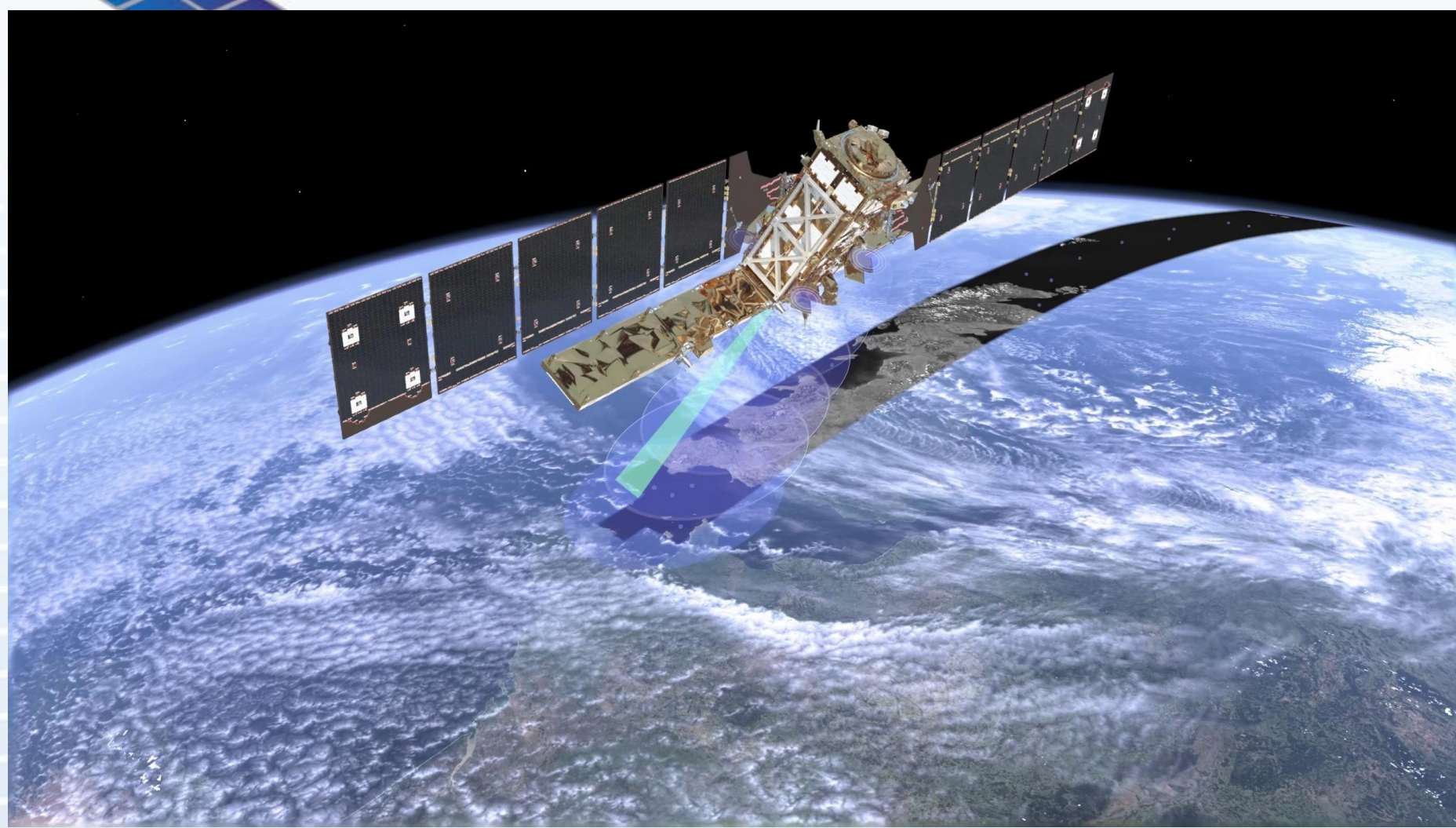


On the combined assimilation of swath SWH and directional wave spectra in the model MFWAM :
Update with Sentinel-1C Data

L. Aouf⁽¹⁾, L. Ferraton⁽¹⁾, Jiuke Wang⁽²⁾
⁽¹⁾ Météo France, DIROP-CNRM, Toulouse, France
⁽²⁾ University of Sun-Yat Sen, Zhuhai, China

