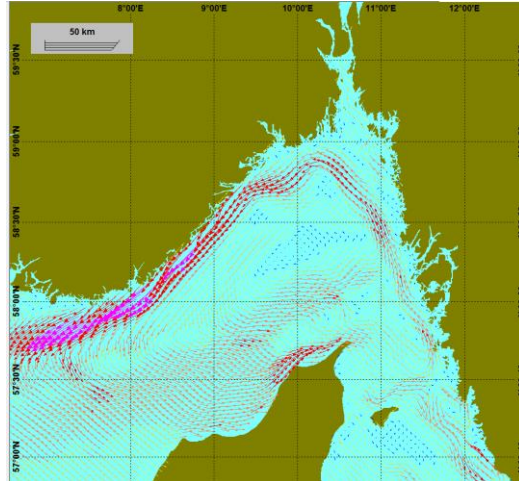


Report

Import of NORA10 and SVIM archives to HYD format

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9 + Appendices**ABSTRACT****Abstract heading**

The NORA10 and SVIM archives for winds and currents in Norwegian coastal water have been converted to the HYD format. This report contains the import routines for this conversion, and gives a quality assurance of the imported HYD format as read by the OSCAR model.

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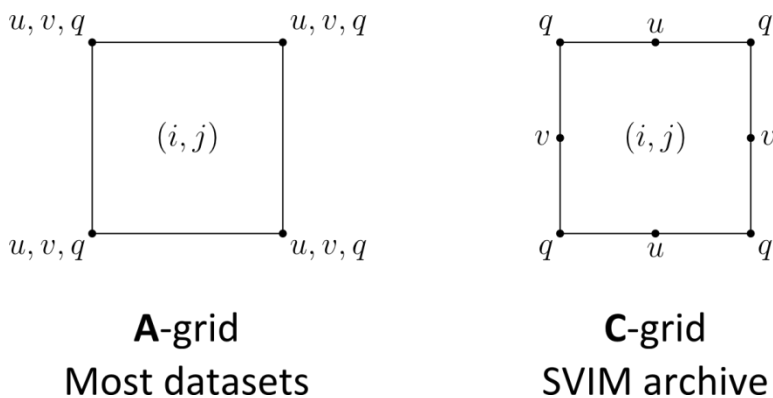
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1 Background on NORA10 and SVIM archives

NORA10 is a ~10km, 3-hourly wind and wave hindcast archive of the Norwegian, North and Barents Seas that has been generated with a downscaling method using the ERA-40 archive as input (Reistad et al. 2011), which compares well with observations (Furevik et al., 2012). The SVIM archive is a 4km ocean current hindcast archive of the Norwegian, North, and Barents Seas, that is available in 24h averaged time intervals on-line¹. The SVIM archive has also been compared with observations and compares well with several measured parameters (Lien et al. 2013).

2 SVIM archive Arakawa C-grid

The SVIM archive is made available on-line in the original model grid, which is an Arakawa C-grid. In this grid the u and v components are located in different geographical locations. This is different from how model data is generally made available, where the u and v components share a common origin. The difference is illustrated in the figure below.

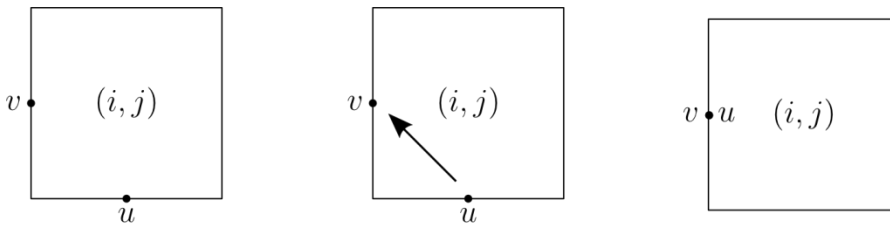


The grid-representation of the Arakawa C-grid represents a challenge for import to the hyd format, which requires that the original data is represented in an A-grid. The preferred solution would be to make the SVIM archive available in the A-grid form through interpolation. This is the procedure for Met.no's products Norkyst-800 and Nordic-4².

