Norwegian
Meteorological Institute
met.no

Use of OSI SAF sea ice and sea surface temperature in HIRLAM's surface analysis

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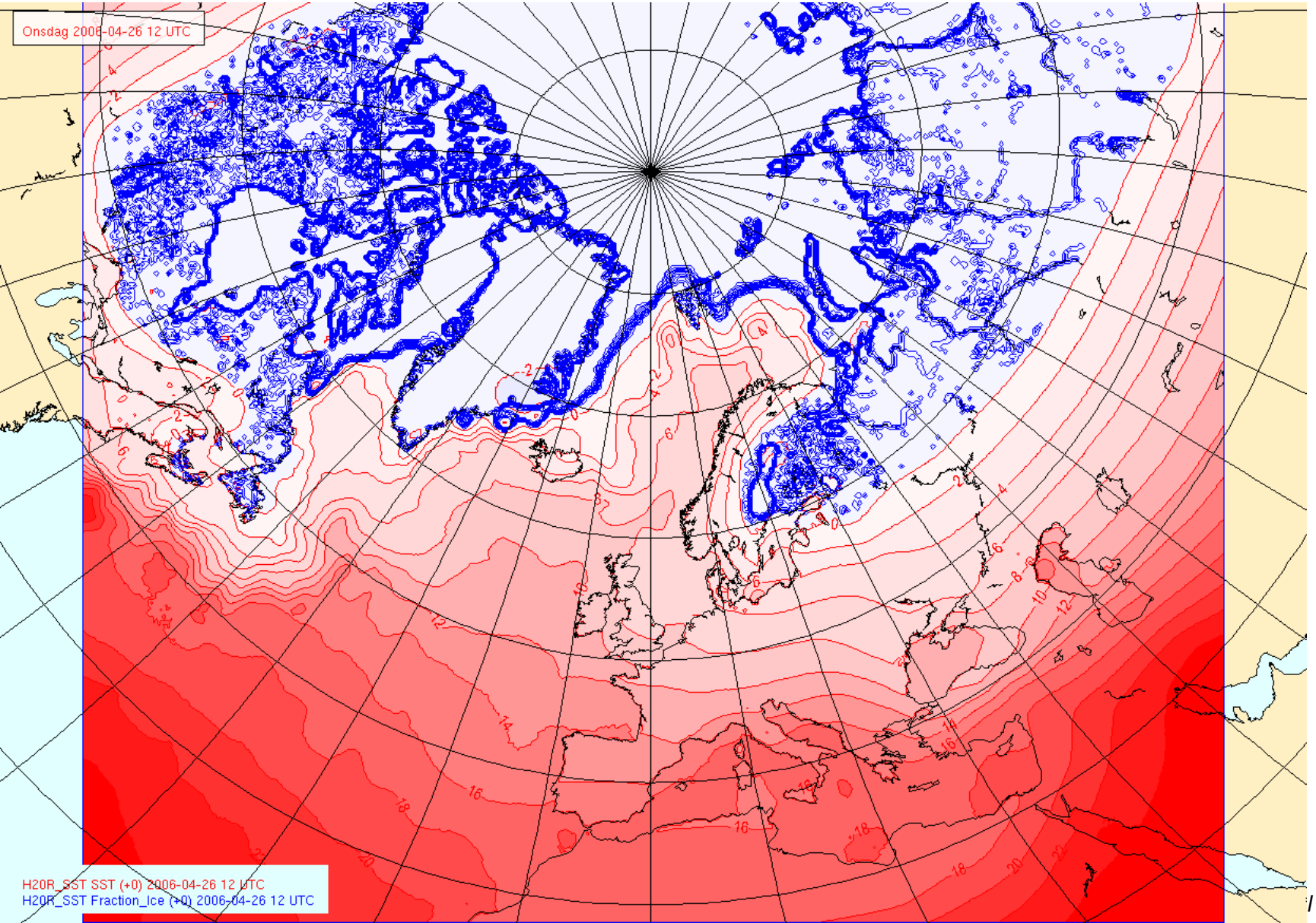
- HIRLAM status on
  SST – sea surface temperature
  SIC – sea ice concentration

- Potential improvements of SST and SIC
  - SST and SIC from satellite data
  - results from parallel experiments April 2006 and January 2007

- Sensitivity of forecasts (and weather) to SST and SIC

H20R - HIRLAM 7.0 - SST and SIC



OSI SAF - Ocean and Sea Ice – Satellite Application Facility

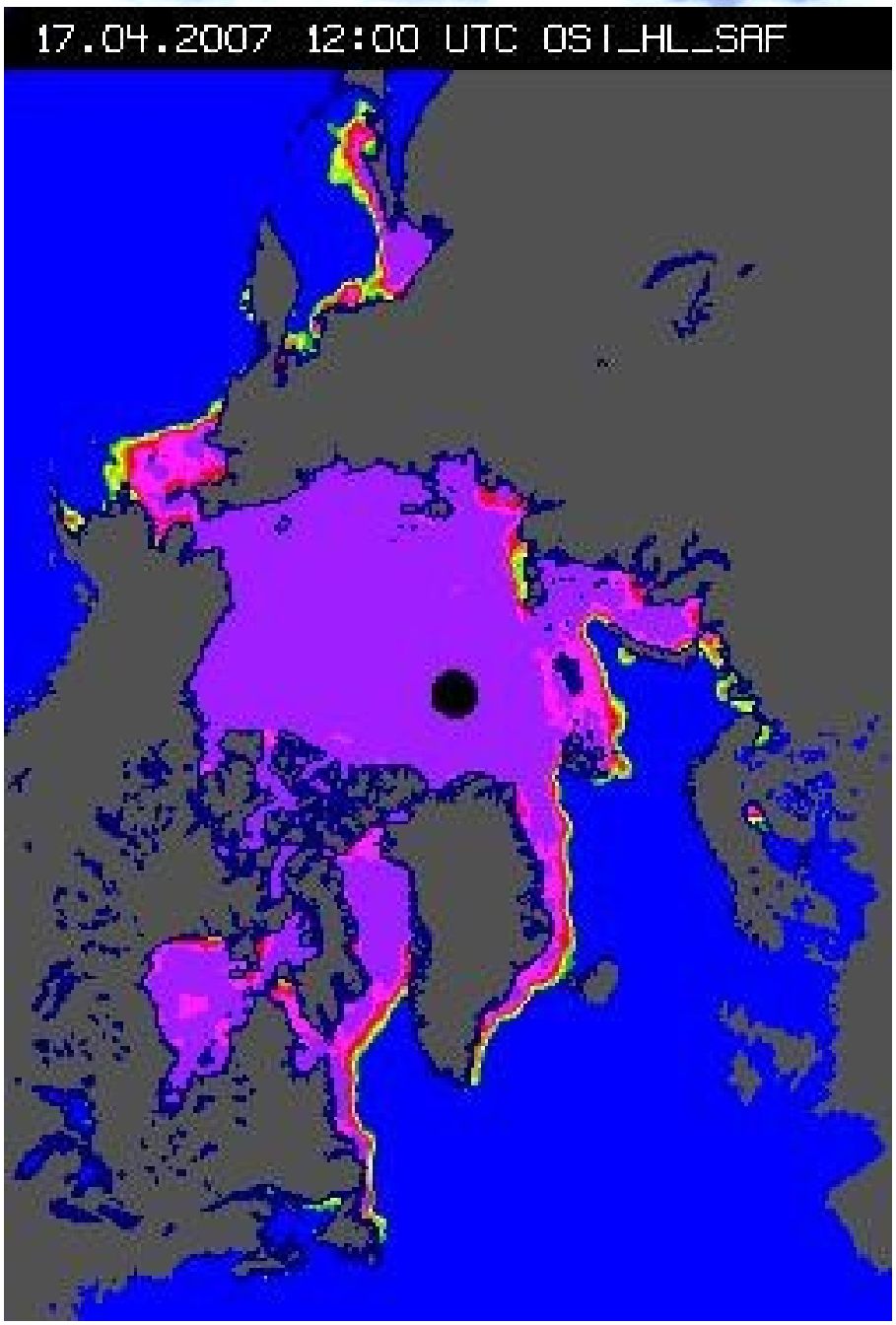
Delivers Sea Surface Temperature and Sea Ice products based on satellite data for input to operational meteorology and oceanography.

