Impact of OSI-SAF sea ice information and improved surface flux calculations on NWP

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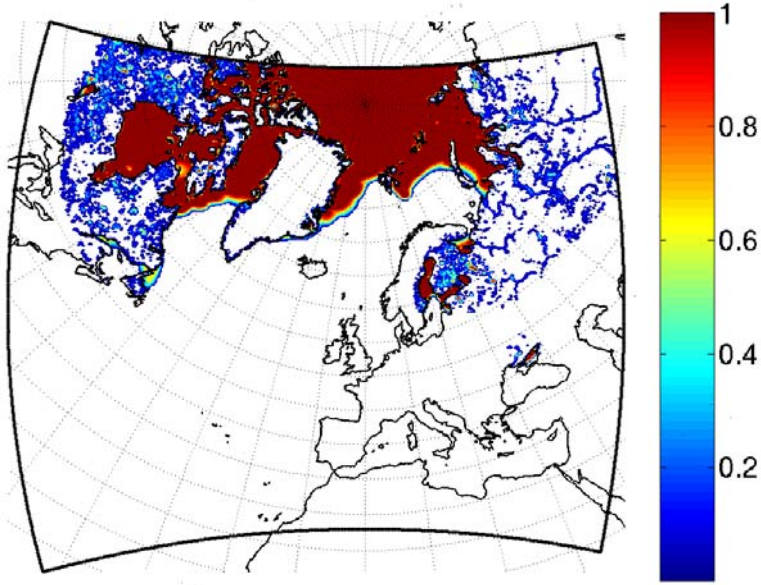
HIRLAM modifications and impact tests

- A: Introduce OSI-SAF fraction of sea ice information into the HIRLAM surface analysis. HIRLAM calculates separate surface fluxes in tiles (open water, sea ice, bare soil, low vegetation, forest).
- B: Improved surface flux calculations in stably stratified boundary layers (Silentikievic, Perov)
- Run parallel data assimilation and forecast experiments with: (1) Reference, (2) Reference + A, (3) Reference + B, (4) Reference + A + B. HIRLAM 22 km, 40 levels for January 2005.

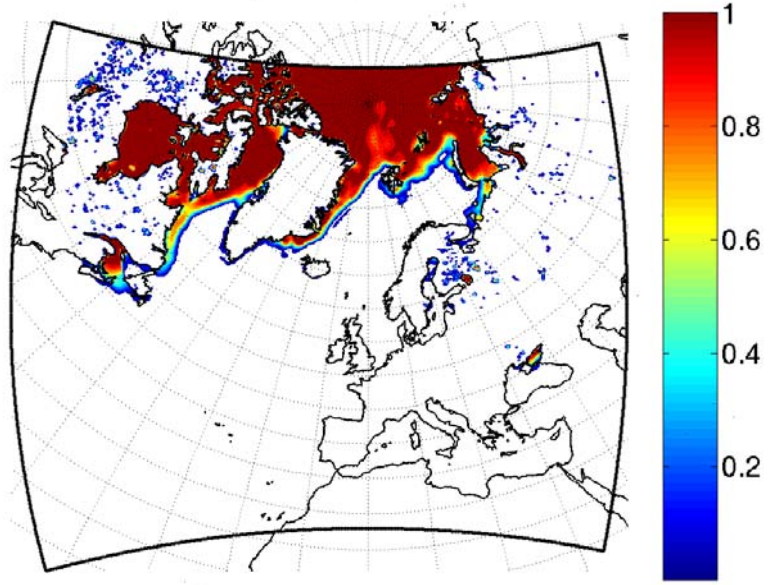
Modified HIRLAM surface analysis with OSI-SAF sea ice

1. Run HIRLAM SST analysis with ECMWF (NCEP) SST analysis values as pseudo-observations (successive correction analysis at large scales). Use a previous analysis as the first guess. (Diagnose fraction of sea ice.)
2. Run Fraction of sea ice analysis with OSI-SAF input in the form of super-observations at 22 km horizontal scale. Use a previous analysis as the first guess.
3. Modify the SST analysis in areas with Fraction of sea ice > a critical limit.

