Circulation generated by a tidal jet

Vigdis Tverberg – Nord University

Frank Gaardsted & Ole Anders Nøst – Akvaplan-niva

JONSMOD16

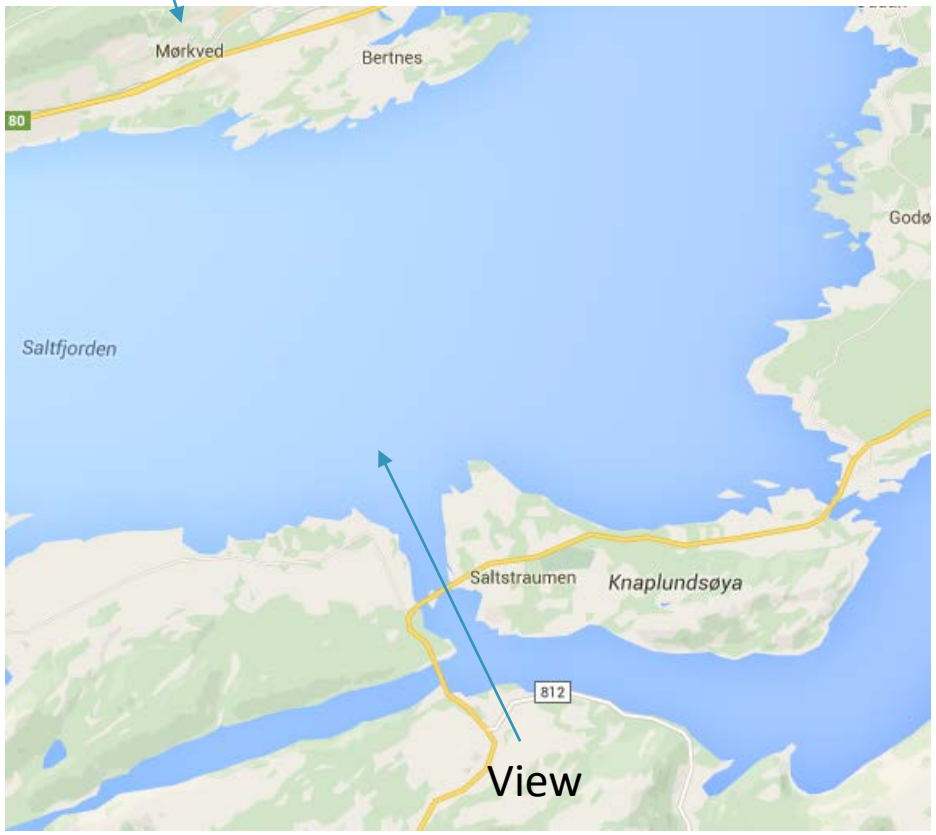
Oslo 10-12 May 2016

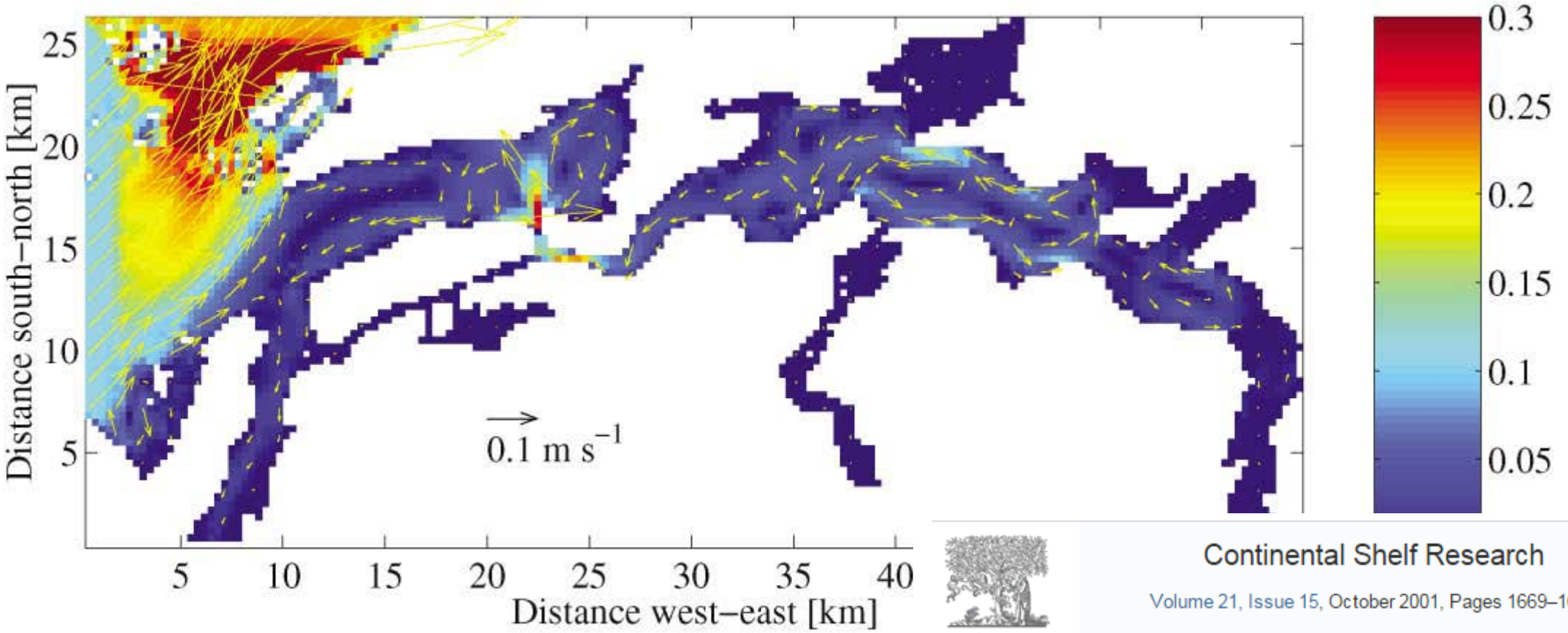
Akvaplan niva

- Tidal jets through multitude of sounds
- Tidal jets through narrow sounds

NORD University

The local motivation: Saltstraumen tidal jet





Residual current (m/s) at 10 m depth.

Bergen Ocean Model

ELSEVIER

Continental Shelf Research

Volume 21, Issue 15, October 2001, Pages 1669–1689

Nearshore and Coastal Oceanography

A numerical study of the circulation in Saltfjorden, Saltstraumen and Skjerstadfjorden

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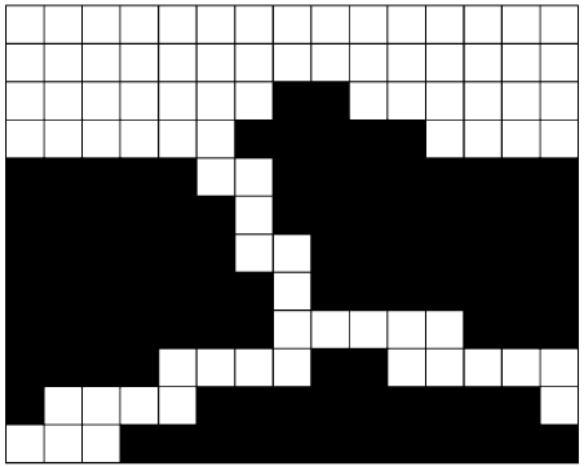
How to get the flux right through a narrow sound?