Sea Ice: hemispherical product daily (12 UTC), 10km
- Ice edge: SSM/I
- Ice concentration: SSM/I
- Ice type: SSM/I, Quickscat

MAP SST (Merged Atlantic Product) twice daily (00, 12), 10 km
- in cloud free areas
- based on Meteosat, GOES and NOAA/AVHRR

NAR SST (North Atlantic Regional) 4 times daily, 2km
- in cloud free areas, based on NOAA/AVHRR

See: http://osi-saf.org



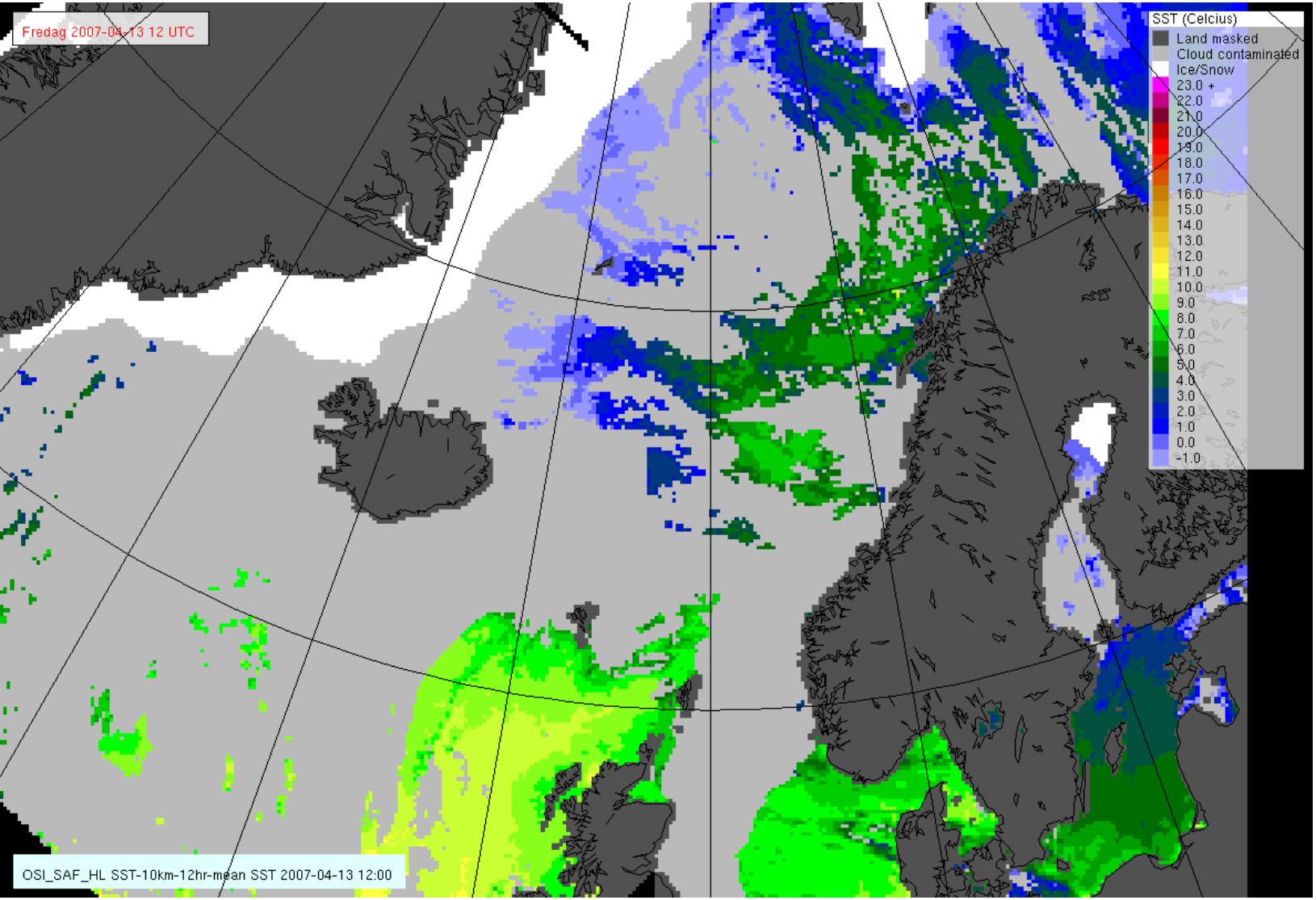
Sea Ice Concentration

- hemicpheric product
- available daily at 12UTC
- based on SSM/I

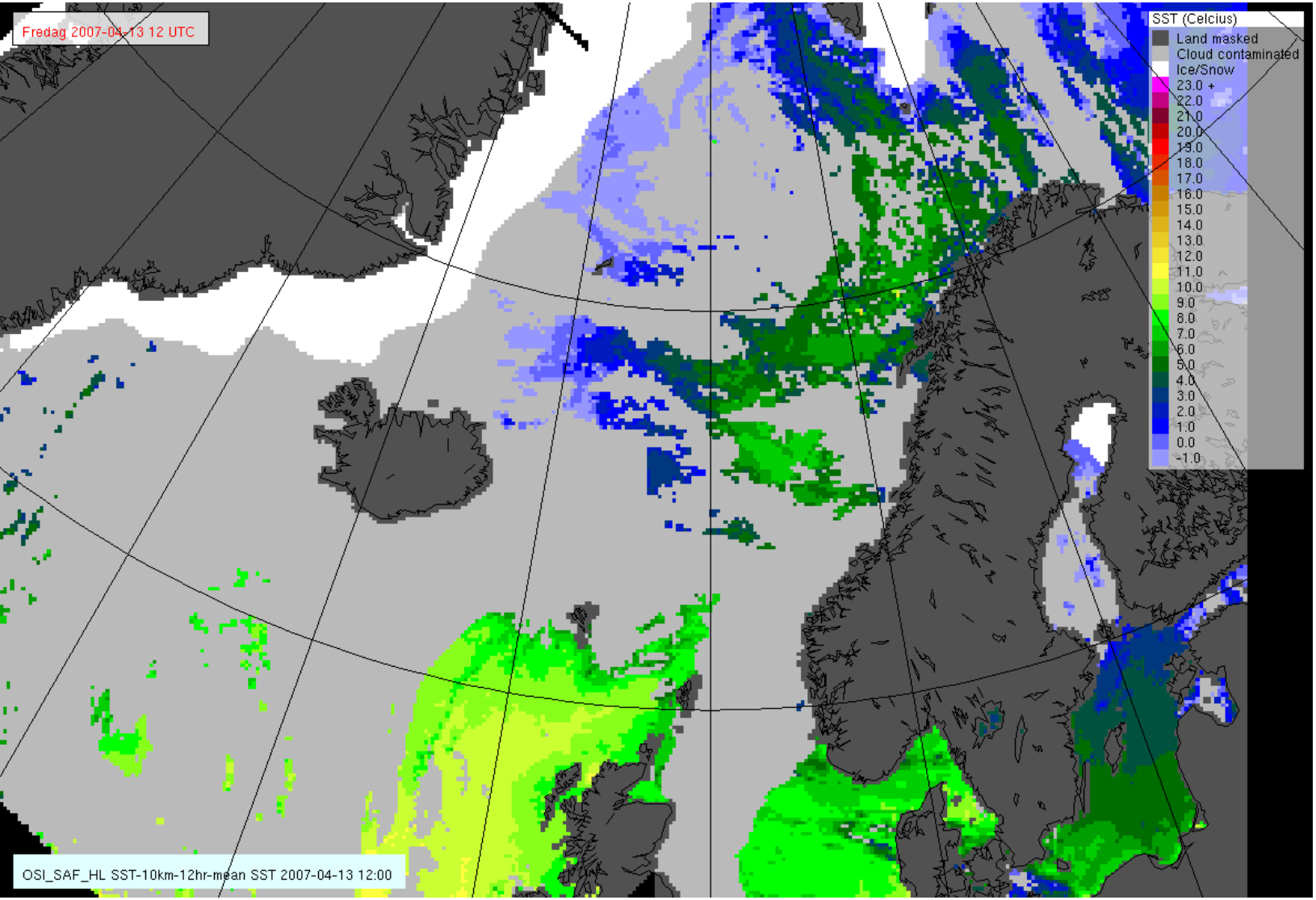
Also available

- ice edge
- ice type

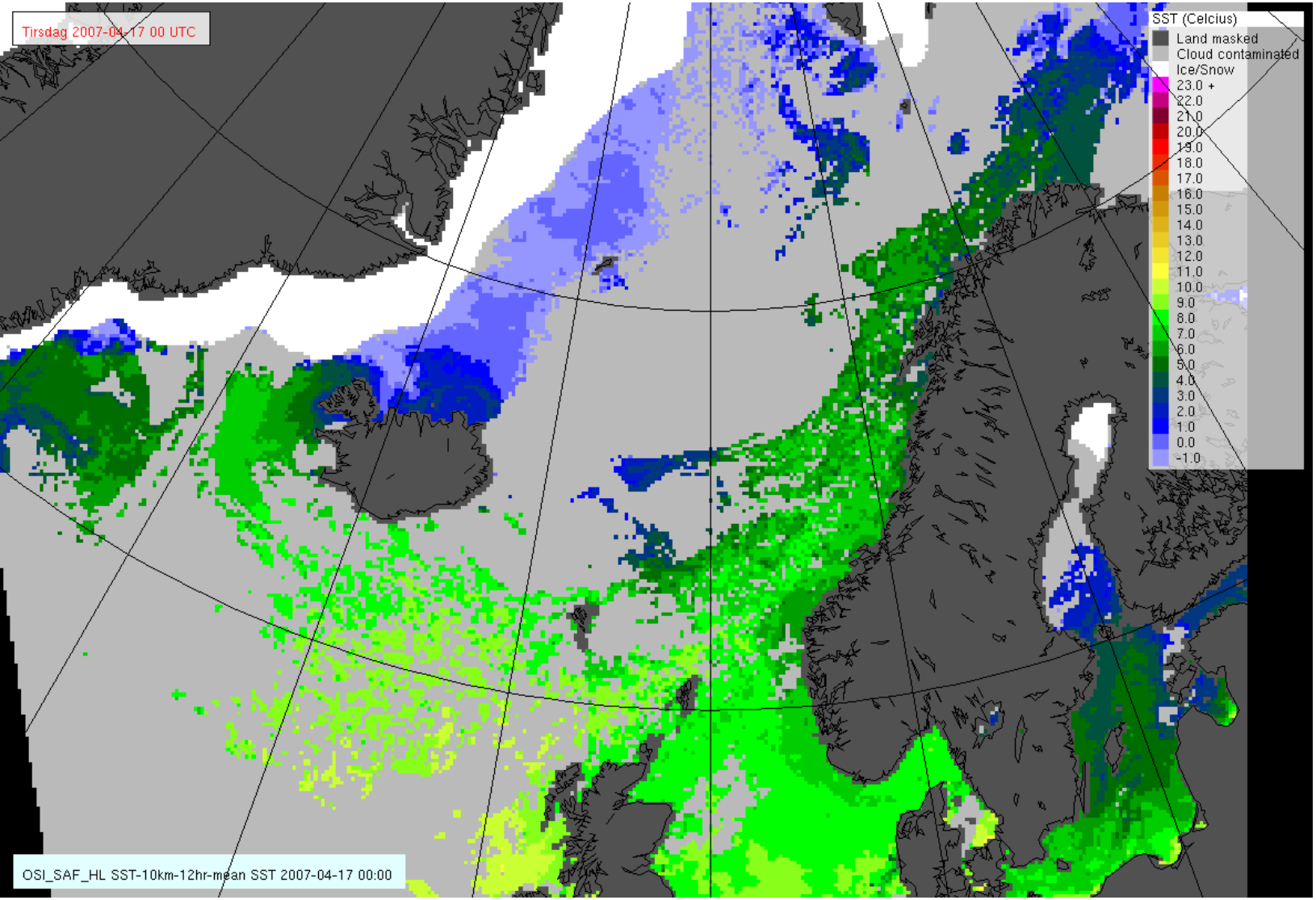
OSI SAF HL SST - MAP SST at High Latitudes