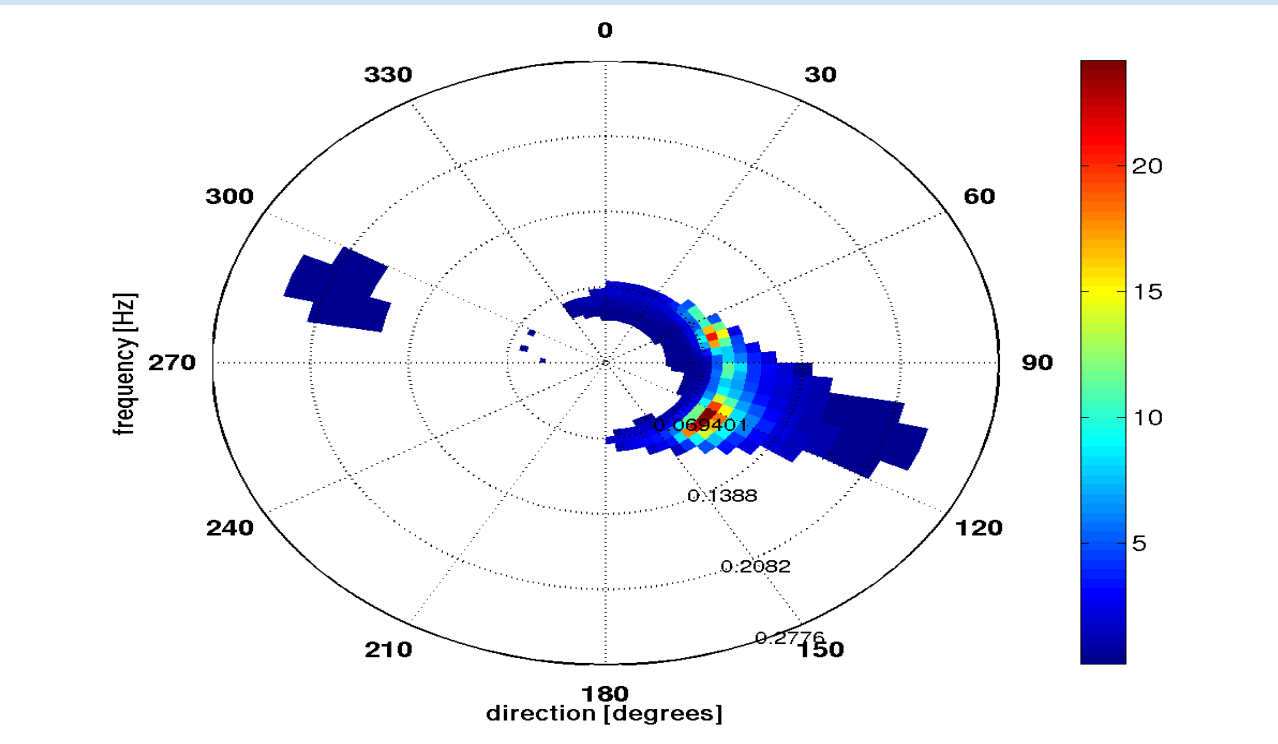
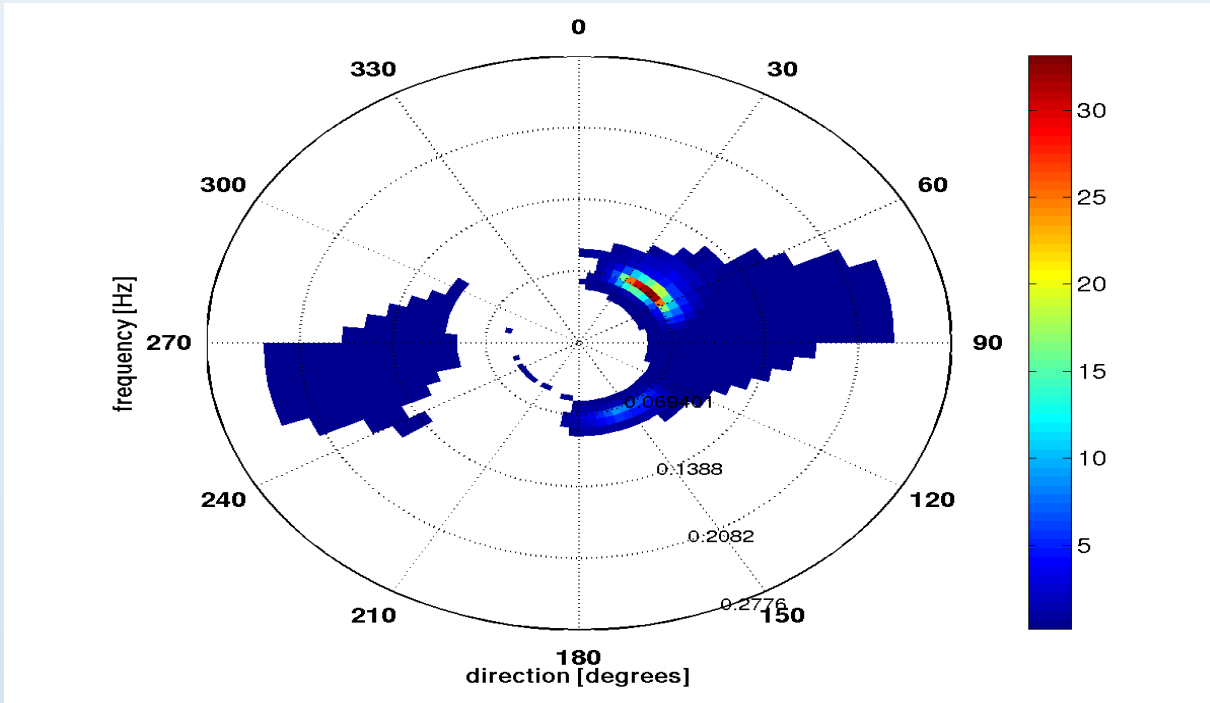
Poster ID : 258
Corresponding author : lotfi.aouf@meteo.fr

- Evaluating the assimilation of directional wave spectra from Seninel-1C : ensuring improved wave parameters for the Copernicus Marine service
- Improved data coverage in global ocean with directional wave observations (S1A and CFOSAT) : enhanced impact for swell propagation over global ocean
- Update combined assimilation of wide swath SWH (HY2 and CFOSAT) with Sentinel-1C wave data