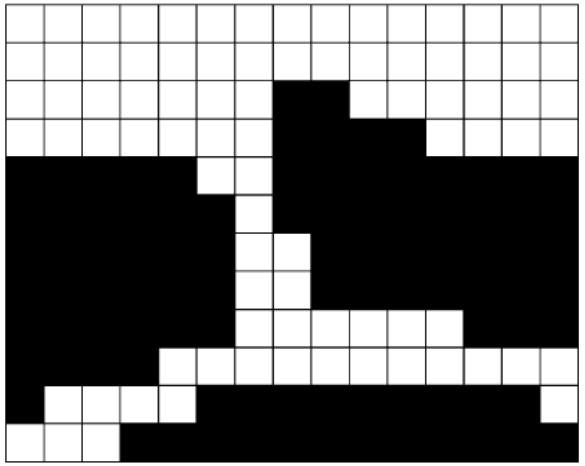
Too low flux through Saltstraumen:

1. Modify the topography

The channel is aligned with the grid:
- Flux is more in accordance with measurements



(a) First interpretation



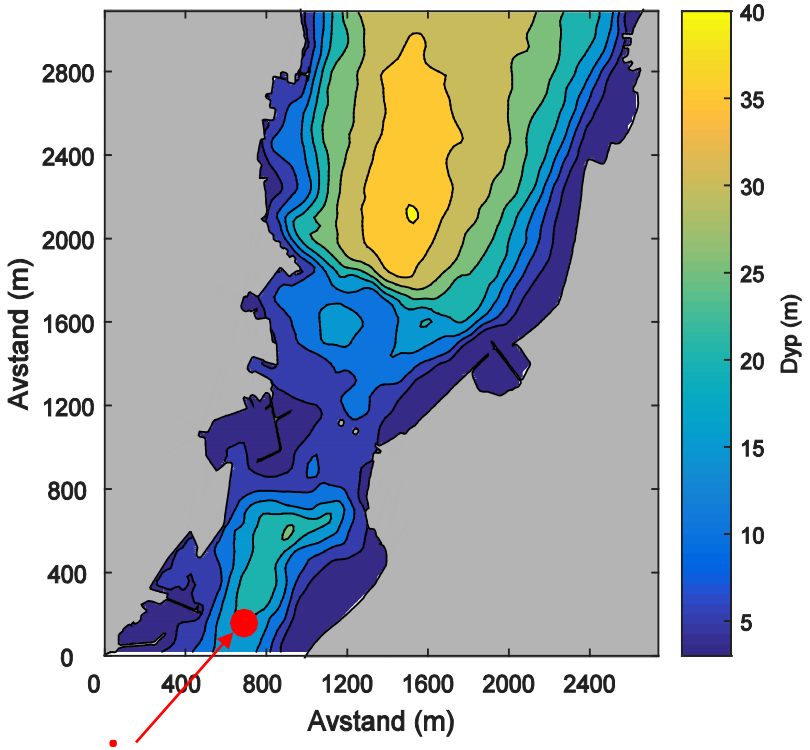
(b) Second interpretation

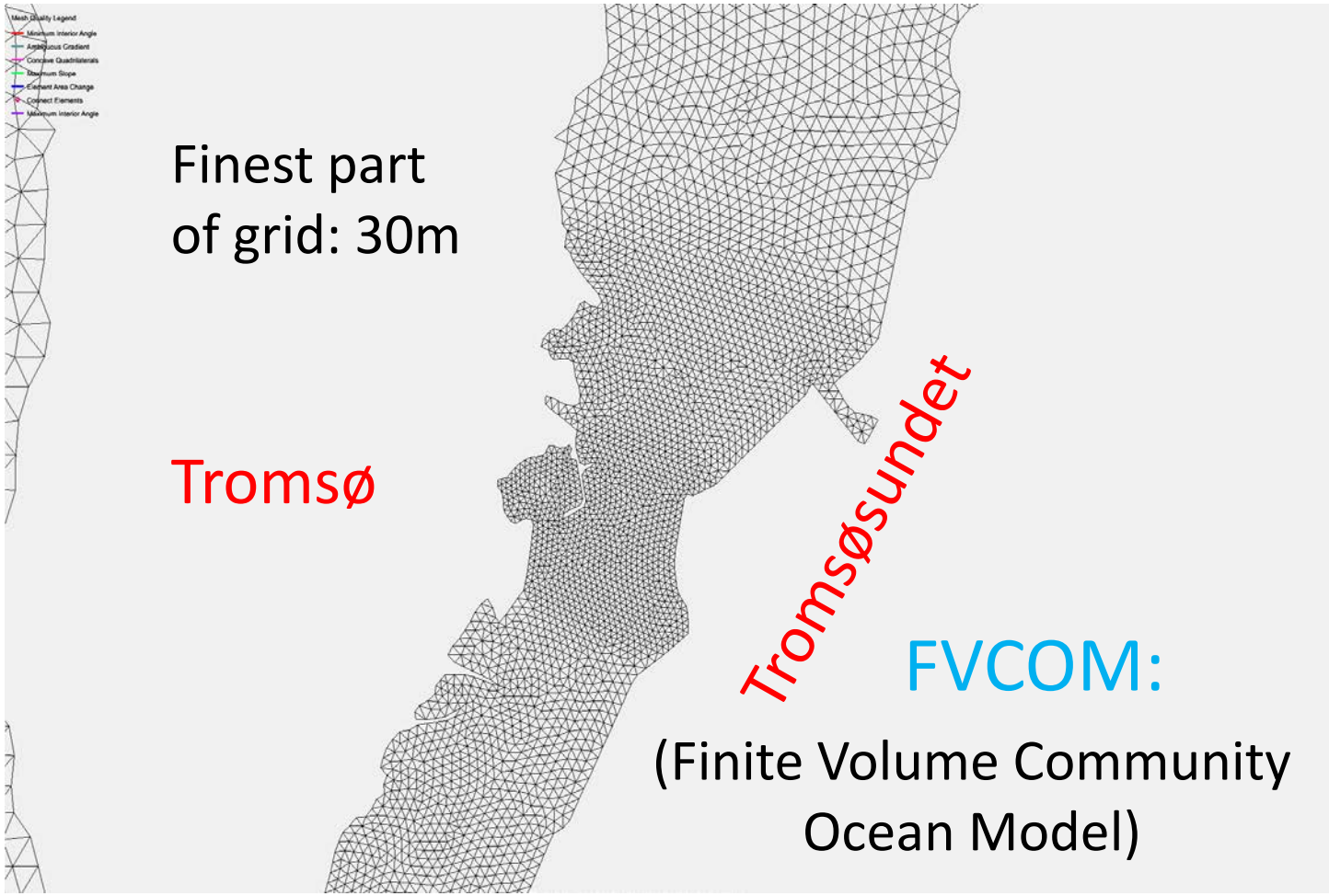
Eliassen et al., 2001

Fig. 4. Two interpretations of the horizontal structure of Saltstraumen.