OSI SAF HL SST - MAP SST at High Latitudes



OSI SAF HL SST - MAP SST at High Latitudes

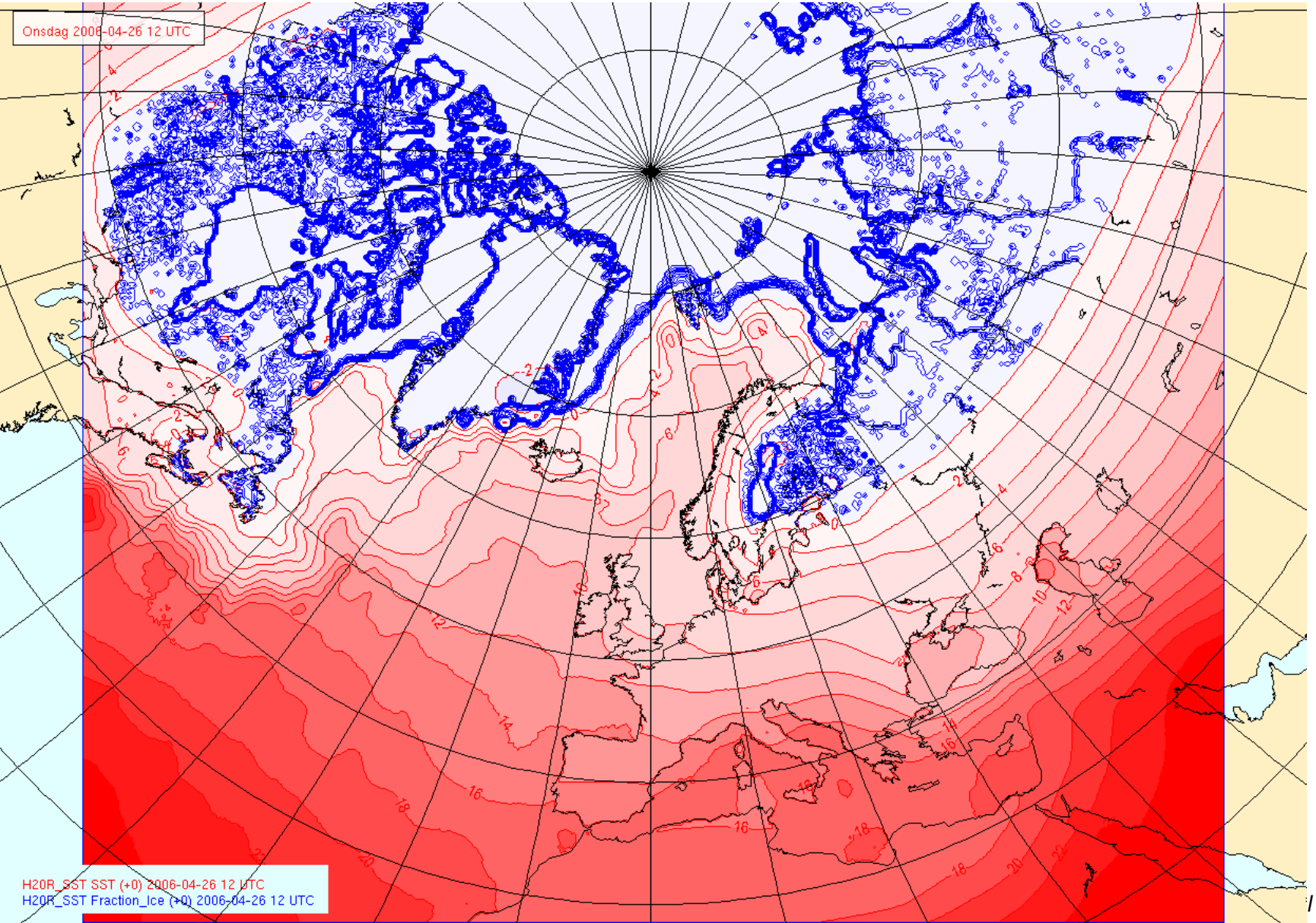


Parallel experiment April 2006

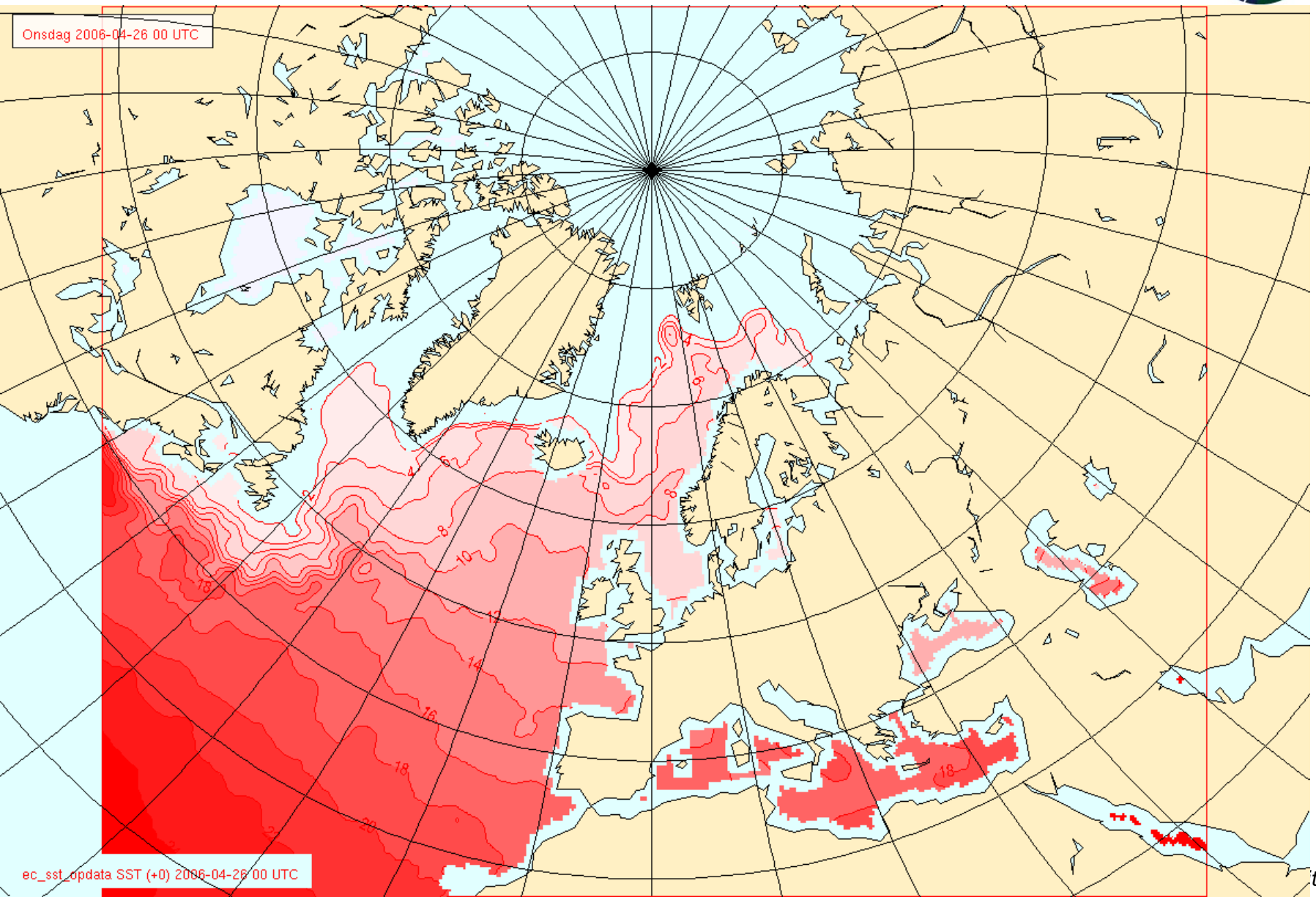
- a time period with much satellite data
- relatively rapid changes in the SST and SIC

- H20R: HIRLAM 7.0
  - SST analysed by successive corrections
    - using observations from ship and buoys and
