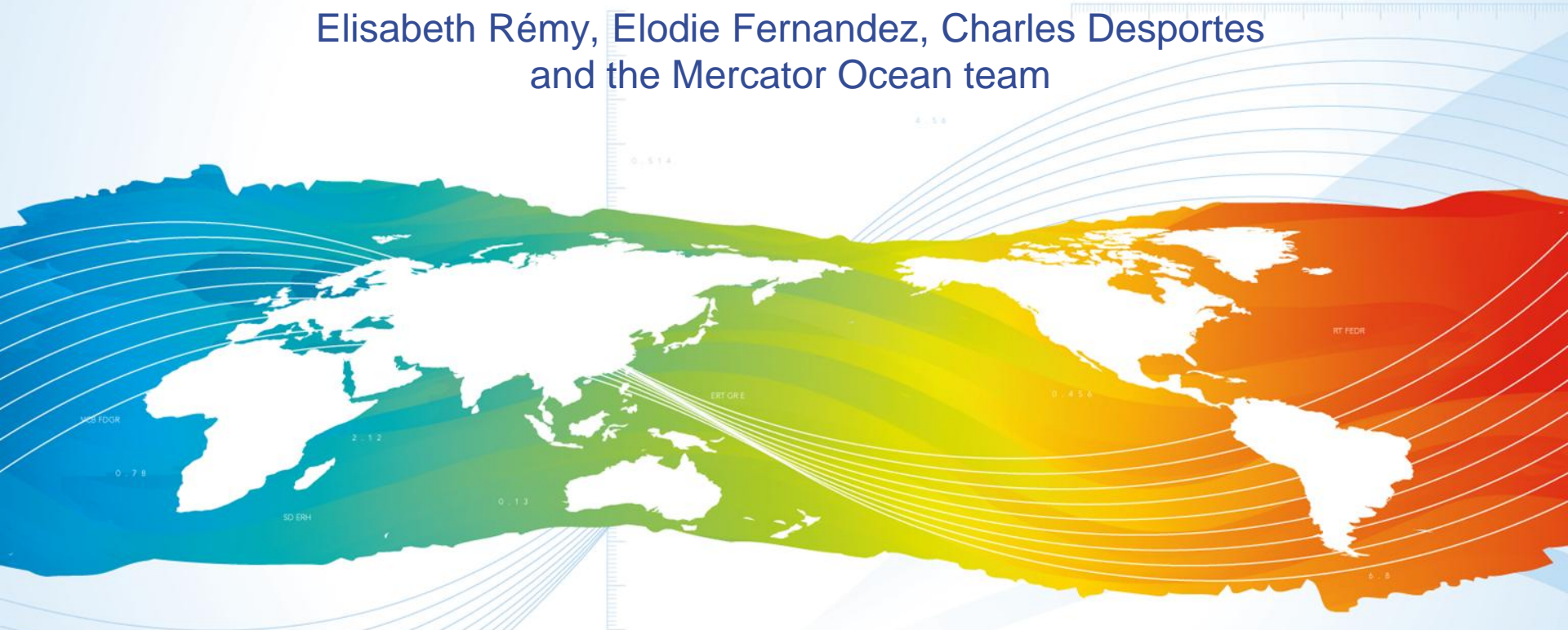# Assimilation of the SARAL/AltiKa SLA data in the Mercator Ocean analysis and forecasting system