How to get the flux right through a narrow sound?

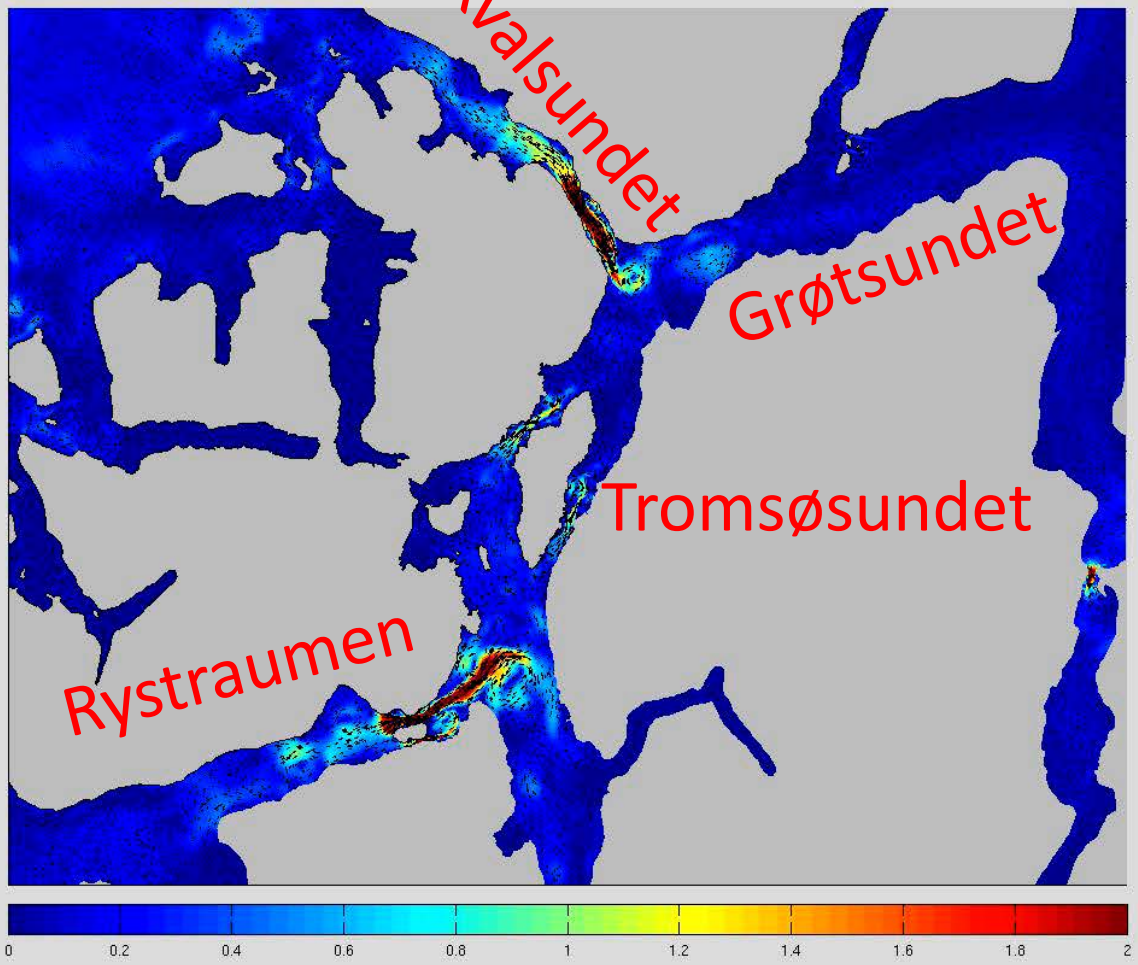
2. Refine the grid





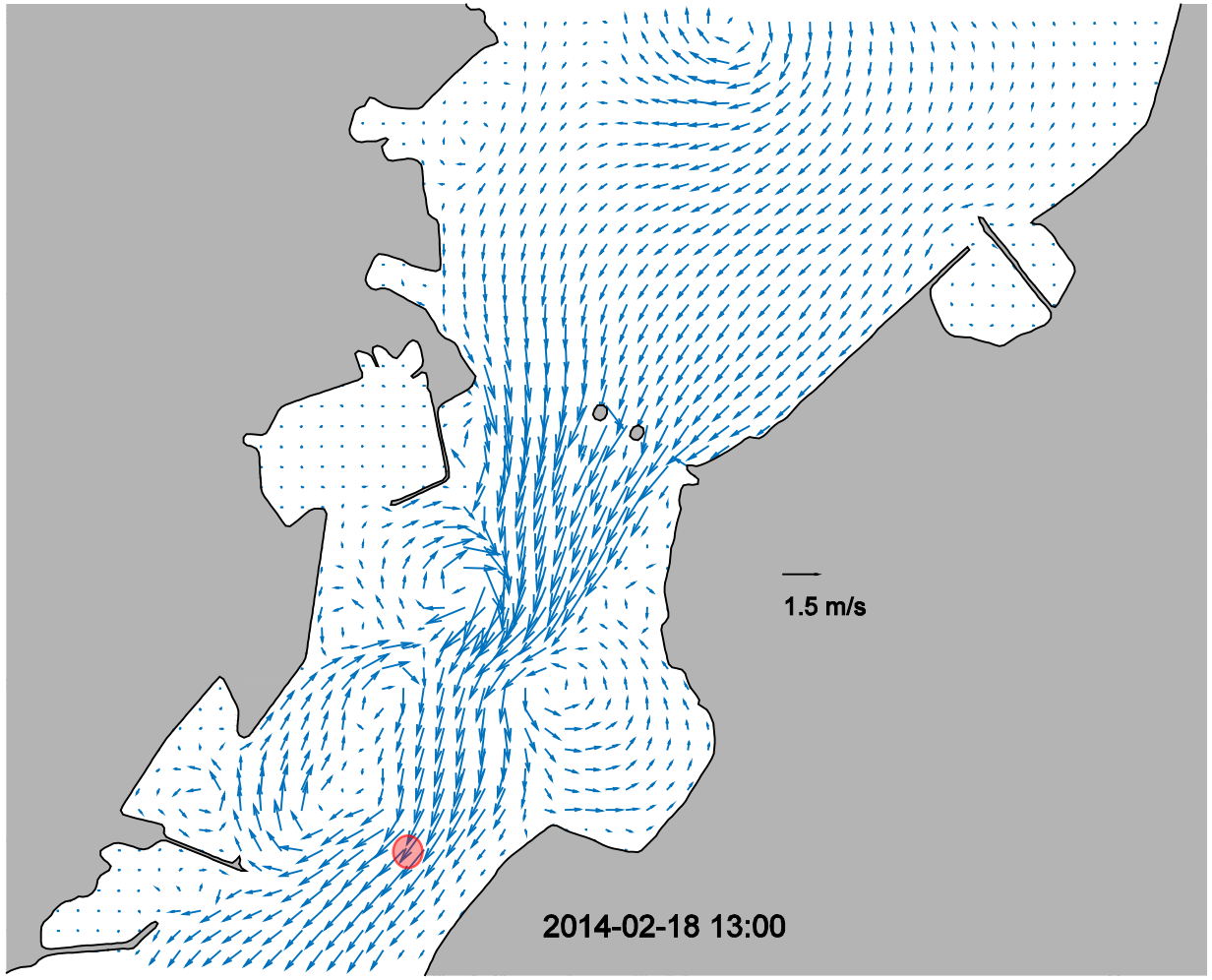
https://www.dropbox.com/s/4tjiwb02i79nsk6/Tromso_vels_long.avi?dl=0