    - pseudo observations created from ECMWF SST
  - SIC diagnosed from SST
- H20exp: HIRLAM 7.0
  - SST analysed by optimum interpolation
    - using observations from ship and buoys and
    - OSI SAF MAP SST
  - SIC updated daily from OSI SAF products

H20R SST and SIC



ECMWF SST



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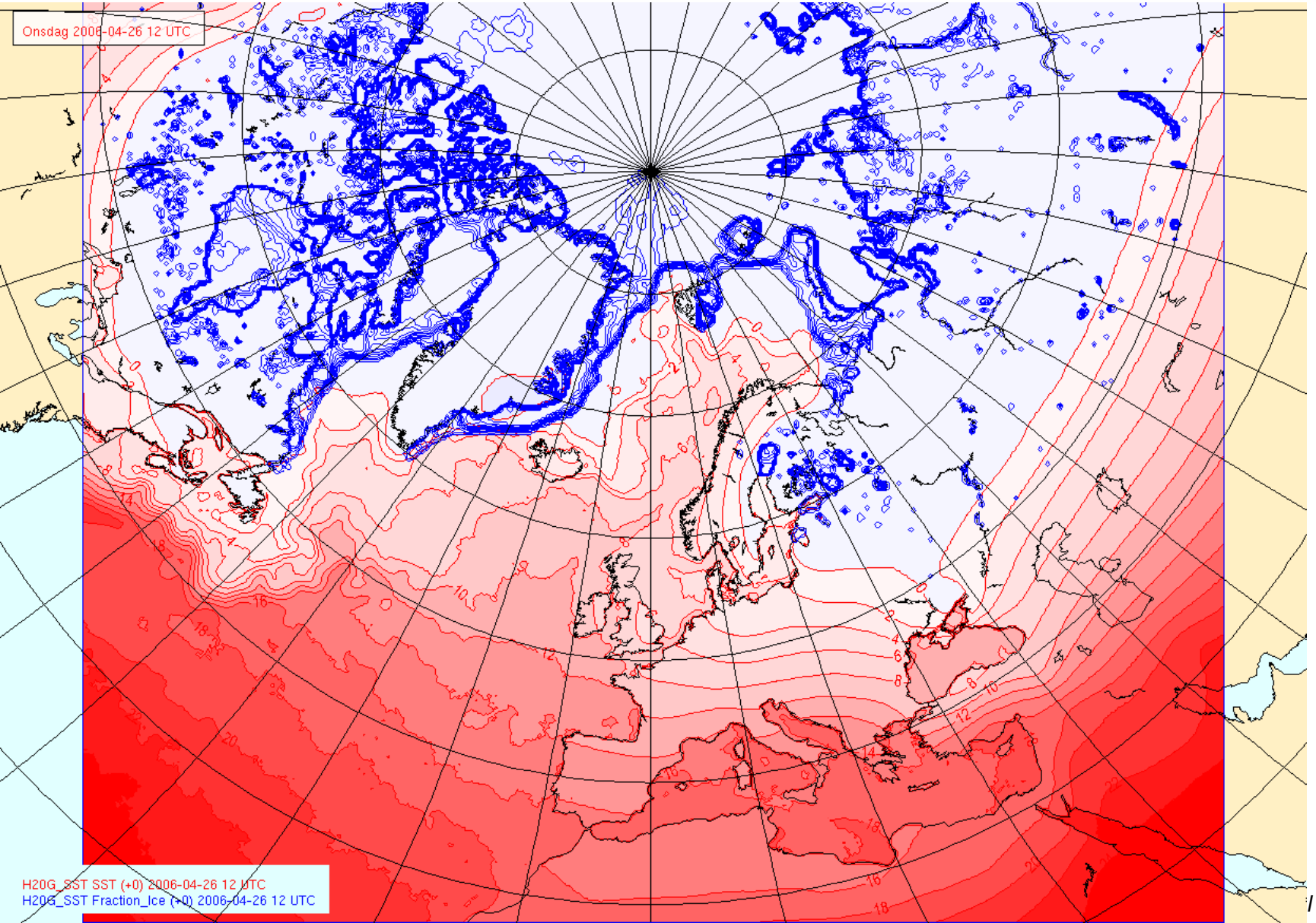
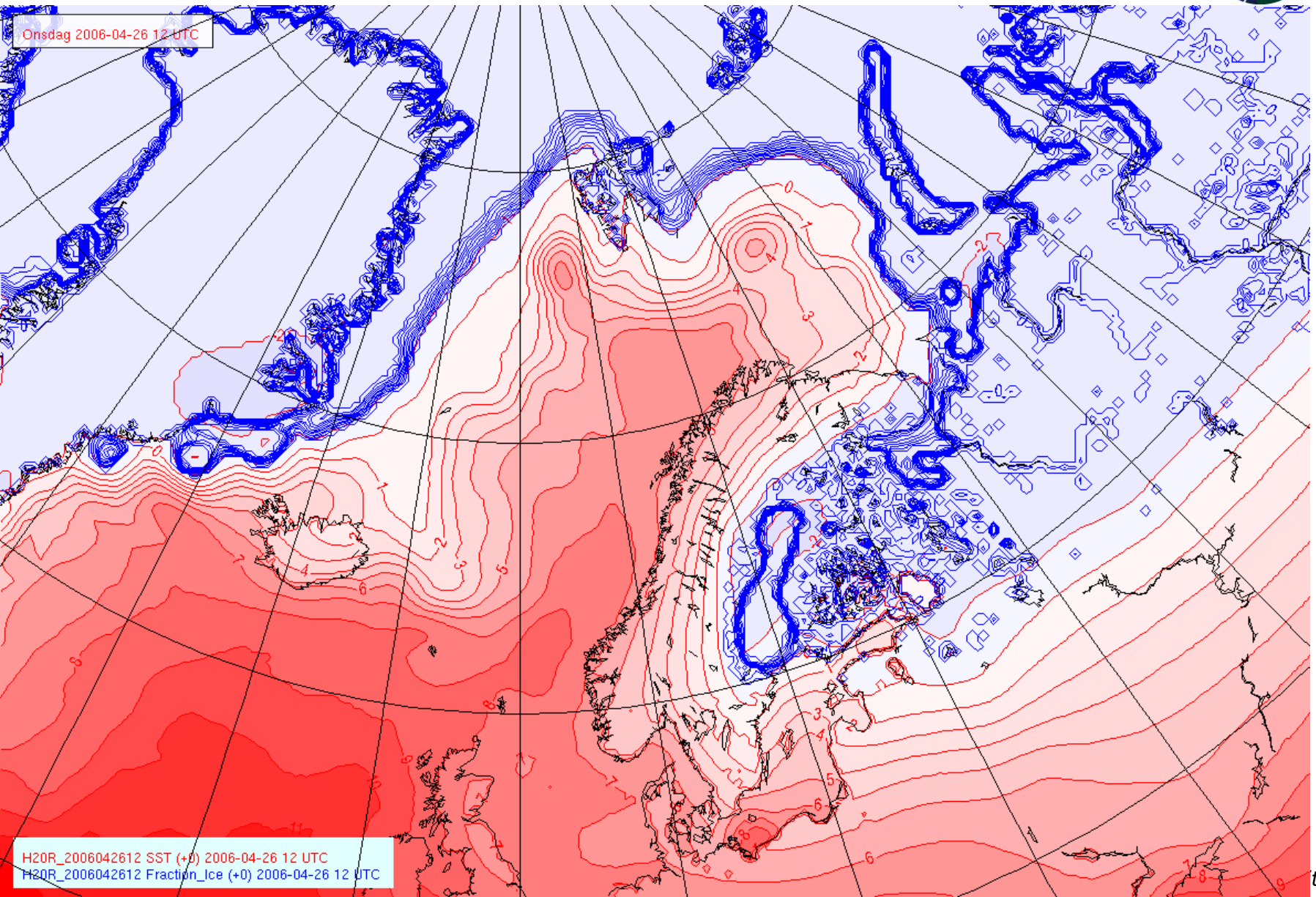
H20exp SST and SIC