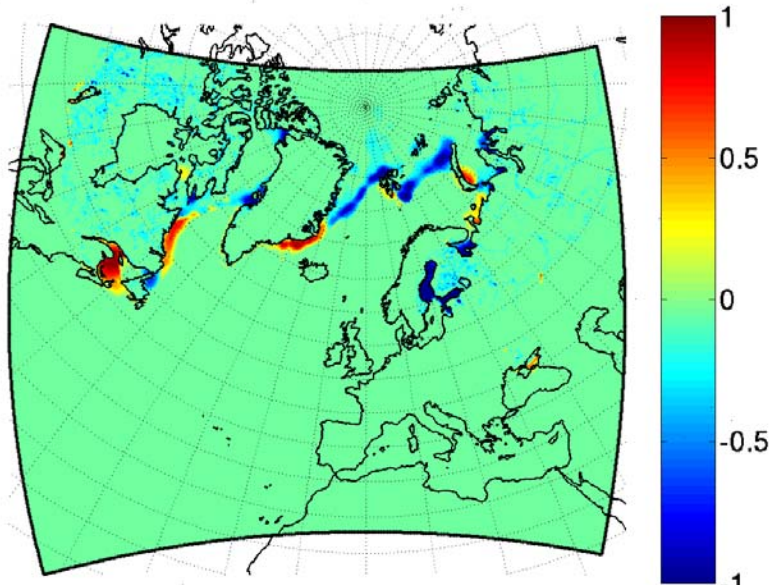
A: Ref. HIRLAM sea ice



B:HIRLAM sea ice with OSI-SAF input

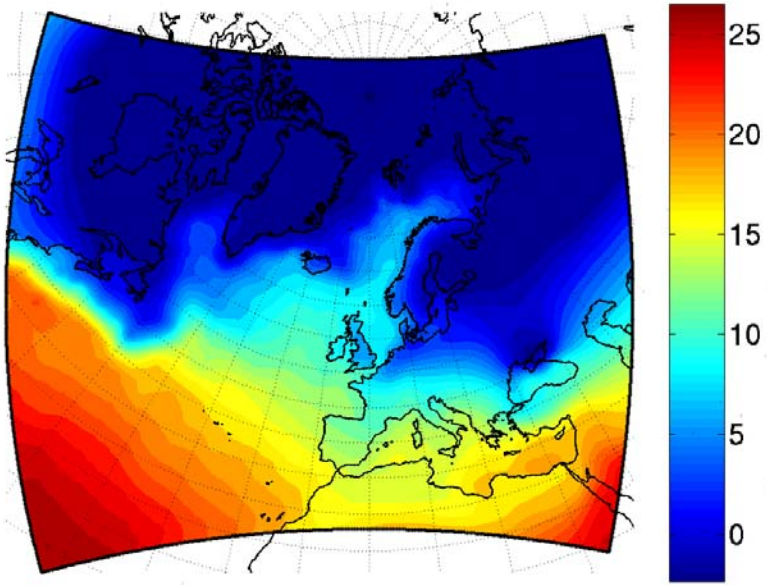


Difference B – A

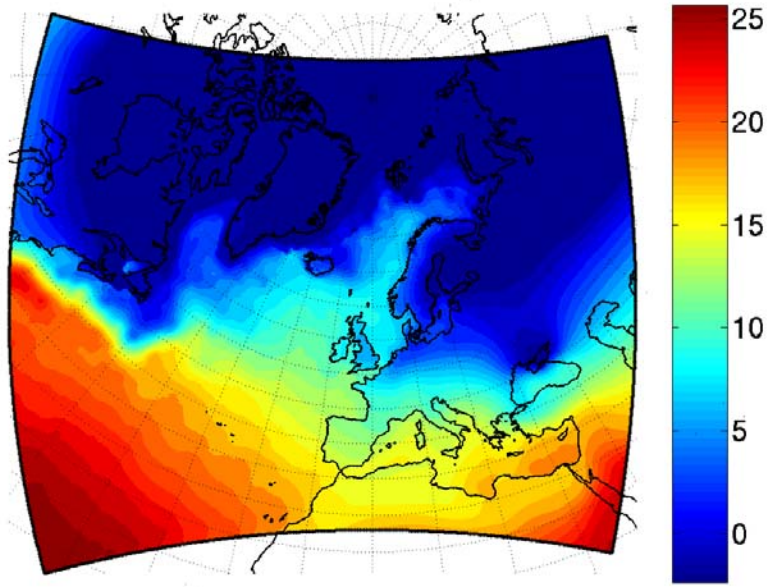


8 Jan 2005 12 UTC

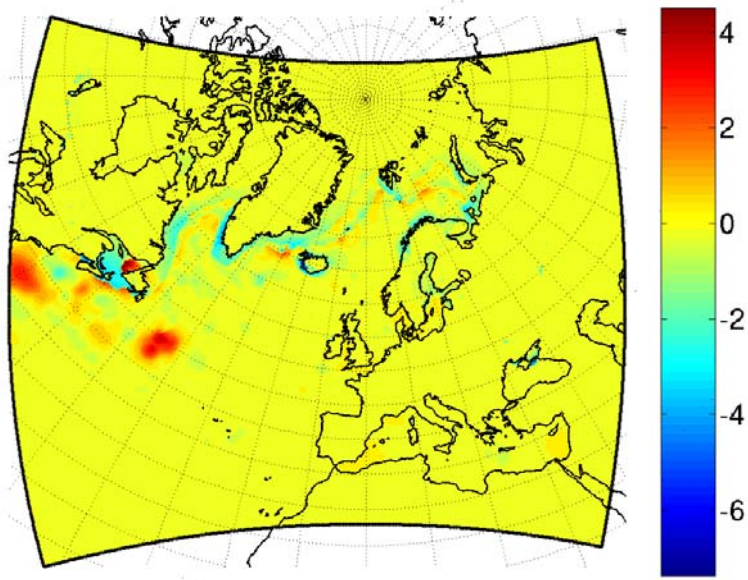
A: Ref HIRLAM SST



B: HIRLAM SST with OSI-SAF sea ice input

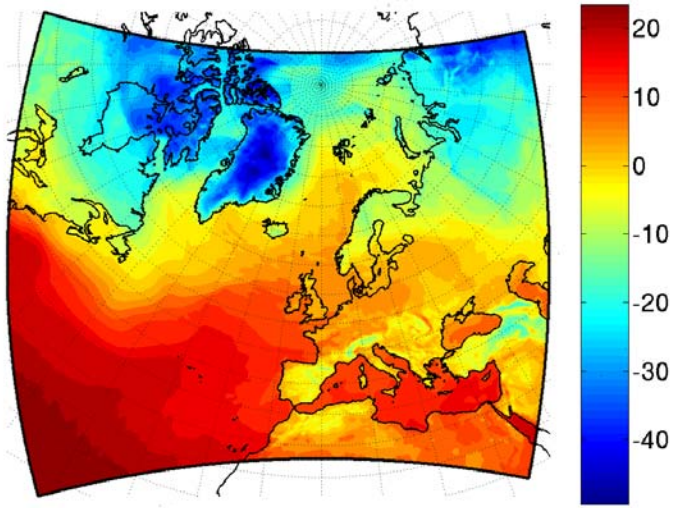


B-A: Difference

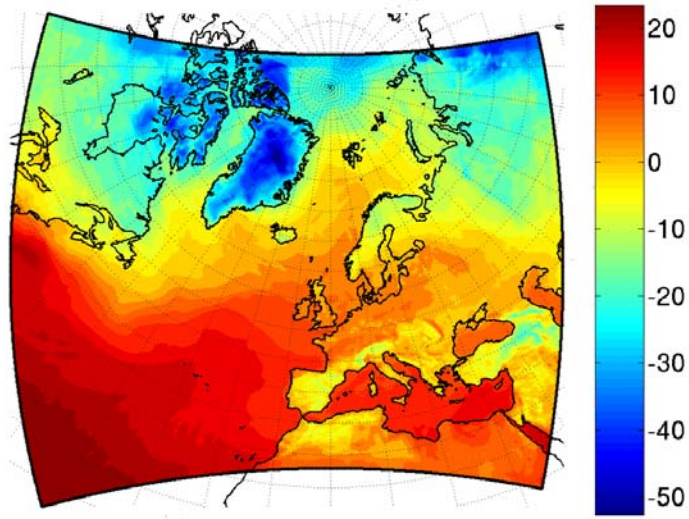


8 Jan 2005 12 UTC

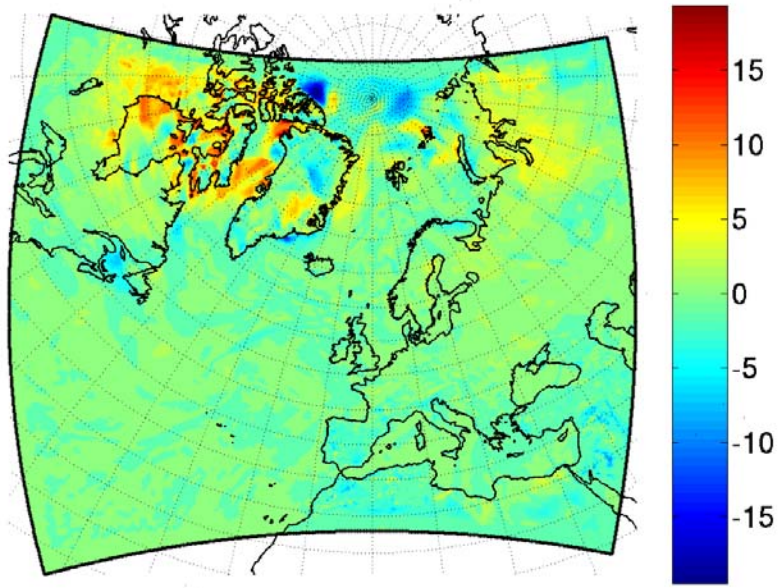
A: HIRLAM ref. 2 meter temperature



B: HIRLAM 2 meter temperature with OSI-SAF sea ice input



B-A: Difference



8 January 2005

12 UTC + 12 h

Some concluding remarks

- Software for introducing OSI-SAF sea ice information into HIRLAM has been developed. A successive correction analysis algorithm needs to be improved.
- Local impact of OSI-SAF sea ice on low level temperature can be significant (0-15 C). Synoptic scale impact and impact on forecast verification scores need to be examined.
- Software for calculation of improved surface fluxes needs to be correctly interfaced.
- We hope to finalize the software modifications and the impact studies by September 2005