FVCOM
-barotropic
-8 constituents



Long version

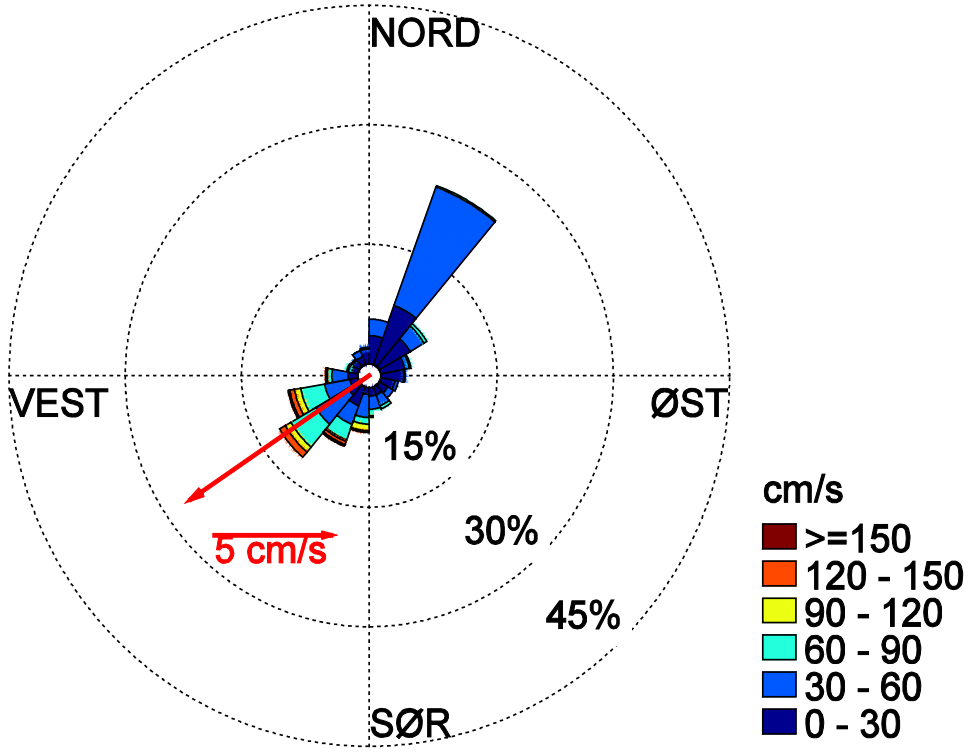
Tromsøsundet -model run snap shot



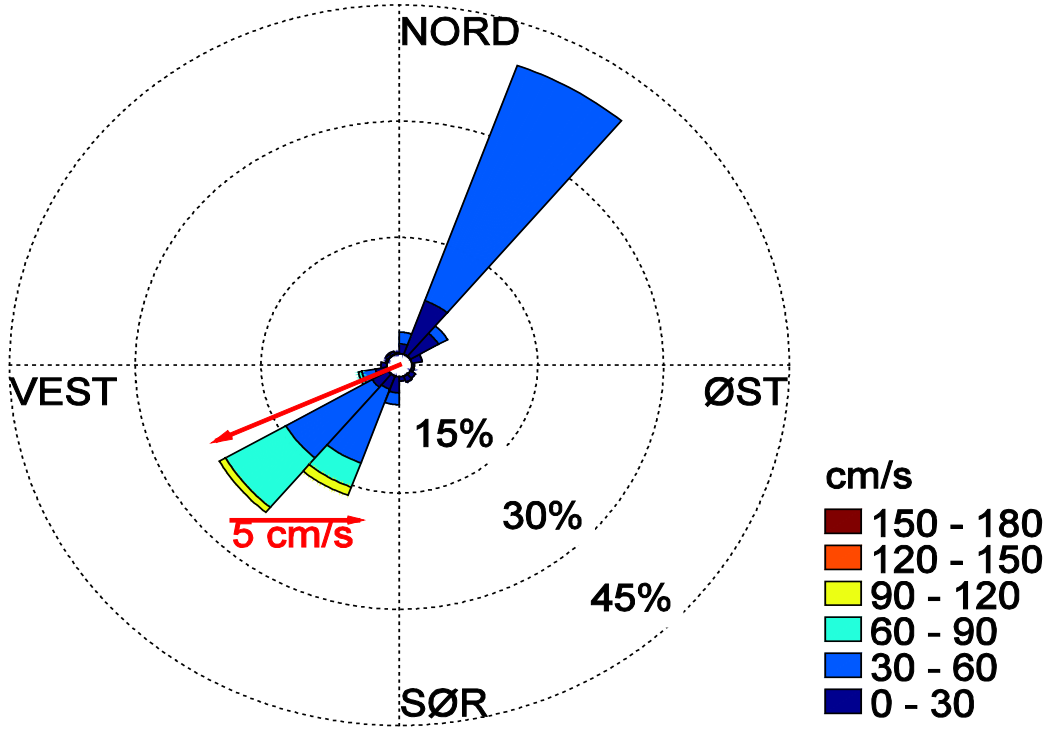
Observations

Tromsøsundet

Model



Observations



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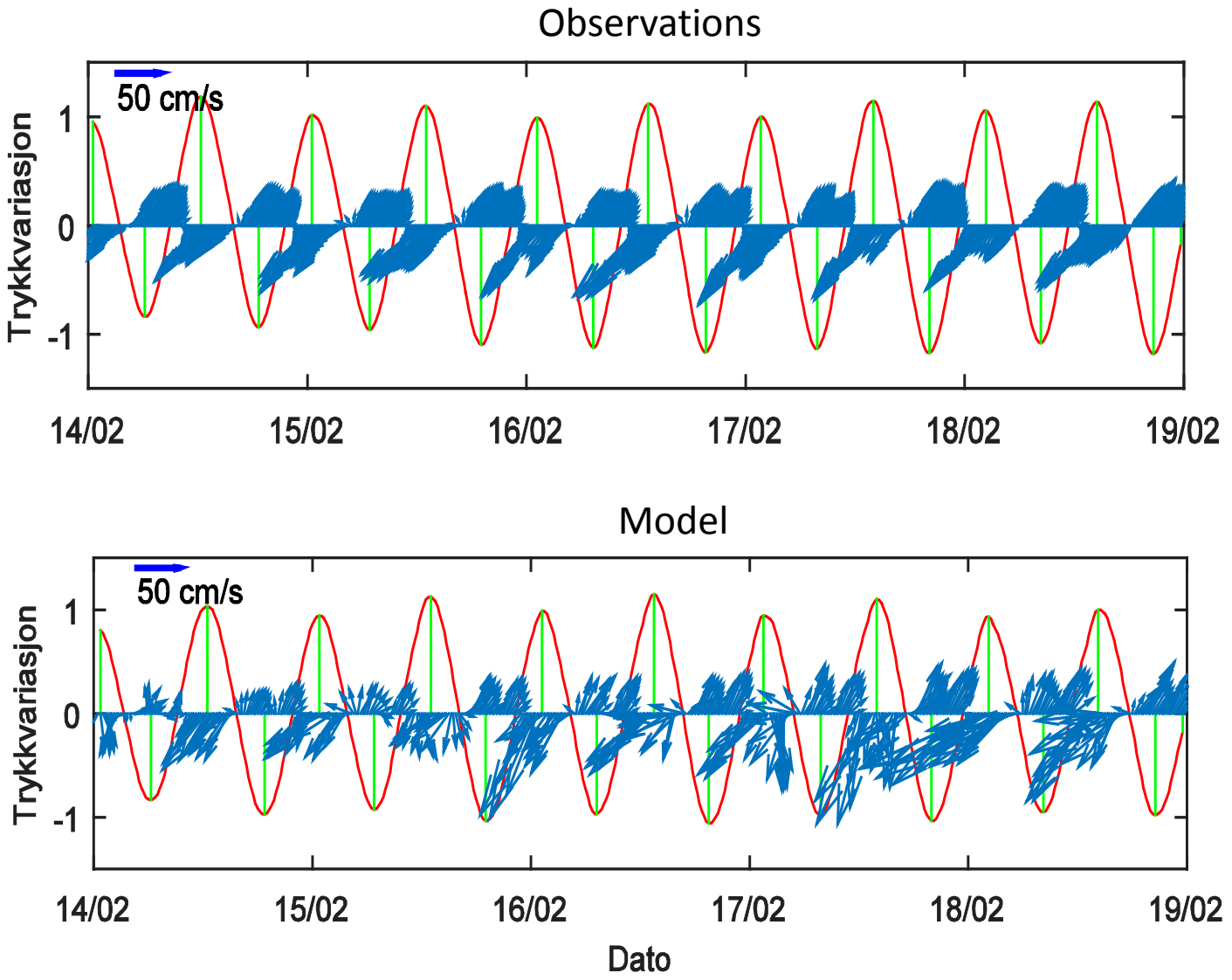