H20R SST and SIC



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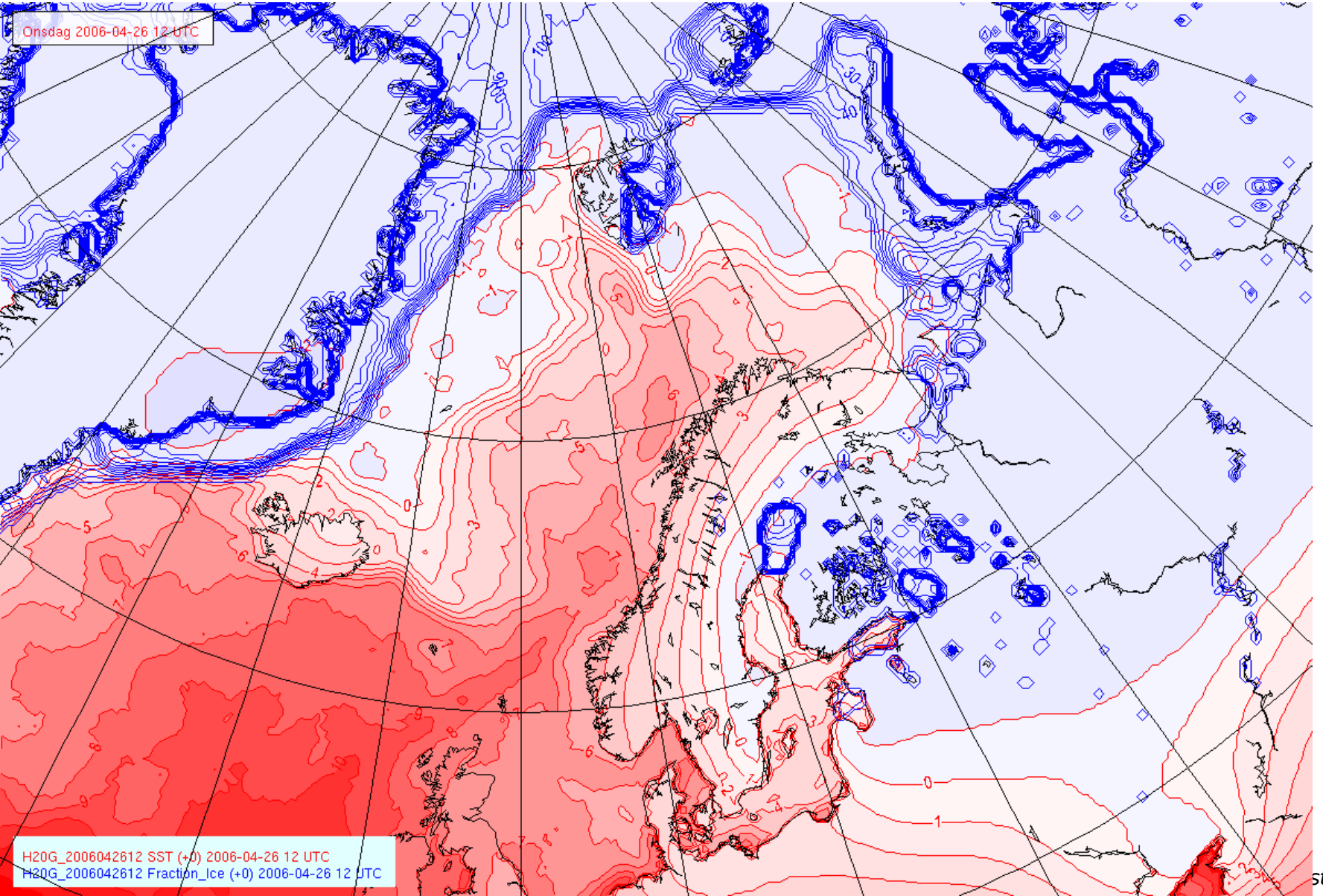
H20exp SST and SIC