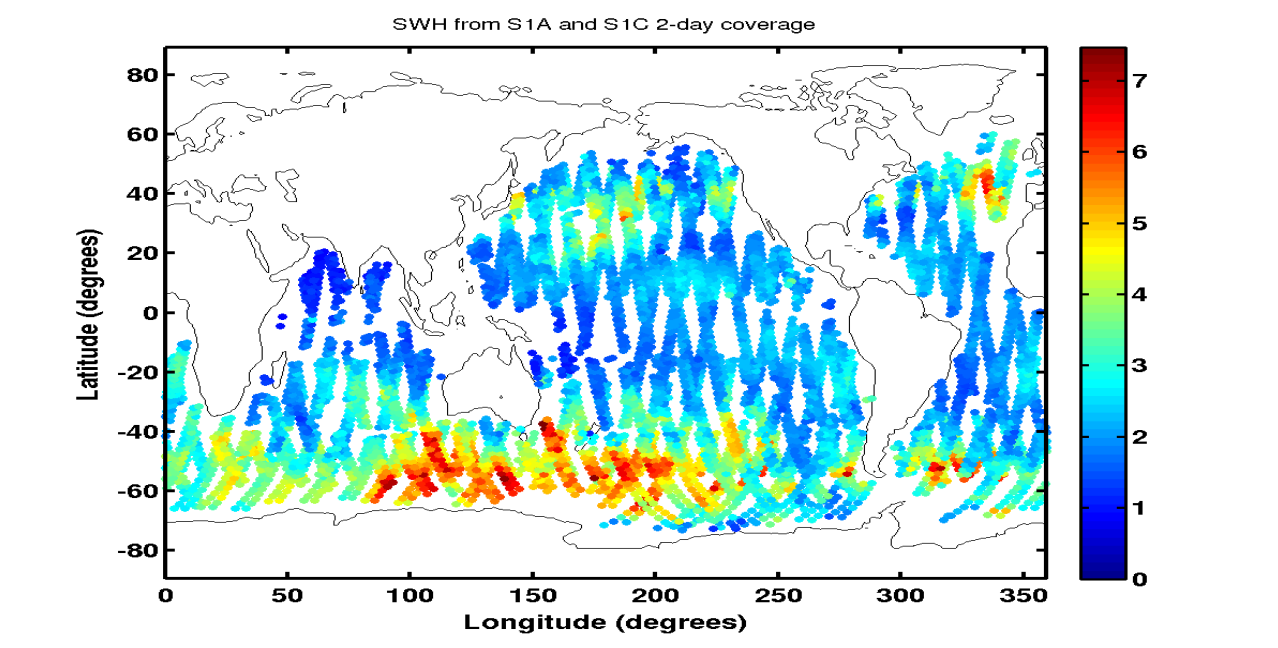
Level 2 directiona wave spectra and wind speed
Provided by ESA :