To still be able to import C-grid SVIM data to the HYD format, an approach is followed where the grid of u -components is shifted 0.5 grid cells to the left and up to overlap the grid for the v -component. The approach is illustrated below

¹ <ftp://ftp.met.no/projects/SVIM-public/SVIMresults/>

² http://met.no/Hav_og_is/Aktiviteter_og_oppgaver/Havovervaking-_og_varsling/Norske_farvann/



C-grid
SVIM archive

Import to HYD by
shifting u-grid 0.5
grid cells to the up
and left

HYD

3 Validation of import: NORA10

NORA10 data was made available in the ".seq" format. This format has an established format of the import file. See Appendix A for an example file that can be used to convert a .seq NORA10-file to a .gwd file. The gwd format is equivalent to the hyd format but specifies wind.

To validate the import of NORA10, comparisons were made between the imported .gwd files and the original wind fields as provided by Magnar Reistad at Meteorologisk institutt. Figure 3-1 shows a comparison between NORA10 winds after import (left) and with images obtained from met.no (right). As can be seen, the conversion conserves the position and direction of the vector field.

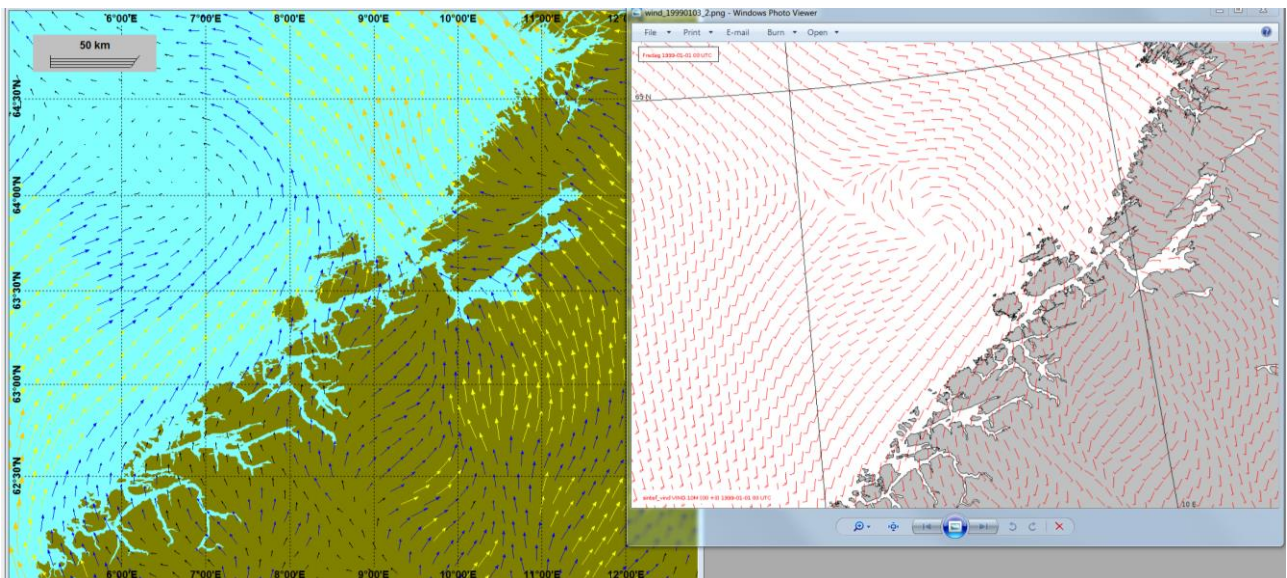


Figure 3-1 Comparison of NORA10 after import (left) and from met.no (right)

4 Validation of import: SVIM

The SVIM archive was downloaded in the netCDF format from the above indicated ftp-server and converted to a hyd file using an import file given in Appendix B. To validate the import, we compared surface current fields with current fields from previous 24h-averaged data.