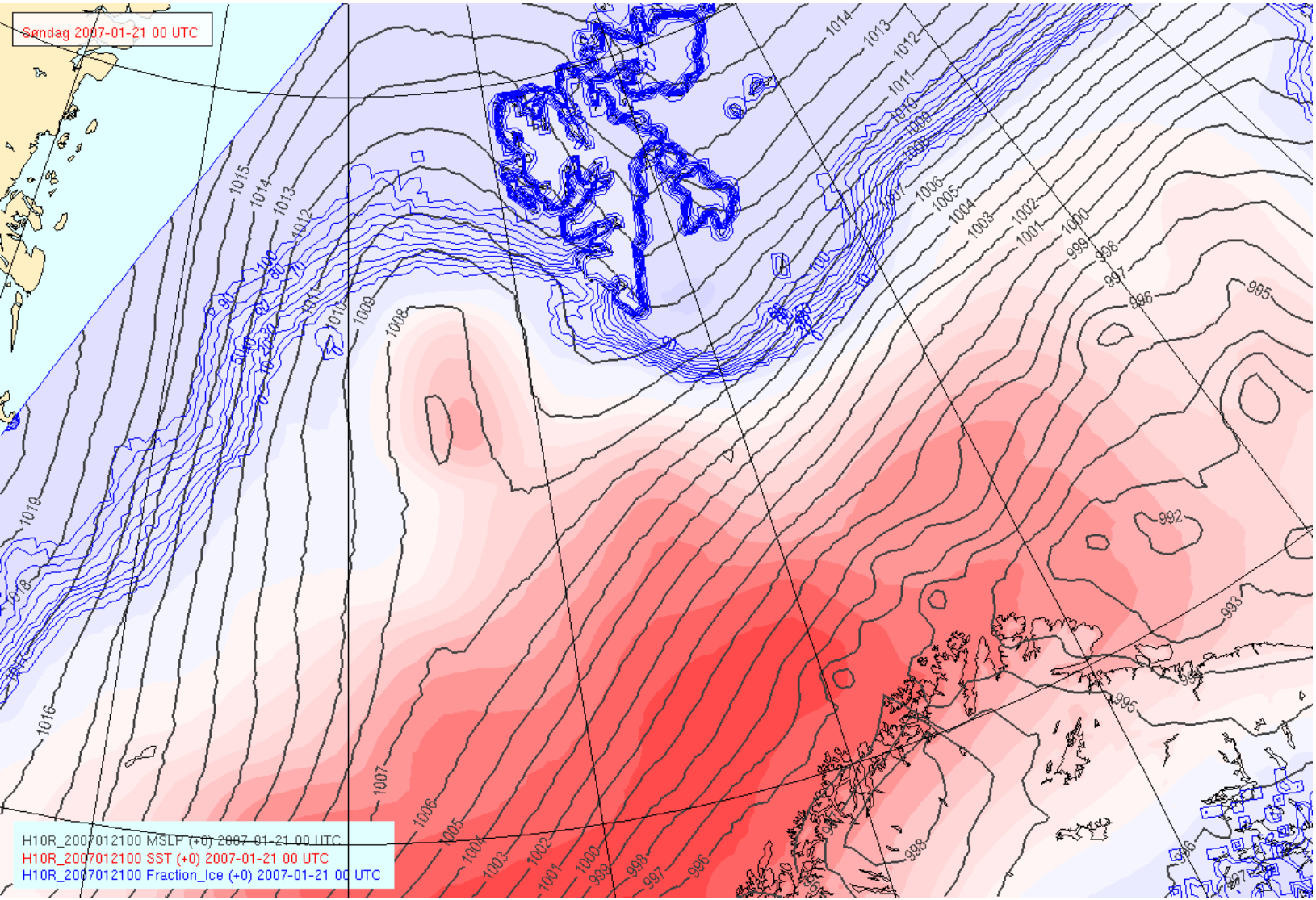


Parallel experiment January 2007

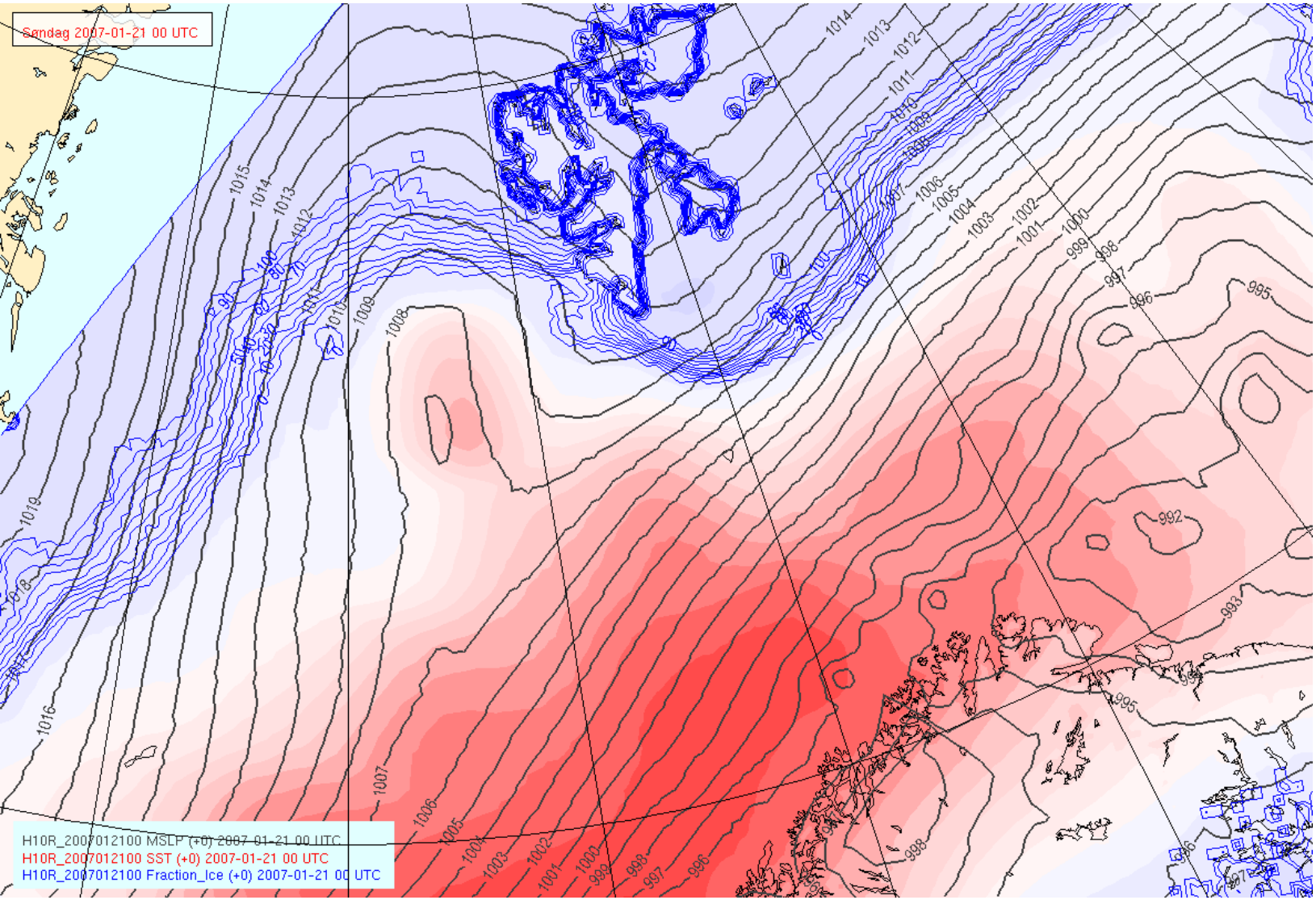
- a time period with lot of clouds and not too much satellite data
- many polar lows during that period

- H10R: HIRLAM 7.1
  - SST analysed by successive corrections
    - using observations from ship and buoys and
    - pseudo observations created from ECMWF SST
  - SIC diagnosed from SST
- H10exp: HIRLAM 7.1
  - SST analysed by optimum interpolation
    - using observations from ship and buoys and
    - OSI SAF MAP SST
  - SIC updated daily from OSI SAF products