Wave spectra

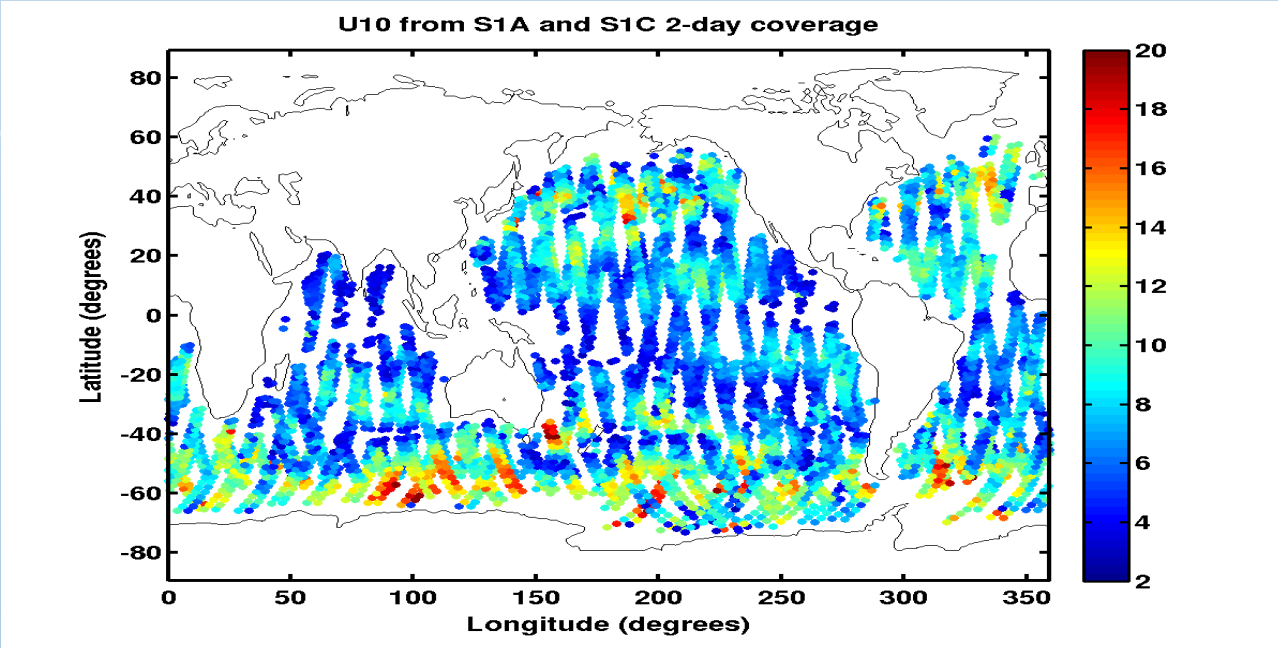


2-day data coverage from S1A & 1C

Significant Wave Height

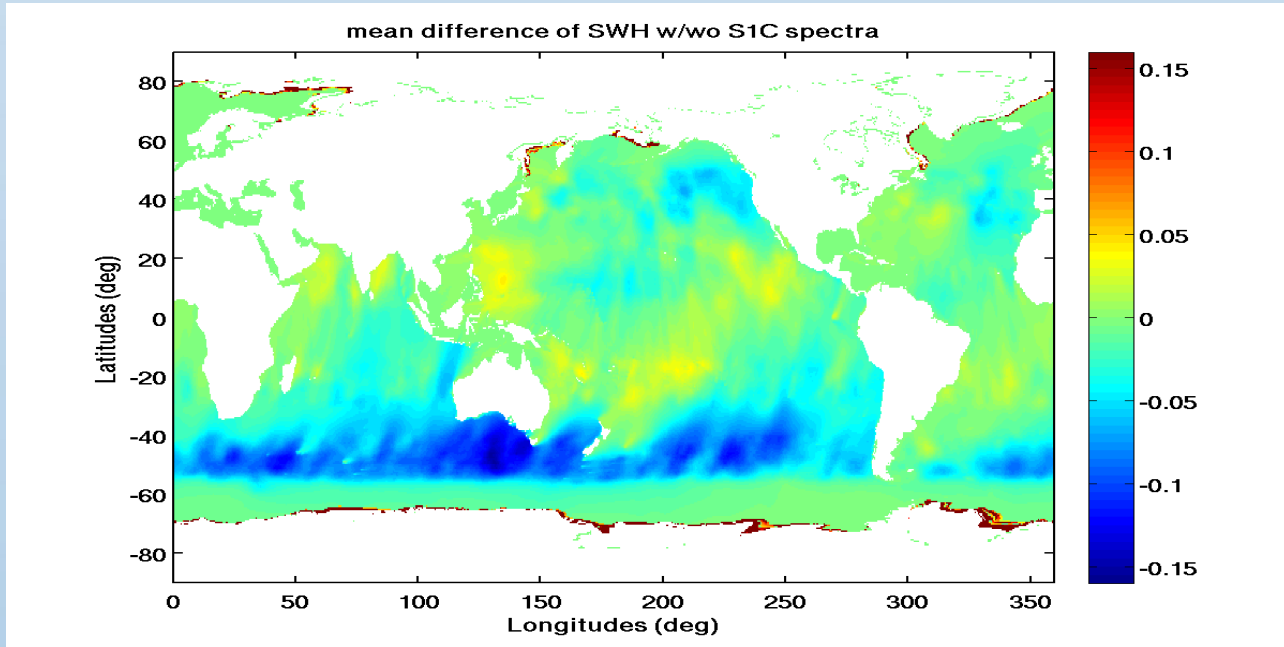


10-m Wind speed U10



Average difference w/wo assimilation of S1C spectra
1 to 26 April 2025