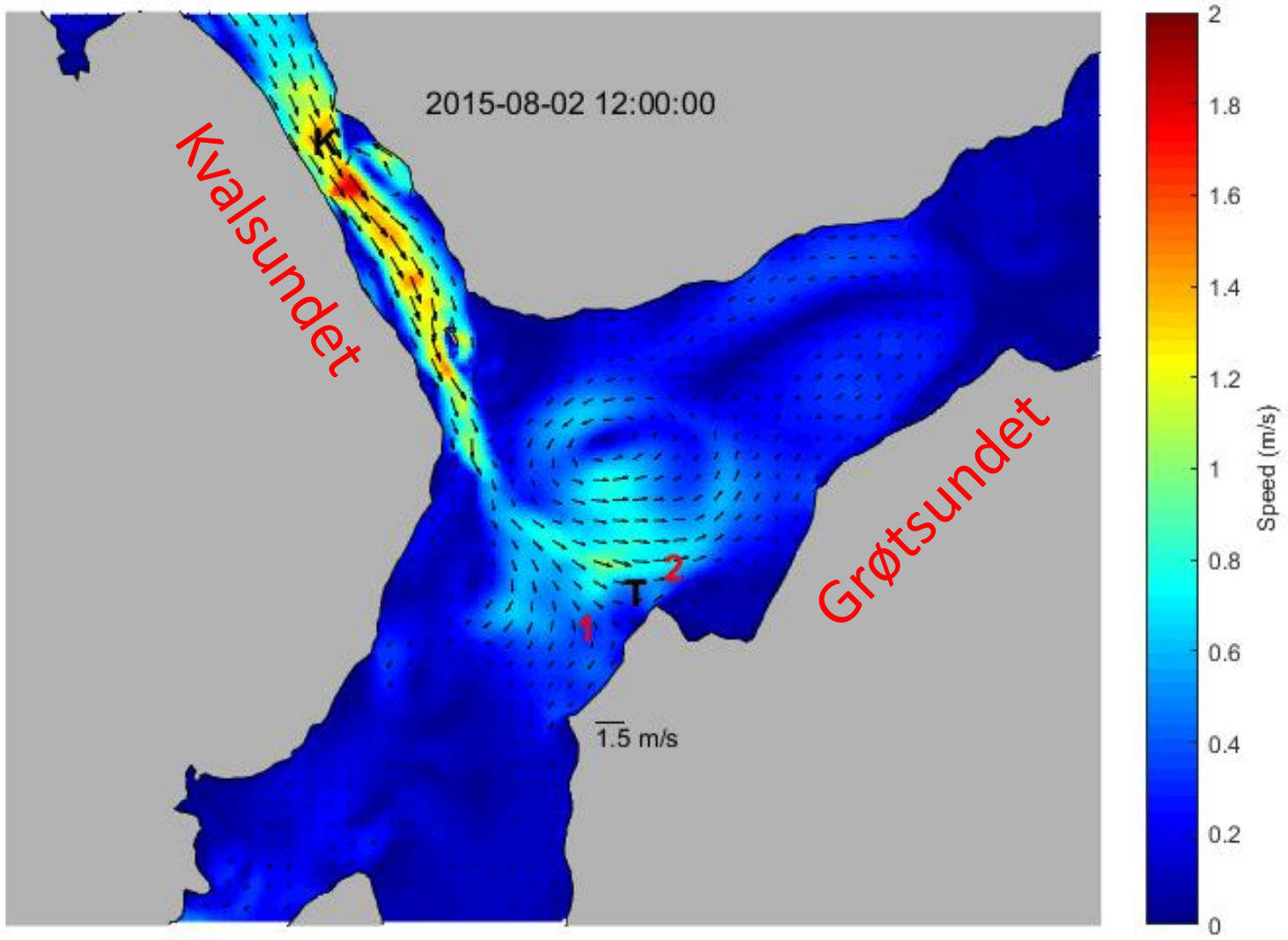
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Kvalsundet
Grøtsundet
K
T
1
2
1.5 m/s
Speed (m/s)
2
1.8
1.6
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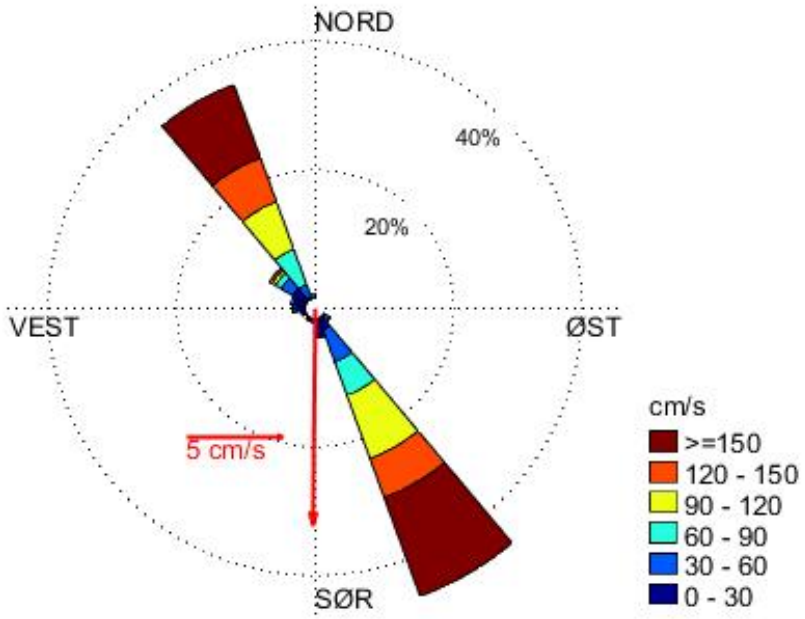
Kvalsundet