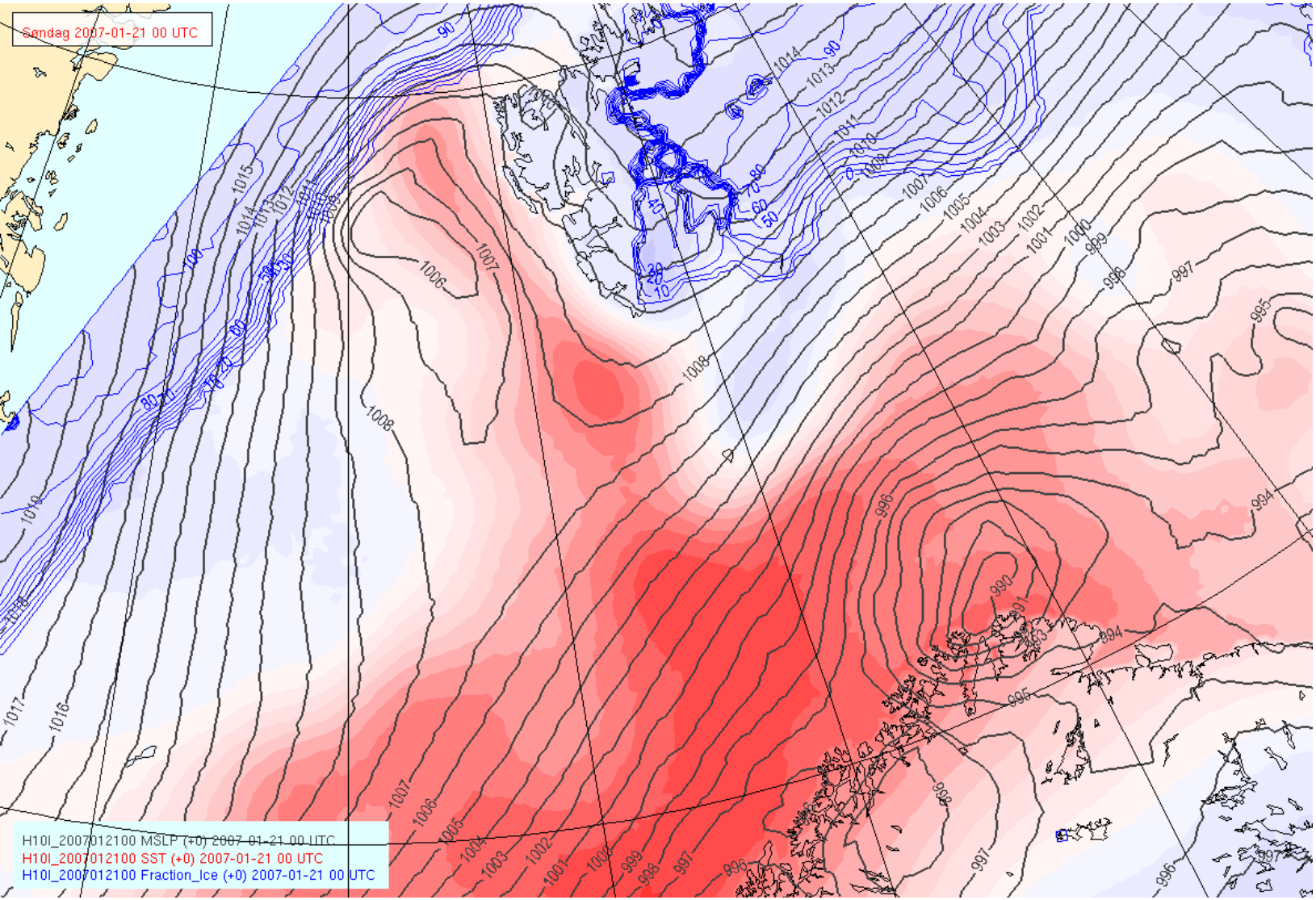
H10R January 2007 MSLP SST and SIC



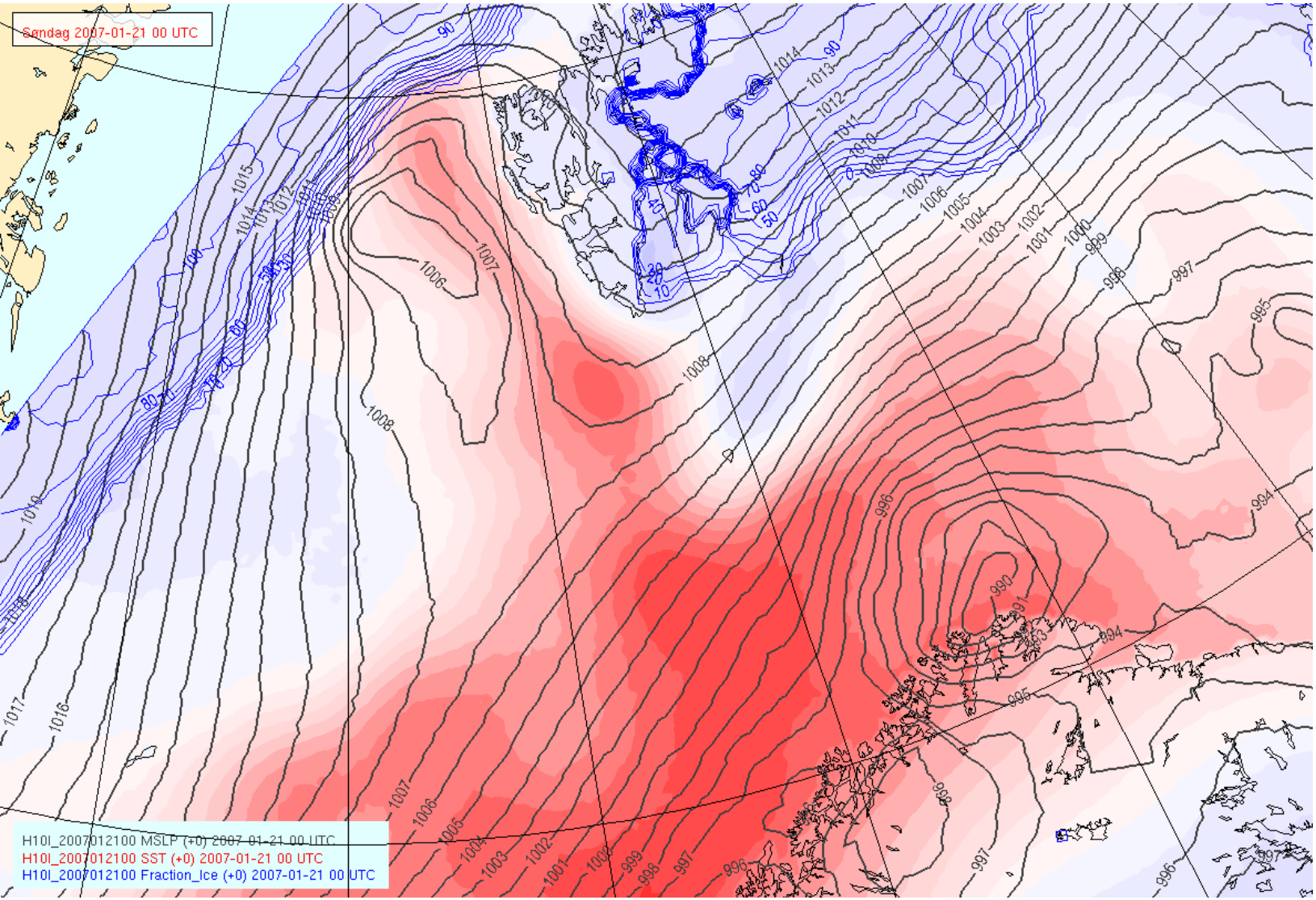
H10R January 2007 MSLP SST and SIC



H10exp January 2007 MSLP SST and SIC

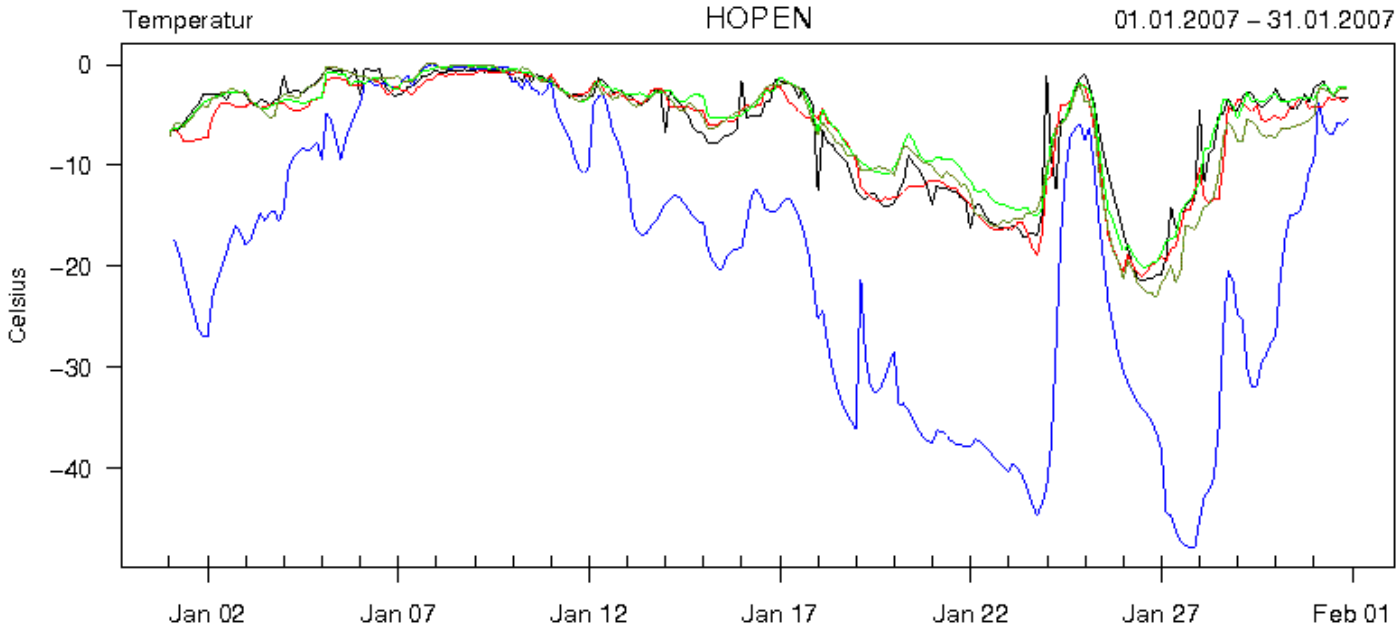


H10exp January 2007 MSLP SST and SIC



T2m at Hopen SE of Svalbard observations H10R

H10exp



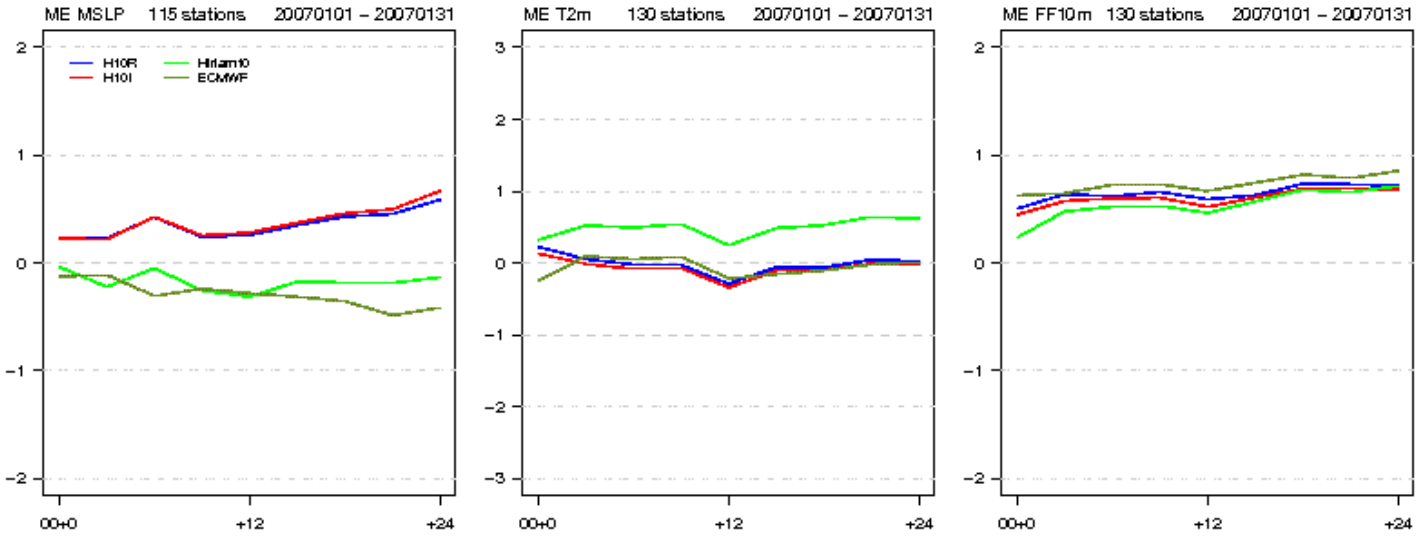
	Min	Middel	Maks	Std	N
synop: 00,...,21 /3	−21.5	−6.2	−0.3	5.6	248
H10R: 00+3,...,+24 /3	−47.9	−18.9	0.1	13.8	247
H10I: 00+3,...,+24 /3	−21	−6.7	−0.6	5.6	247
Hirlam10: 00+3,...,+24 /3	−20.1	−5.6	−0.1	4.9	248
ECMWF: 00+3,...,+24 /3	−23.1	−6.3	0.1	5.7	248

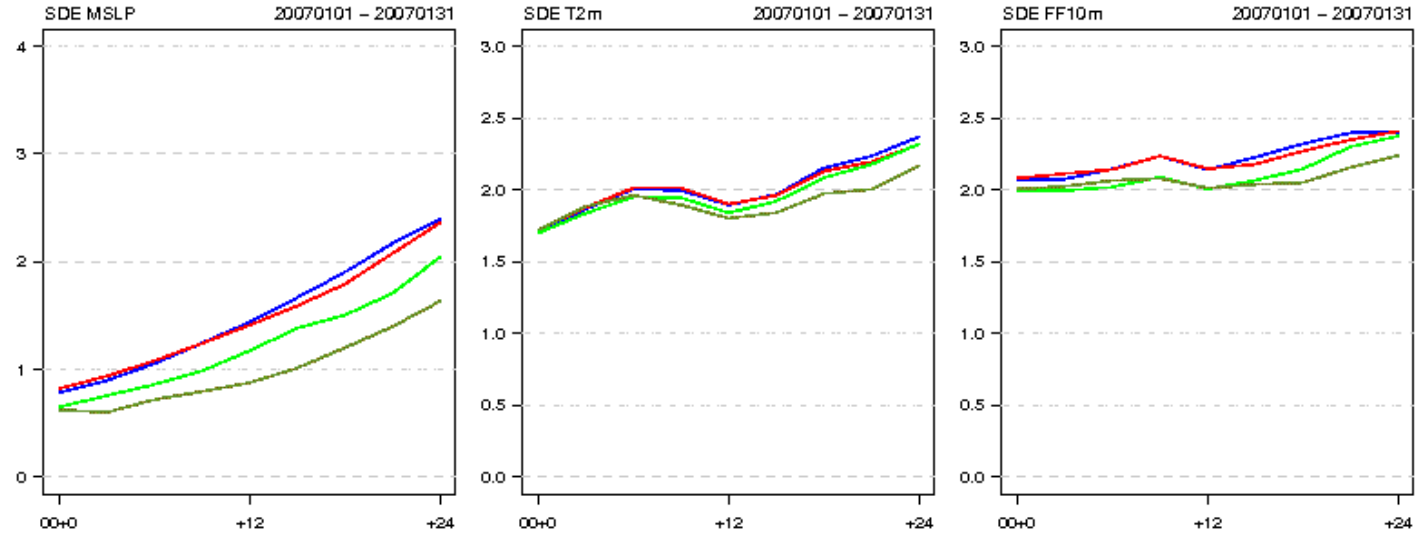
	Middelfeil	Std.feil.	RMSE	MAE	Maks.abs.feil	N
H10R – synop	−12.7	9.7	16	12.8	41	247
H10I – synop	−0.5	1.9	1.9	1.3	10.3	247
Hirlam10 – synop	0.6	1.7	1.8	1.3	10.2	248
ECMWF – synop	−0.2	2.1	2.1	1.5	10.8	248

ME and SDE of MSLP, T2m and FF10-forecasts January 2007

H10R H10exp Hirlam10 at met.no ECMWF

Scandinavian stations





SST and SIC in HIRLAM

Alternatives discussed in Dublin 2 years ago:

A. Assimilation of satellite data in HIRLAM

B. Include fields processed by OSI SAF or others

Status 2007:

SIC - OSI SAF delivers a hemispheric product with good quality daily

- OSI SAF SIC has been used operationally at met.no since April 2005 and will be available in the next version of HIRLAM

SST - global SST products and analysis based on satellite data are available from e.g. the MERSEA project

- experiments with assimilation of OSI SAF SST in HIRLAM by OI give good results, and will probably be implemented in HIRLAM