Significant Wave Height

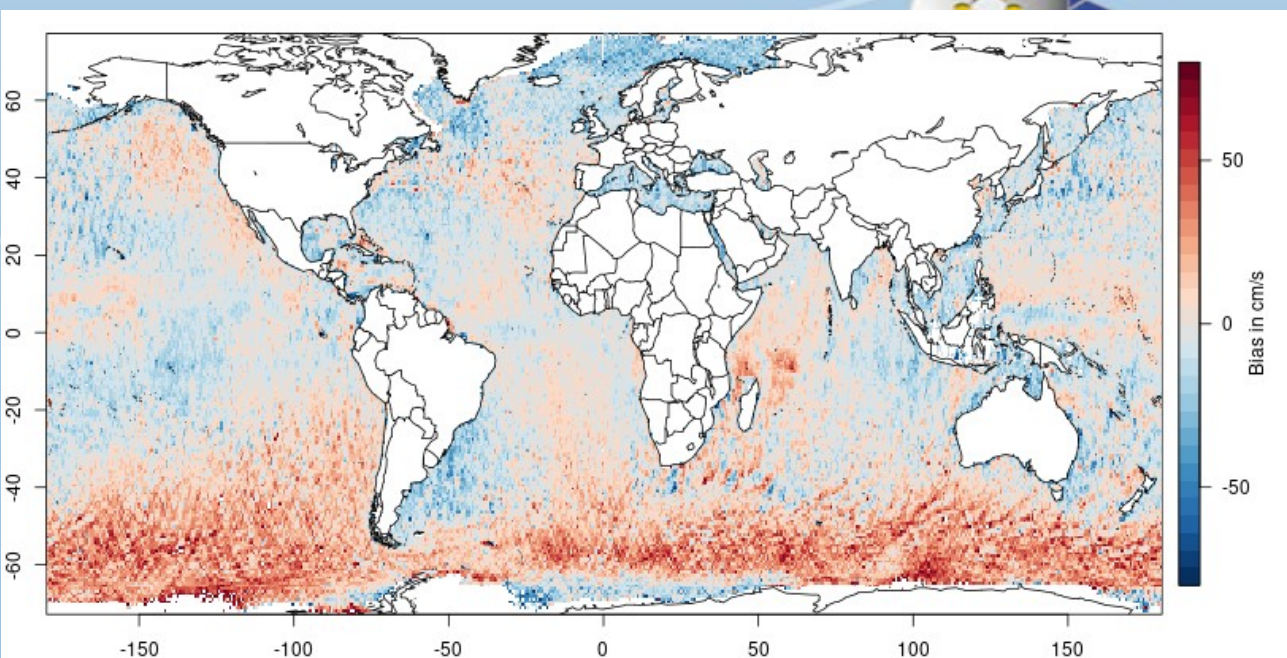


Blue : model overestimation
Red ; model underestimation

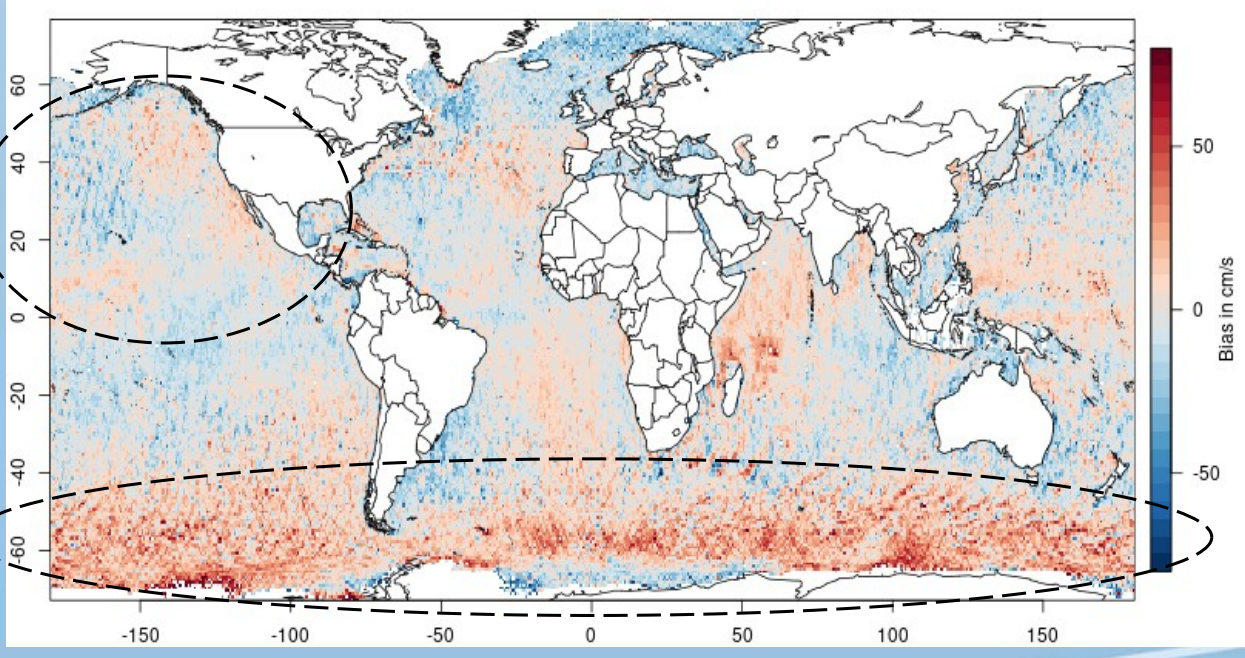
Synergy between Sentinel-1A & 1C : SWH and wave spectra

SWH bias maps (in cm)