Model



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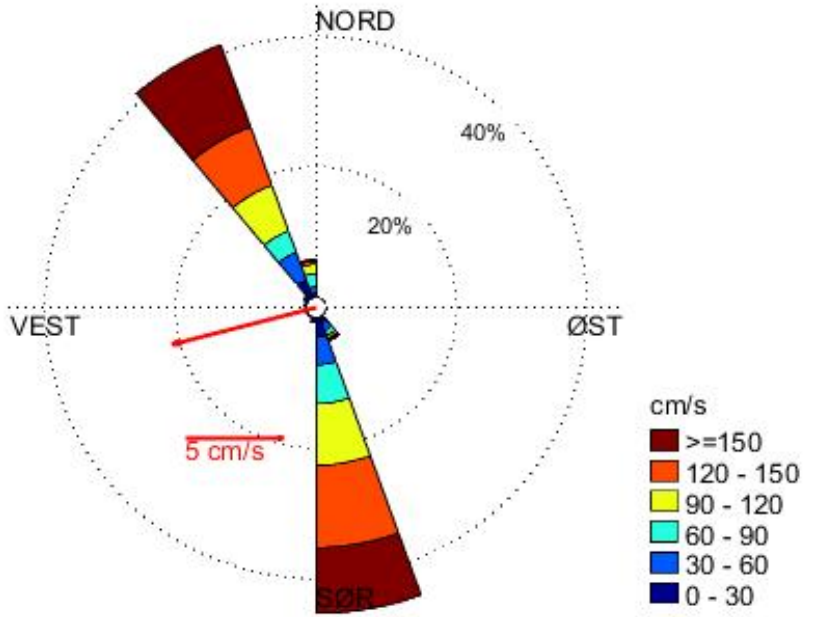
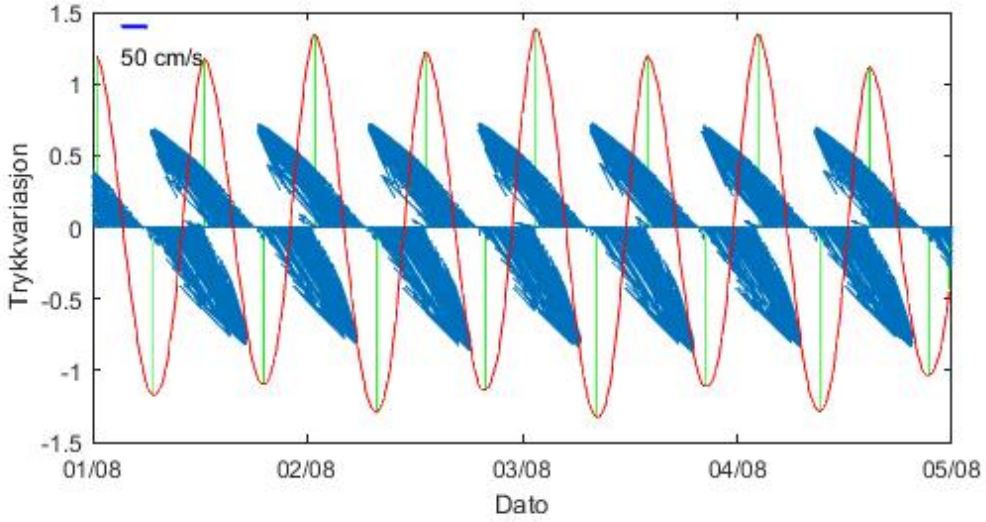
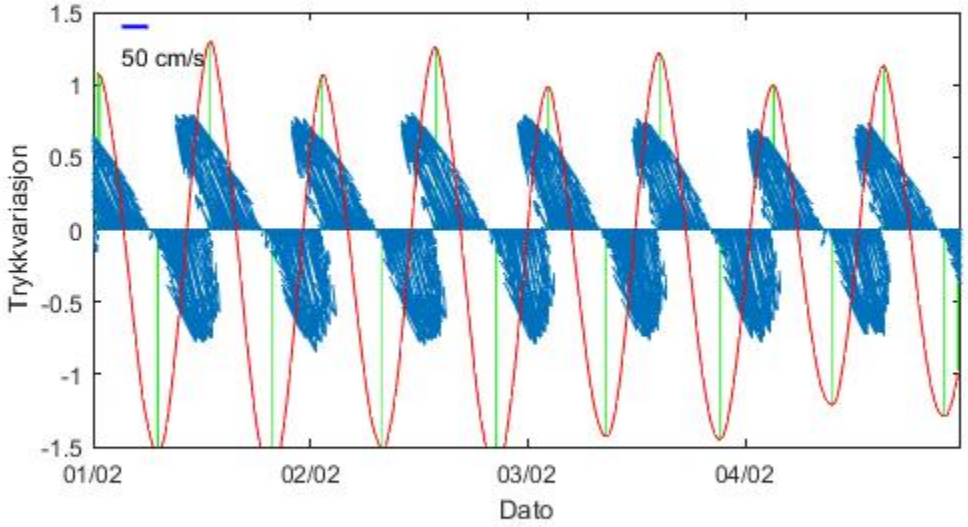


