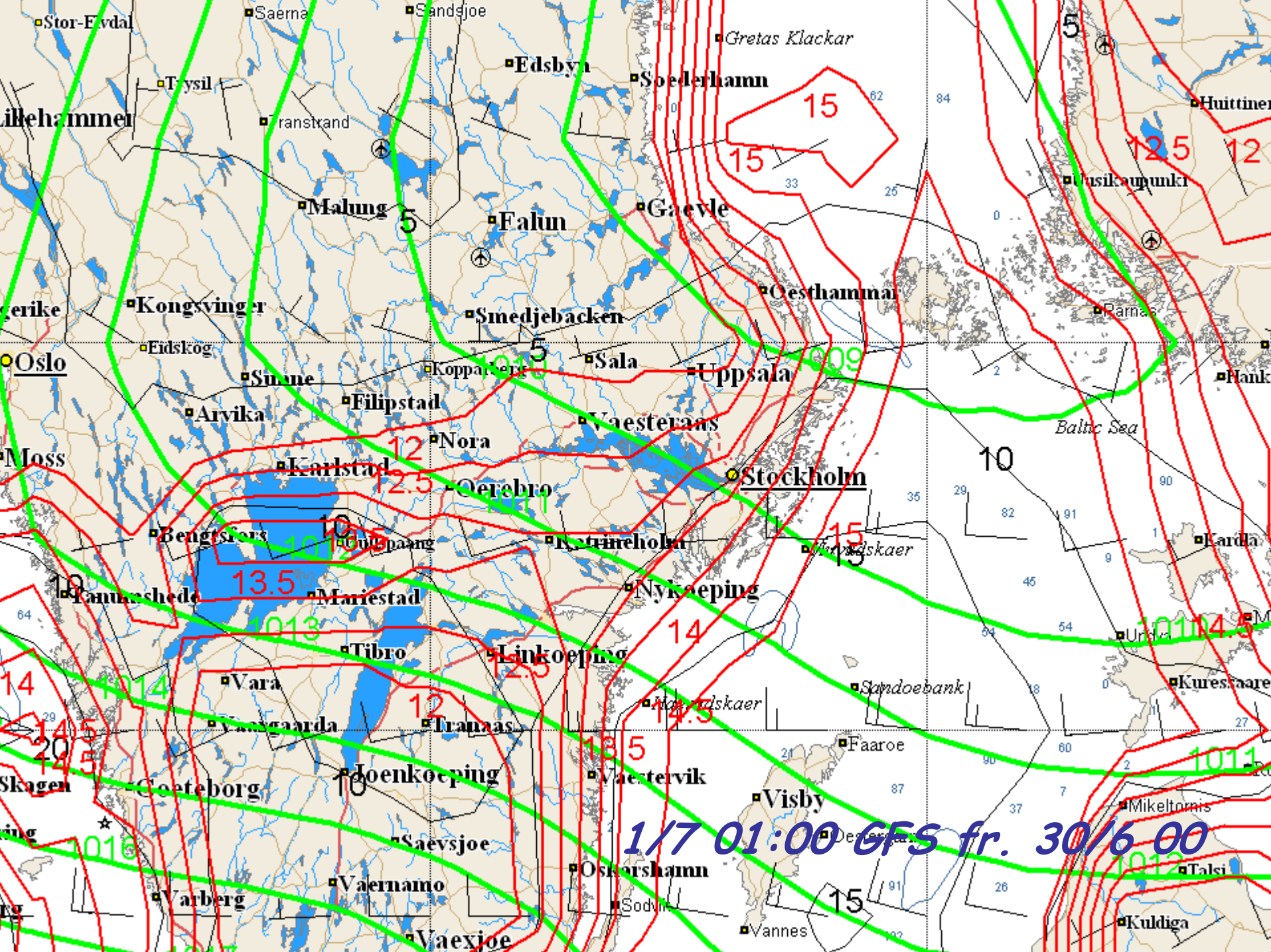


1/7 19:00 ProGrib 10 km
fr. 30/6 06

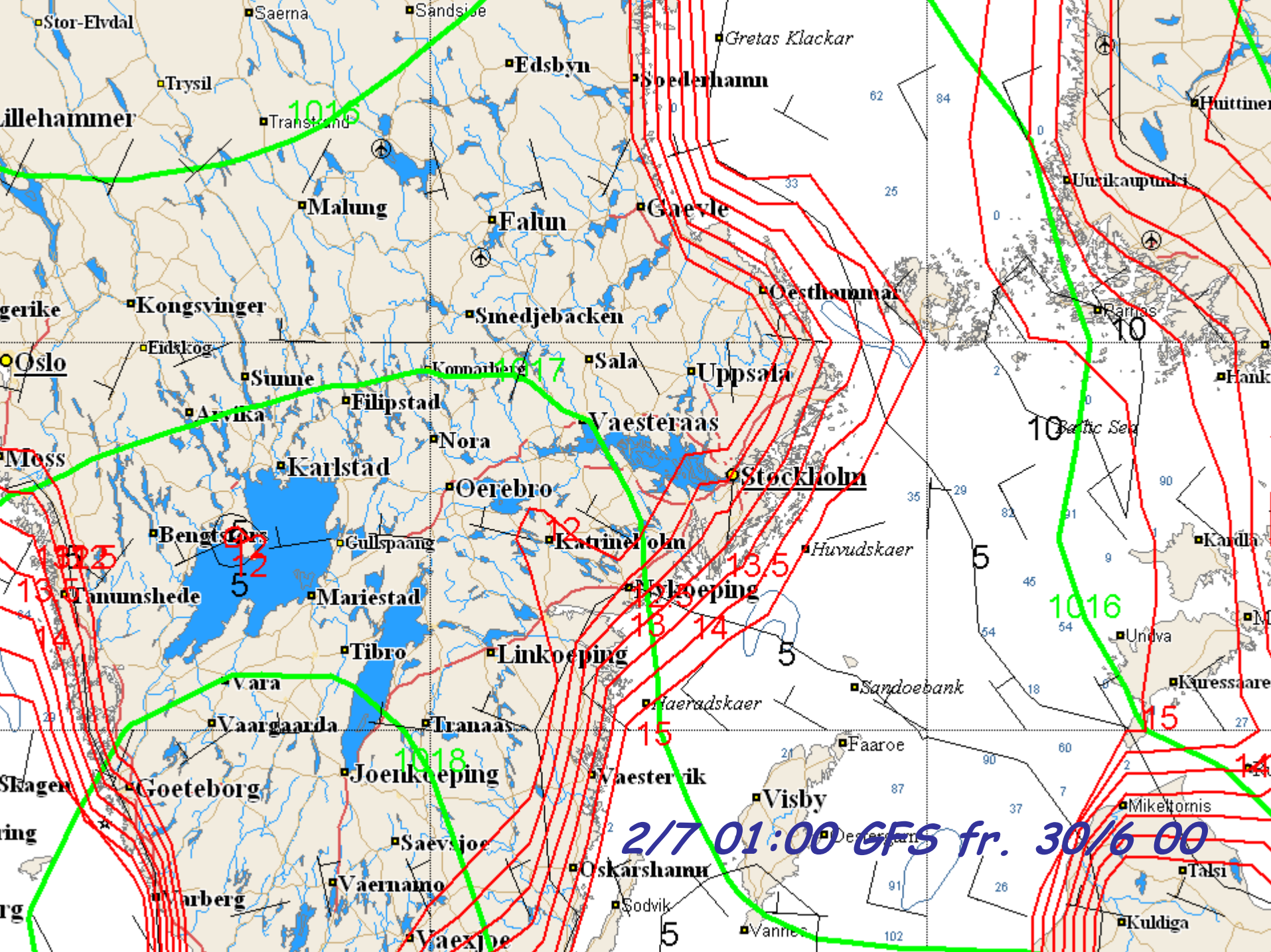
GFS fr. 30/6 00



30/6 13:00 GFS fr. 30/6 00



1/7 01:00 GFS fr. 30/6 00



1016

1016

1018

2/7 01:00 GFS fr. 30/6 00

Stor-Elvdal