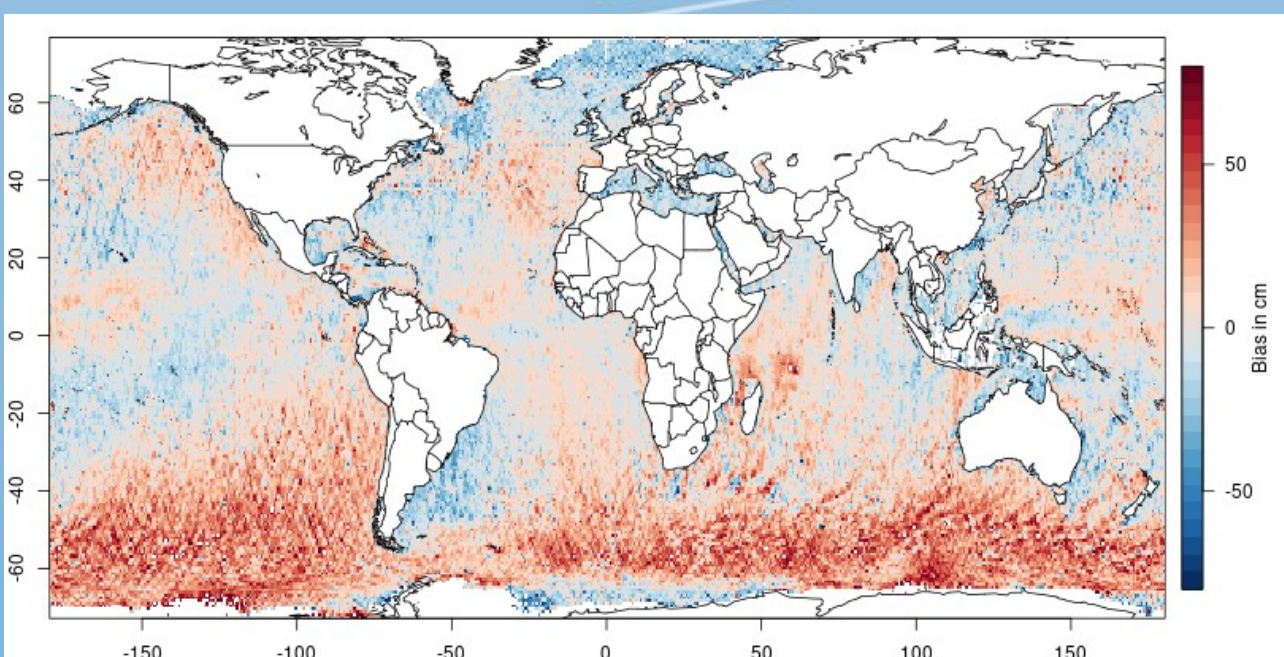
Assimilation of S1C



Assimilation of S1A & S1C



NOASSI

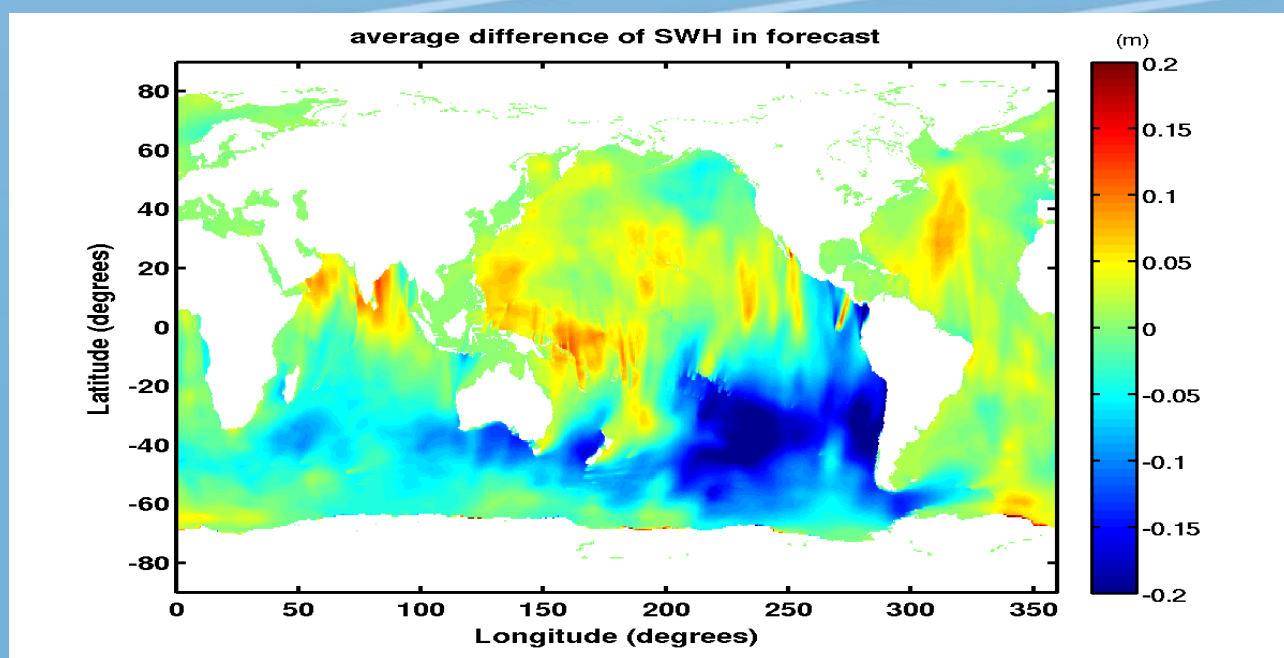


Enhanced SWH bias reduction when using jointly S1A and S1C

Comparison with
SWH altimeters

Impact of joint assimilation of CFOSAT and Sentinel-1A & 1C
during the forecast

Average difference of SWH in the forecast



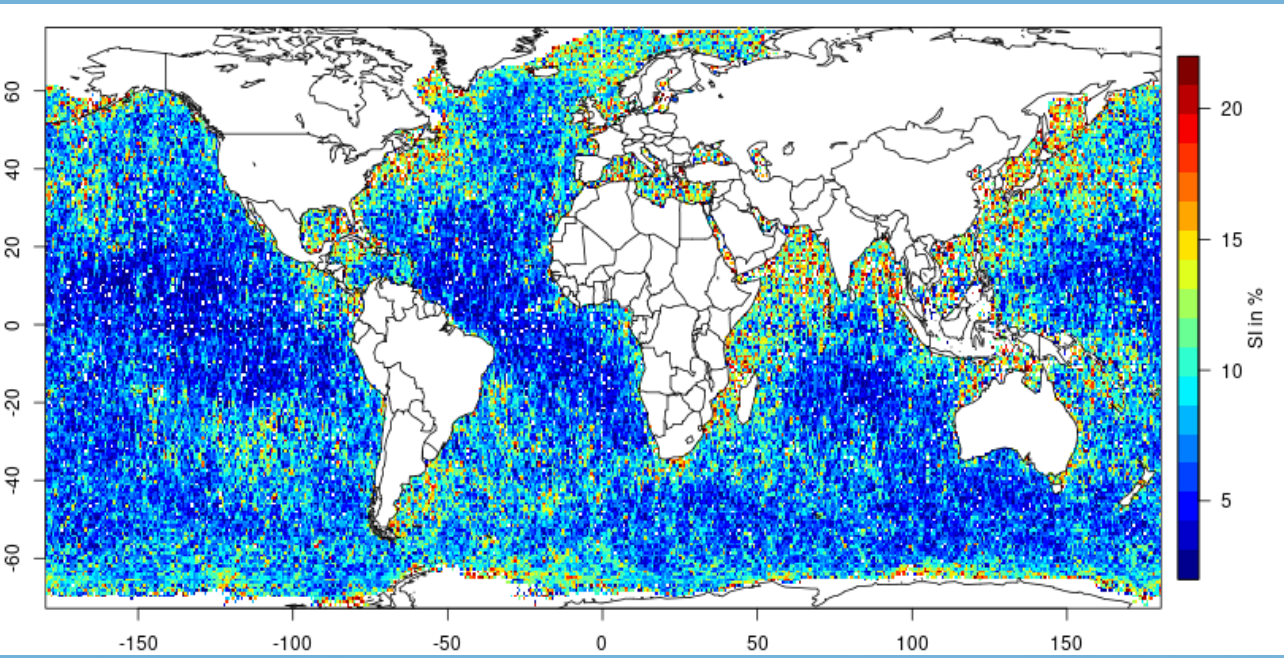
Swell tracks from SO are significantly affected during the forecast (max. average of more than 20 cm)
Negative and positive values stand for Overestimation and underestimation, respectively