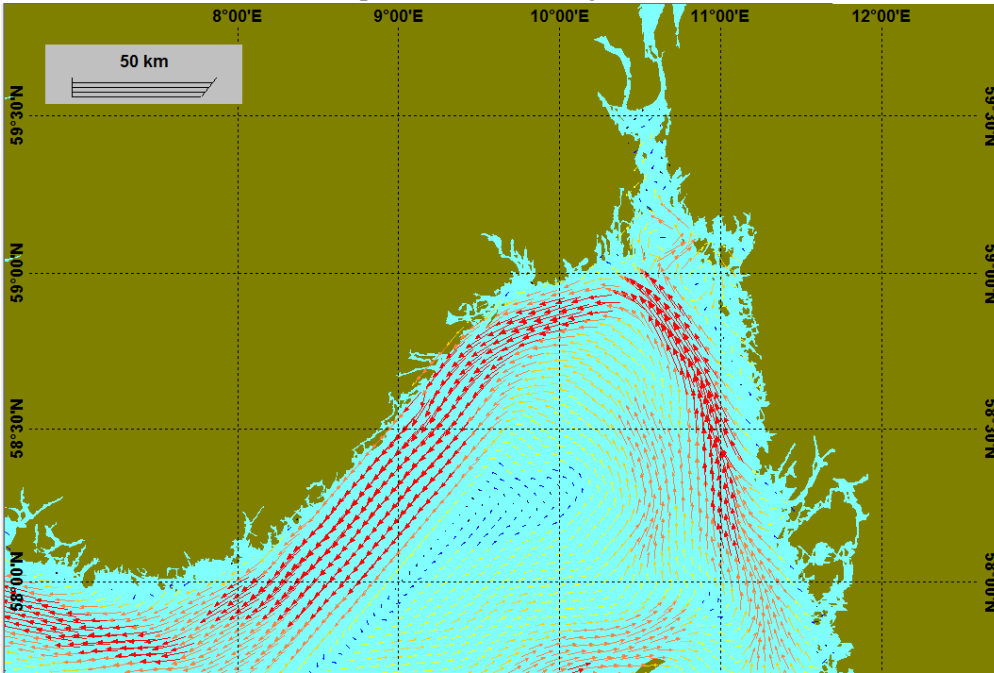


Figure 4-1NS4_ERAI 1998-07-01

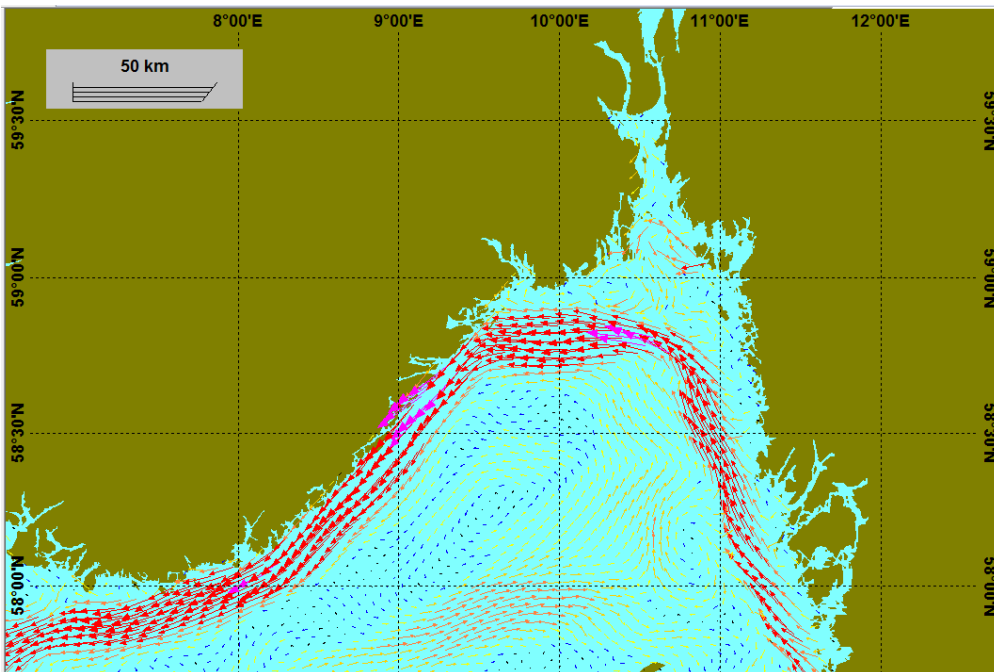


Figure 4-2 SVIM 1998-07-01

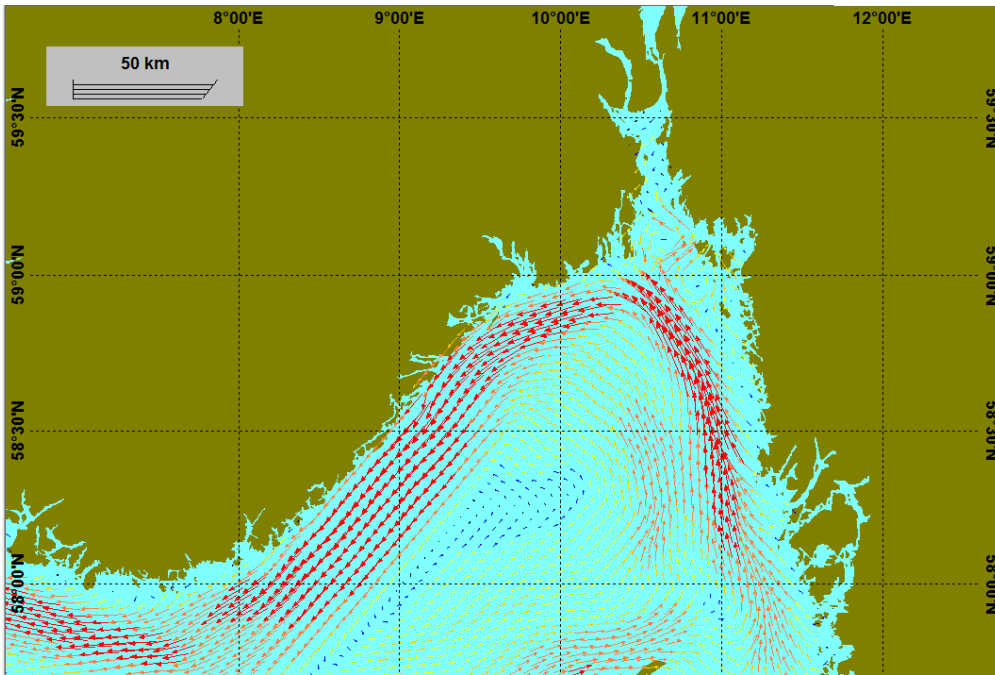


Figure 4-3NS4_ERAI 1998-07-01

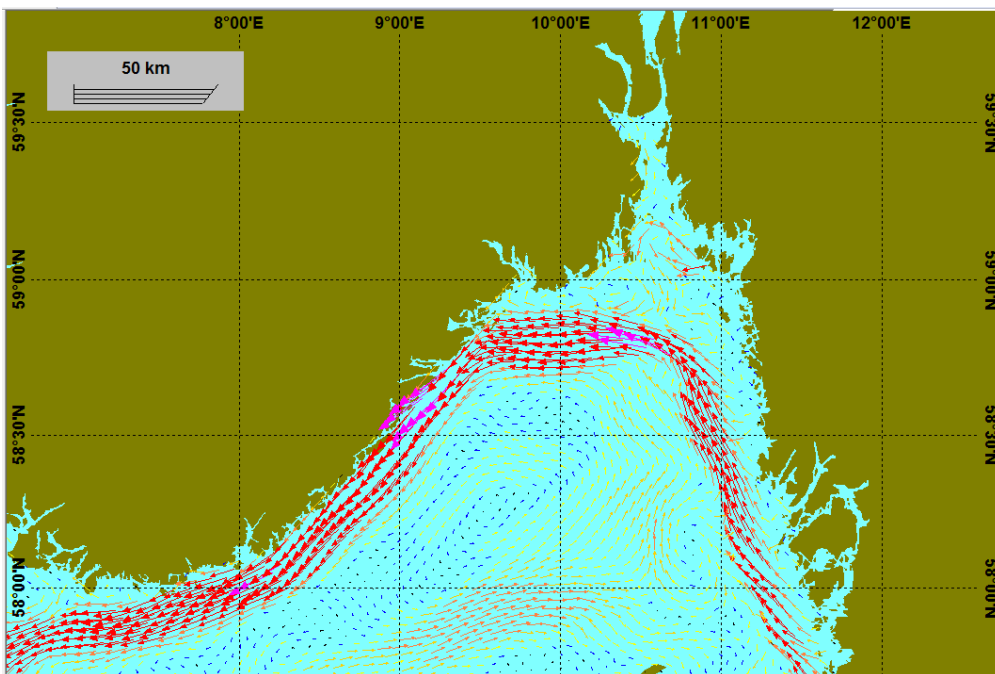


Figure 4-4 SVIM 1998-07-01

5 Adjustment of import parameters for better fit in Svalbard area

For geographical locations removed from the Norwegian coast, the import settings given in Appendix B do not give an exact match with shorelines. Examples are the Svalbard area. This is likely due to the ROMS model using a different earth radius than what is assumed by the HYD format. It is not possible to correct this by specifying the earth radius during import to HYD; instead