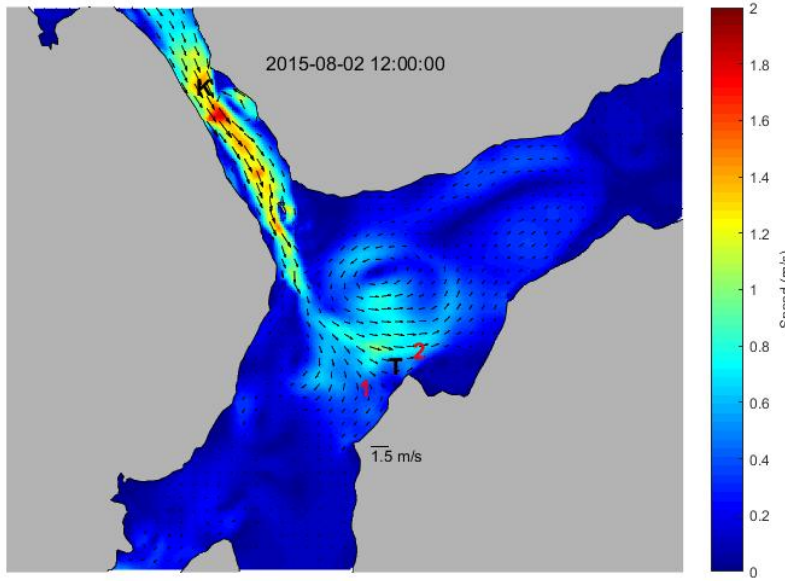
Kvalsundet

Model



Observations

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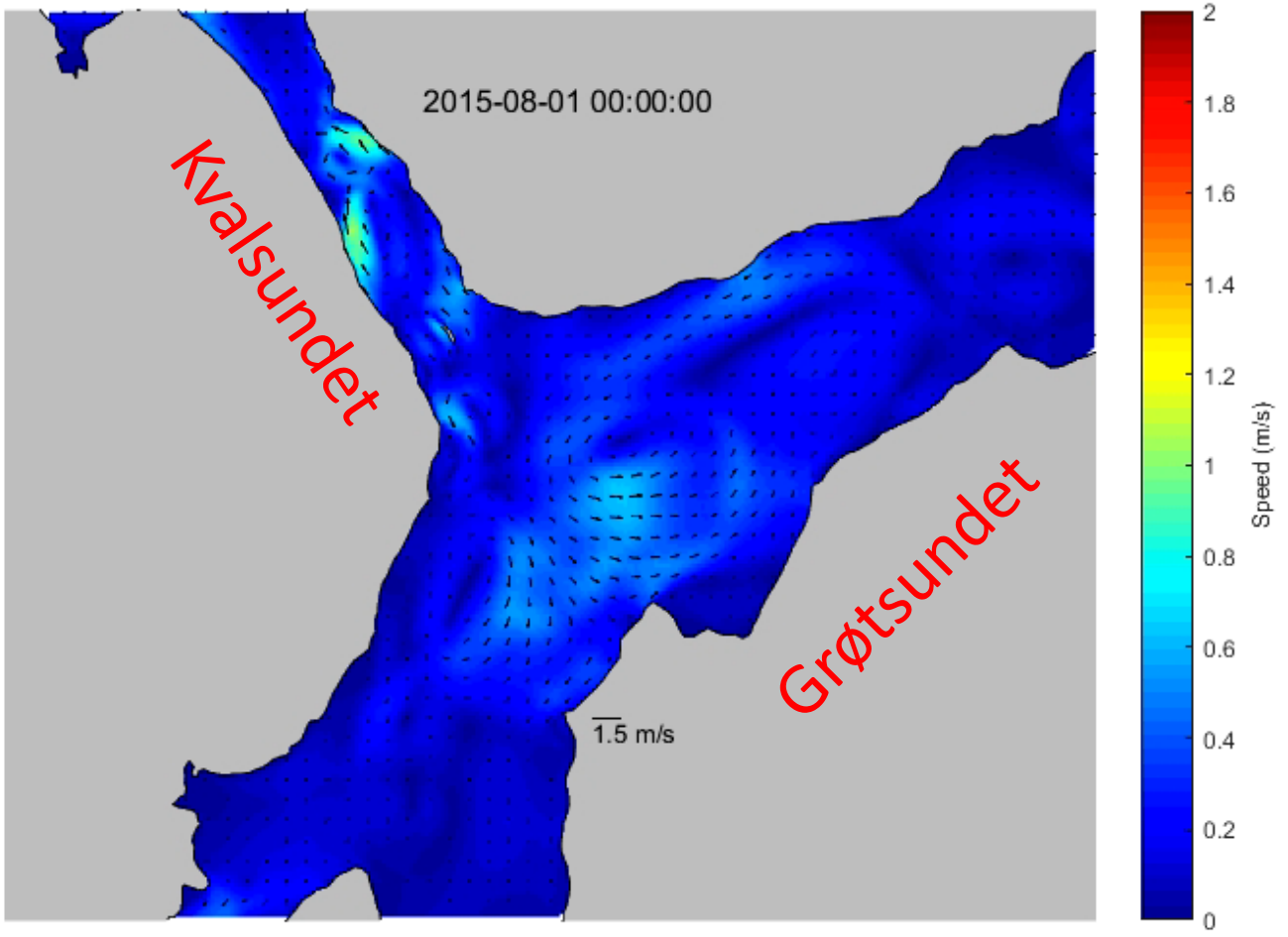
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Kvalsundet
Grøtsundet
1.5 m/s
Speed (m/s)
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1.6
1.4
1.2
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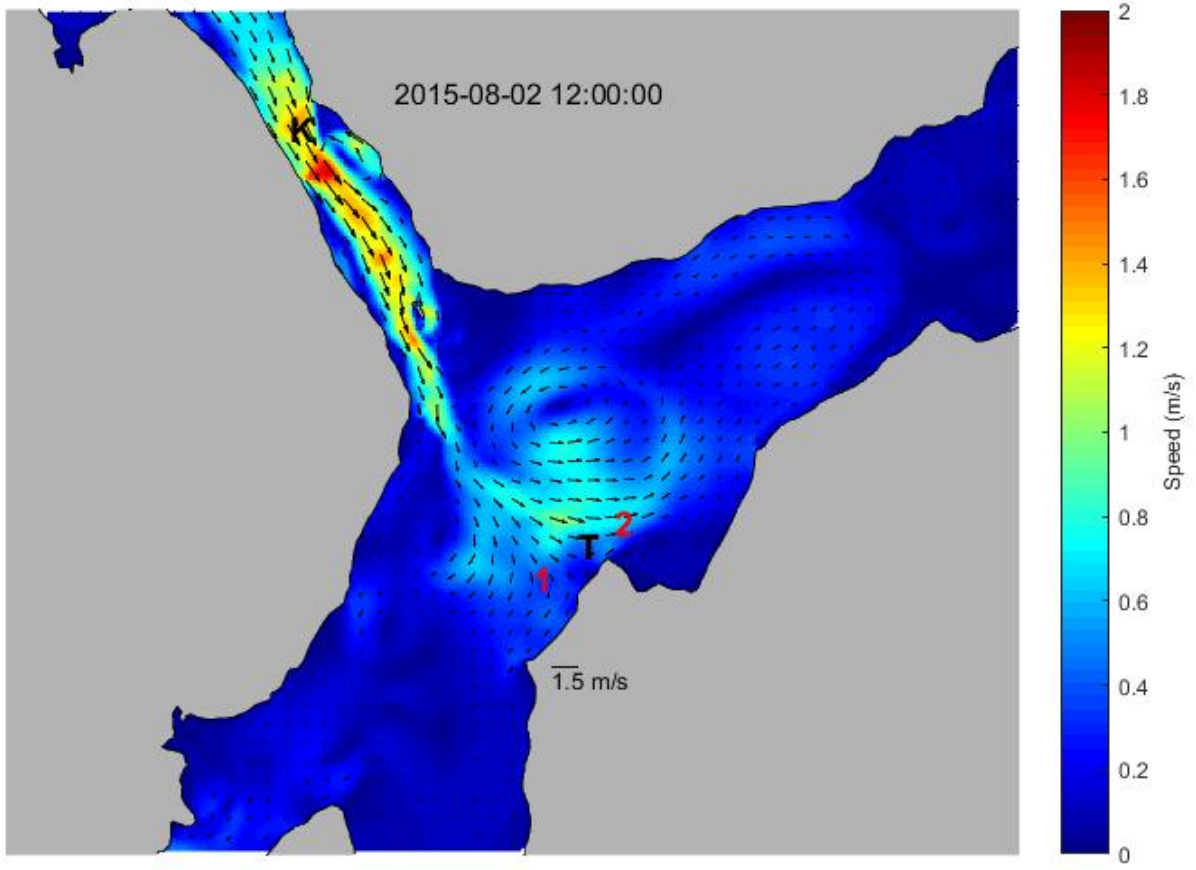
2015-08-02 12:00:00
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T
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1.5 m/s
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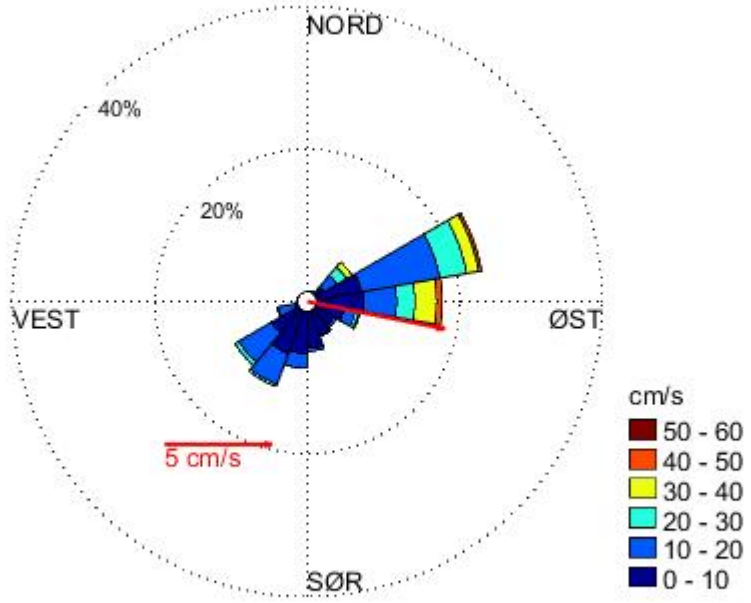
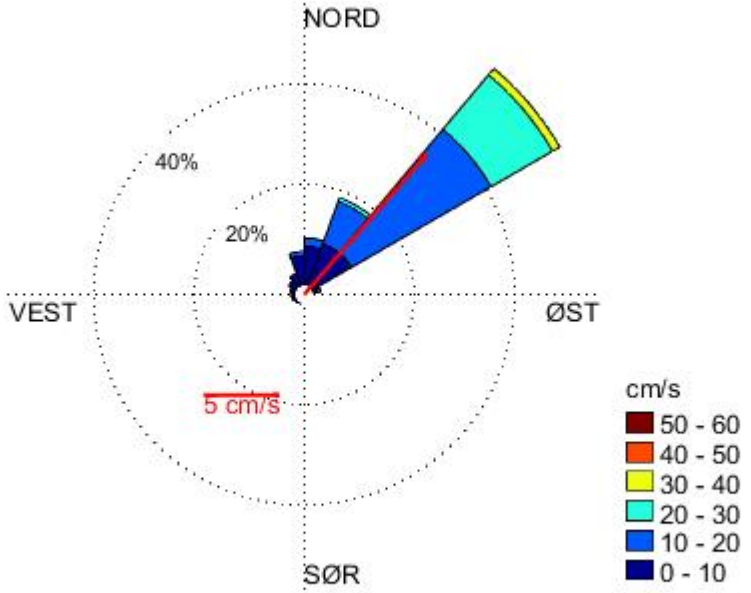
Speed (m/s)