Joint assimilation of wave spectra and SWH from Sentinel-1A & 1C
April 2025

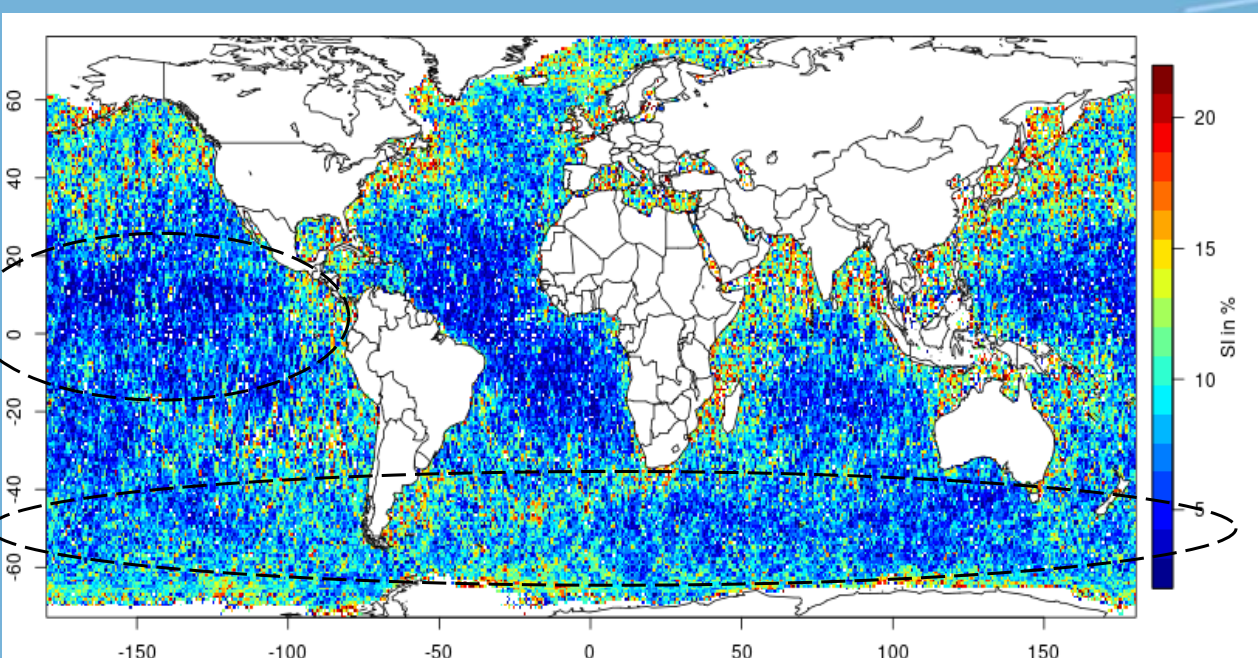
Scatter index of SWH maps (in %)