one can modify the PROJ-POL-X and PROJ-POL-Y values until a suitable fit is obtained. The following values gave improved fit for the Svalbard area:

```
PROJ-POL-X 998
PROJ-POL-Y 638
```

A Example import file for NORA10

```
FORMAT                DNMI-Felt
HYD-COMPRESSION       BYTE-SCALED
FILE-INPUT            C:\Konvertering_NORA10\wind_199901.seq
FILE-OUTPUT          C:\Konvertering_NORA10\wind_199901.gwd
FIELD-WIND-U          33
FIELD-WIND-V          34
BYTESWAP-INPUT       0
```

B Example import file for SVIM

```
FORMAT    NetCDF
FILE C:\ocean_avg_3days.nc
FILE-OUTPUT C:\ocean_avg_3days.hyd
COMPRESSION 0
NAME-TIME  ocean_time
NAME-LAYER s_rho
UNIT-LAYER sigma
LIMIT-DEPTH 1
NAME-DEPTH h
DEPTH-UNIT m
NAME-UVECTOR u
NAME-VVECTOR v
NAME-LON lon_u
NAME-LAT lat_u
DIMNAME-X xi_u
DIMNAME-Y eta_u
MASK-PREFIX mask_
IGNORE-UV-MISMATCH yes
PROJECTION POLARSTEREOGRAPHIC
PROJ-POL-X 999.0
PROJ-POL-Y 638.5
PROJ-POL-DX 4000
PROJ-POL-REFLON 58
```

C References

Reistad, M., Breivik, Ø., Haakenstad, H., Aarnes, O. J., Furevik, B. R., & Bidlot, J. R. (2011). A high-resolution hindcast of wind and waves for the North Sea, the Norwegian Sea, and the Barents Sea. *Journal of Geophysical Research: Oceans*, *116*, 1–18.

Furevik, B. R., & Haakenstad, H. (2012). Near-surface marine wind profiles from rawinsonde and NORA10 hindcast. *Journal of Geophysical Research: Atmospheres*, *117*(5007), 1–14.



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