Grøtsundet – Station T

Model

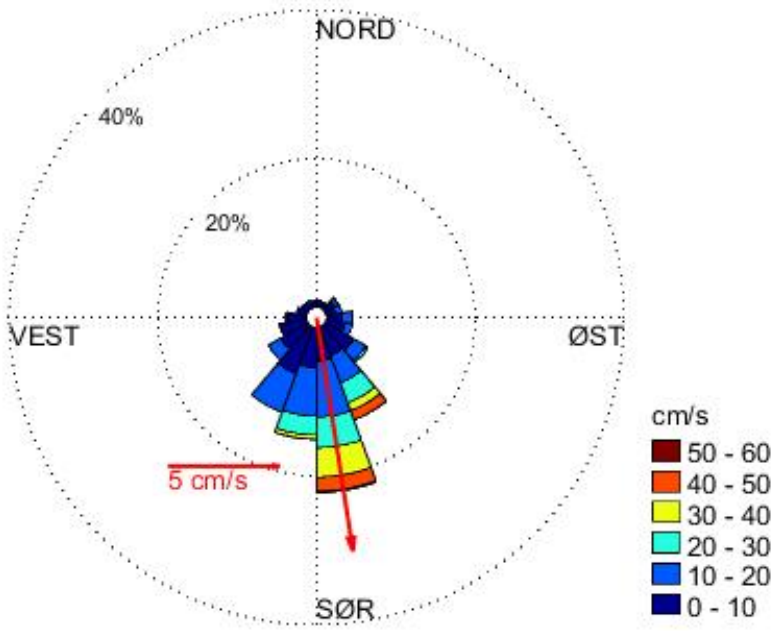


Observations

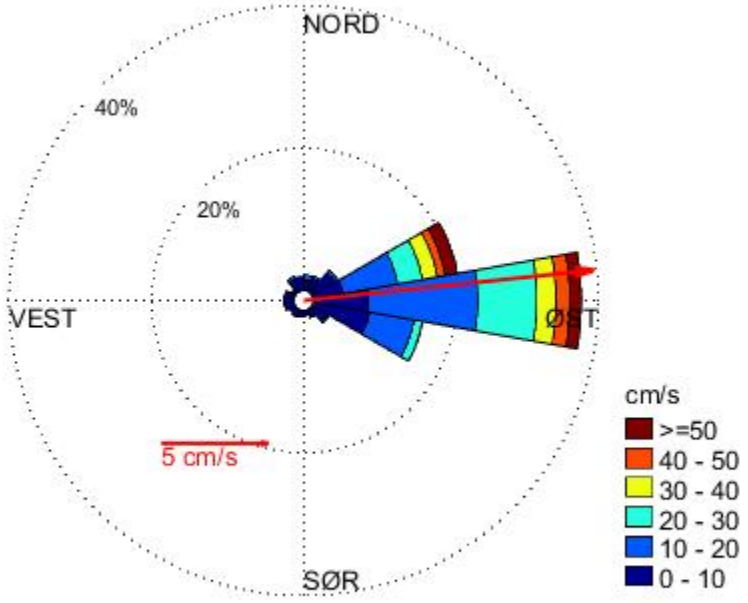


Grøtsundet

Station 1



Station 2



Thank you for your attention!

Work is in progress …