The smaller SI, the better

With Assimilation S1A & 1C



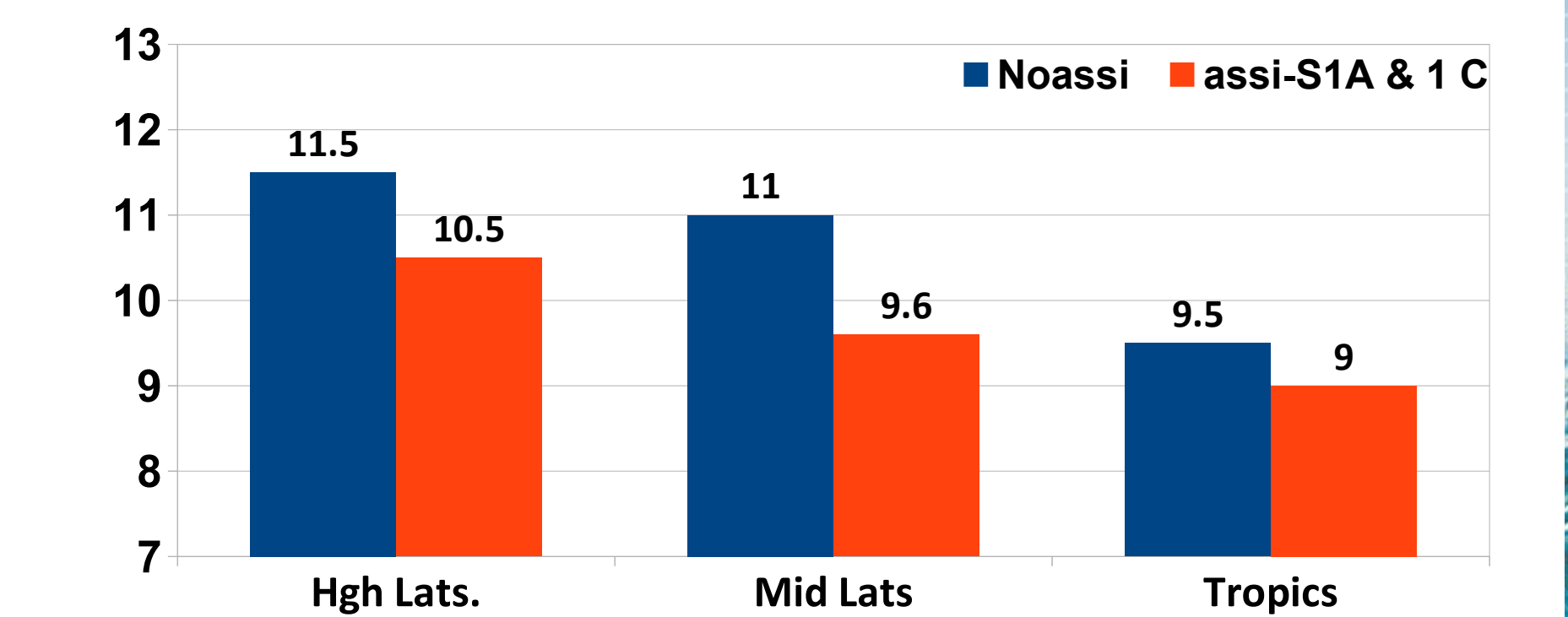
Without assimilation



Good reduction of SWH bias in
SO and mid latitudes

Significant reduction of SI in mid latitudes

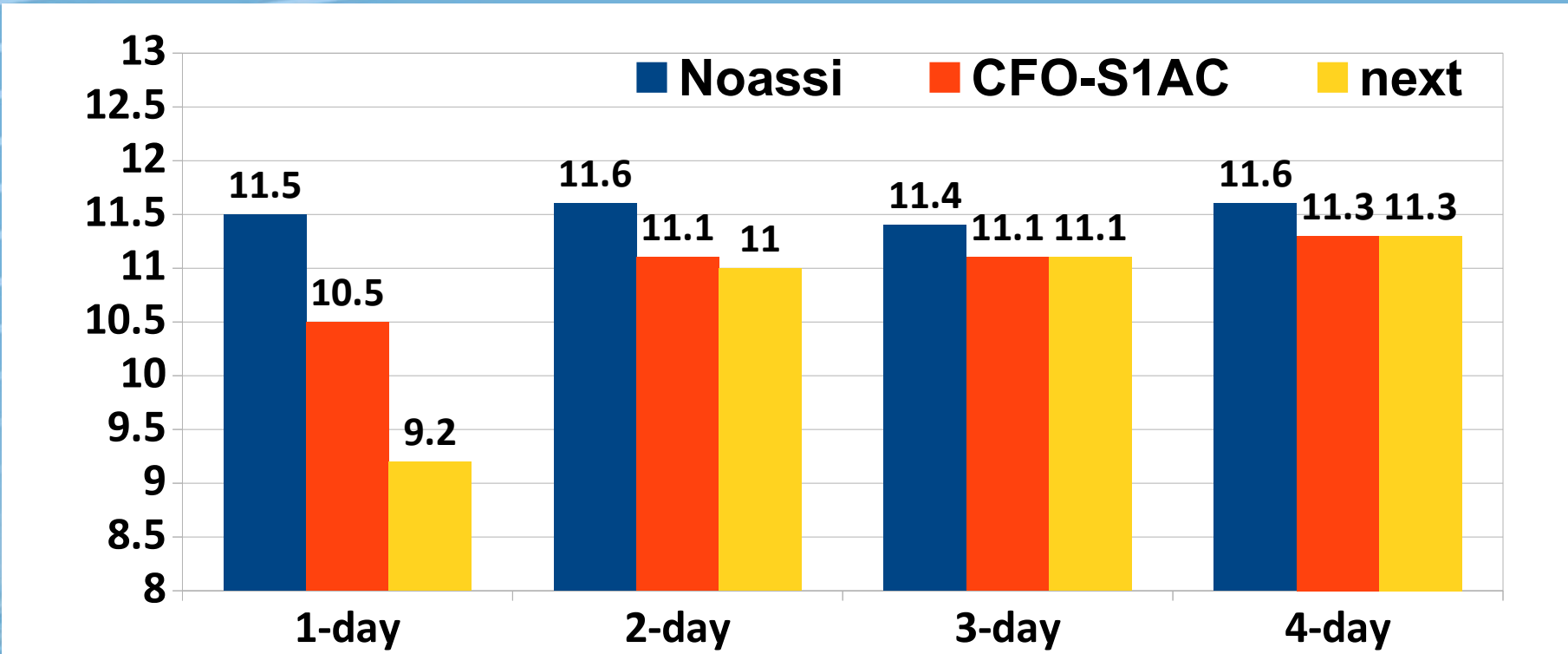
Scatter index
of SWH (%)



Scatter index
of SWH (%)

Impact on SWH still efficient after
3 days of forecast

Performance of the assimilation in the forecast mode



Forecast lead in time

Key messages

- Very positive impact of the assimilation of S-1C wave data on integrated wave parameters : ready to update the assimilation for operational global model MFWAM
- Very promising DA of jointly S1A, S1C and CFOSAT : enhanced impact in the analysis and in the forecast (impact efficiency of ~4-day) : good perspective for the wave reanalysis
- Joint assimilation of wide swath SWH and directional wave spectra from S1 and CFOSAT will enhance the impact and improve the data base performed in the frame of Dragon-6 proposal