Saerna

Sandsjö

Gretas Klackar

Trysil

Edsbyn

Soederhamn

illehammer

Transtrand

Malung

Falun

Gävle

gerike

Kongsvinger

Smedjebacken

Oesthammar

Oslo

Eidskog

Sunne

Kommahele

Sala

Uppsala

Arvika

Filipstad

Nora

Vaesteraas

Moss

Karlstad

Oerebro

Stockholm

Bengtfors

Gullspang

Katrineholm

Huvudskaer

Tammshede

Mariestad

Fykoeping

Linkoeping

Vara

Vaargaarda

Tranaas

Vaesterik

Skagen

Goeteborg

Joenkoeping

Visby

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Saevsjoe

Vaesterik

Visby

rg

Arberg

Vaernamo

Oskarshamn

Dejerskans

Miketornis

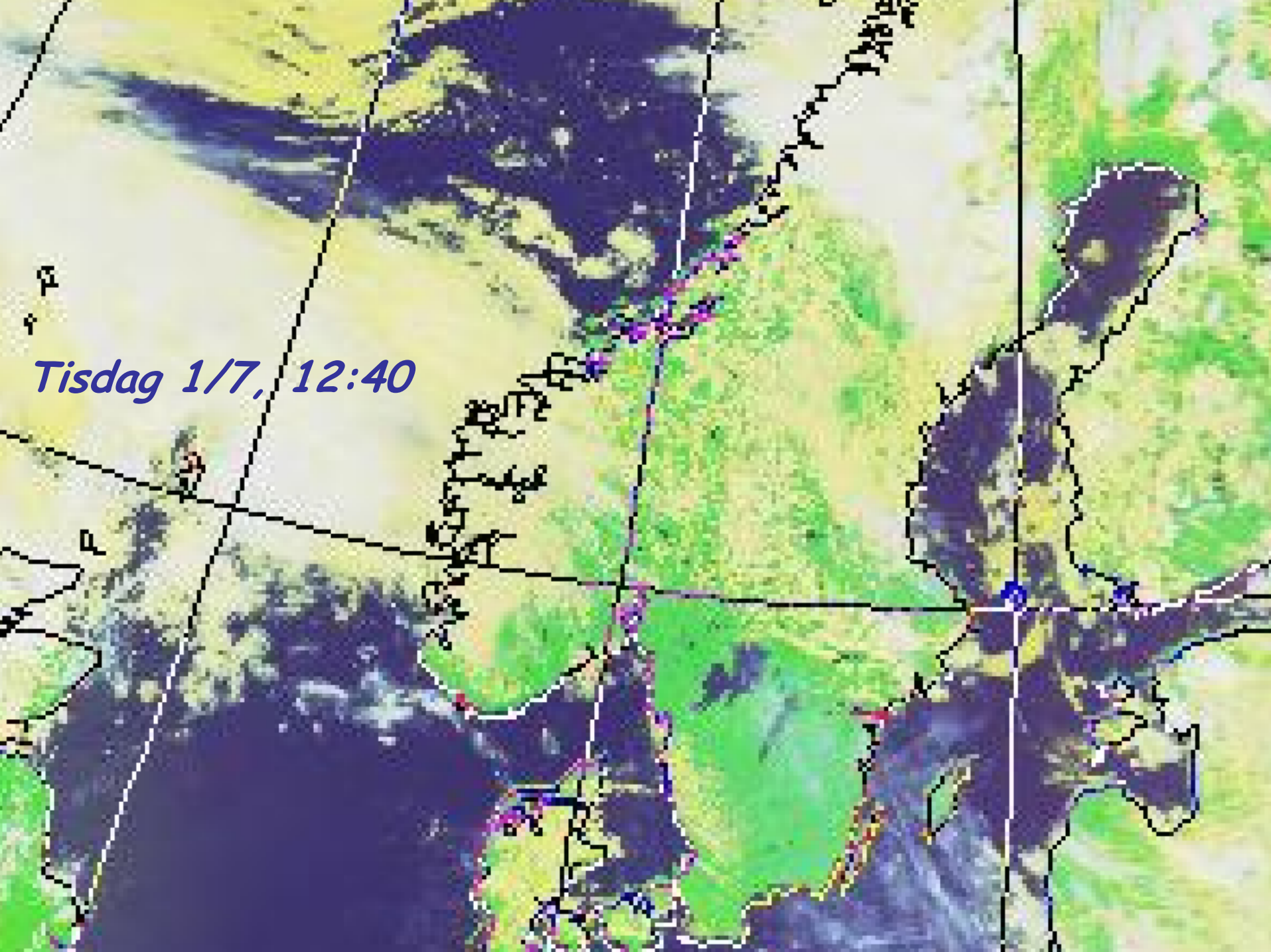
Talsi

Kuldiga

Sodvik

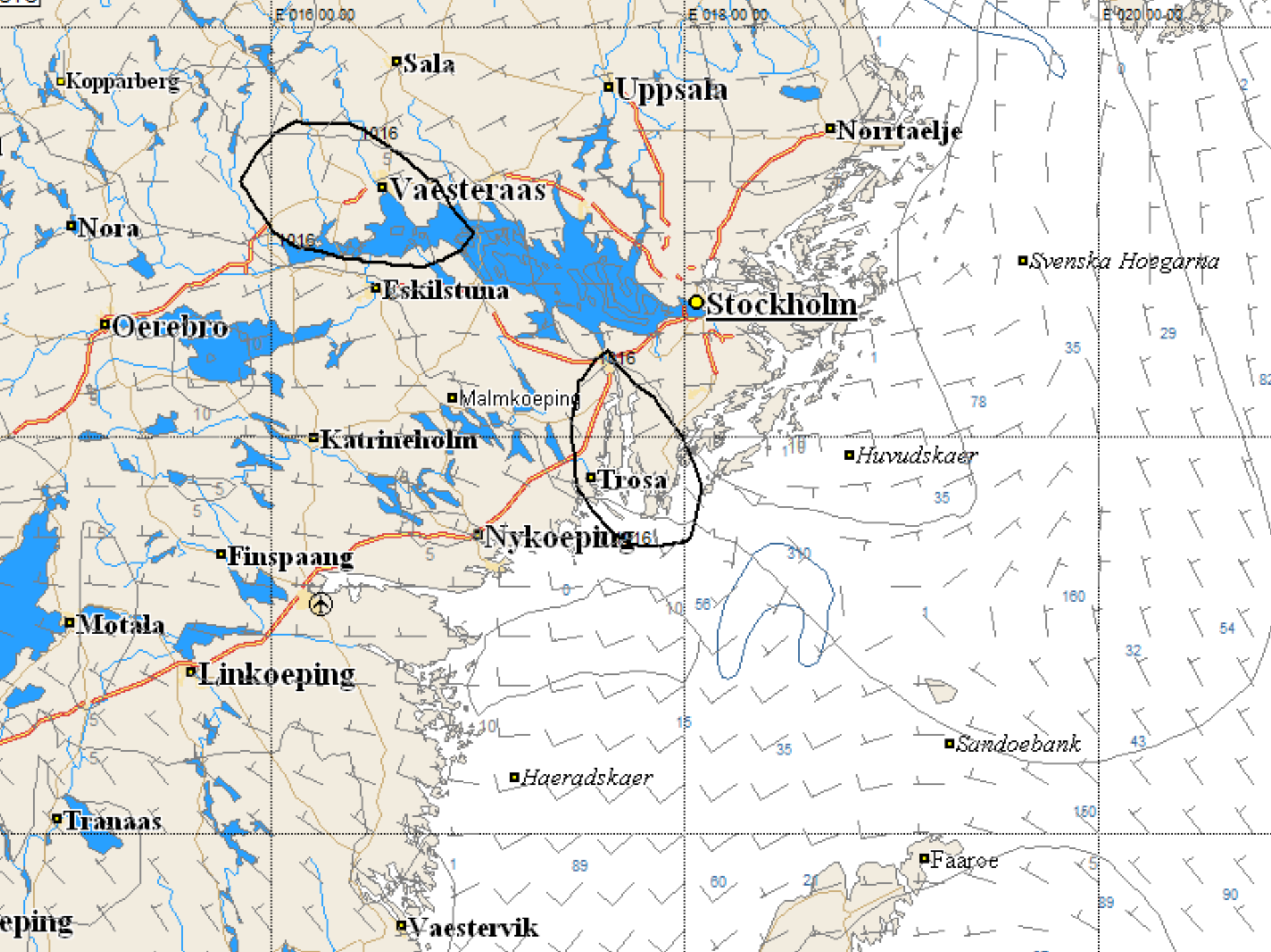
Vanne

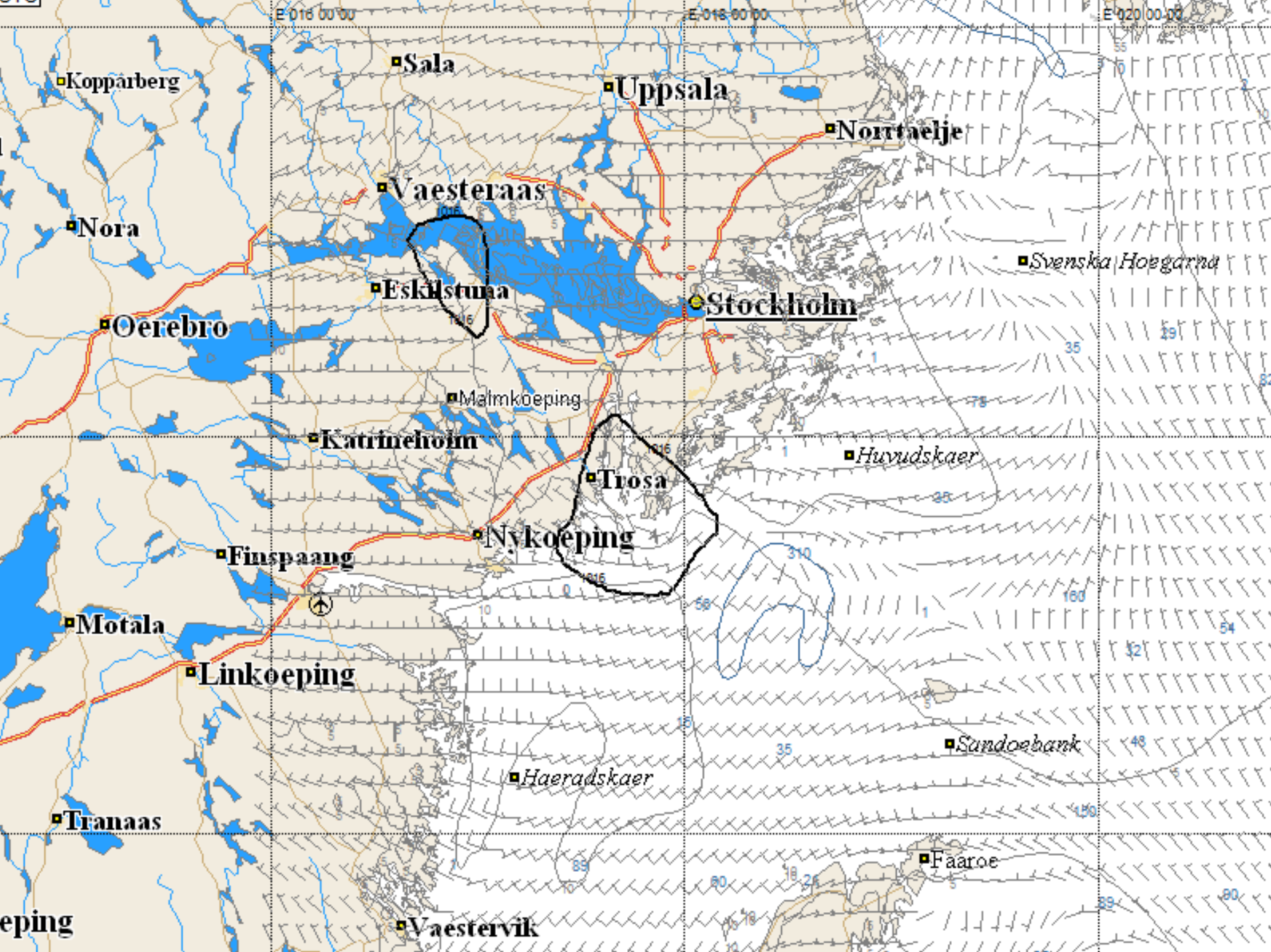
102



Tisdag 1/7, 12:40

12 km vs 4 km upplösning





Slutsatser

- *Ostadiga förhållanden gav 'hoppiga' prognoser*
- *Använd om möjligt flera prognoskällor*
- *Notera den storskaliga utvecklingen*

Måns Håkansson, mans.hakansson@yahoo.com

Stefan Söderberg, stefan.soderberg@weathertech.se

WeatherTech