Elisabeth Rémy, Elodie Fernandez, Charles Desportes
and the Mercator Ocean team

Mercator Ocean
Ocean Forecasters

Mercator Ocean: French Operational Oceanography Centre

5 shareholders CNRS, IFREMER, IRD, Météo-France, SHOM and CNES as a key-partner.
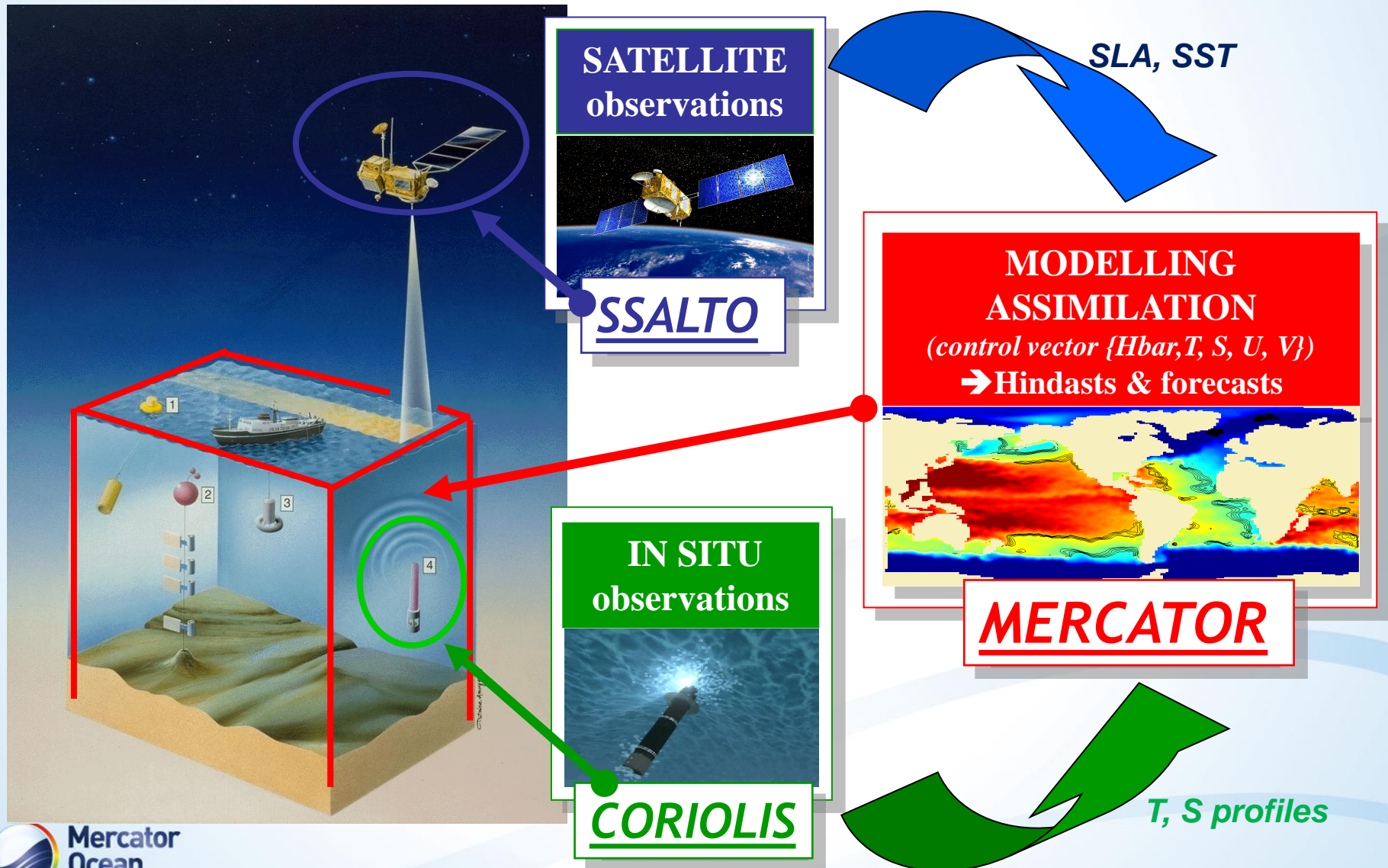

Missions:

- Develop and operate systems able to describe, monitor and forecast the global ocean from the deep ocean to the surface.

- Distribute ocean products and give expertise to users

- Coordinator of the MyOcean2 project involving ocean operational monitoring & forecasting centers and partners from the maritime community in Europe.

Mercator Ocean Centre
Ramonville St Agne
Toulouse, France

Mercator Ocean integrated systems

SATELLITE observations

SSALTO

SLA, SST

MODELLING ASSIMILATION
(control vector {Hbar,T, S, U, V})
➔ **Hindasts & forecasts**

MERCATOR

IN SITU observations

CORIOLIS

T, S profiles

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Global 1/12° ocean system (PSY4)

The along track SLA of AltiKa provided by SSALTO/DUACS has been assimilated in the different operational systems since the 31th of July 2013.

      - no technical problem occurs (load/use of the data),

      - no significant « anomalous » response during the assimilation process (data rejection, bias, high model misfit…) found so far.

We focus on the global 1/12° ocean system (PSY42r2, MyOcean product).

- Global ocean and ice model, 1/12° horizontal resolution, 50 vertical levels, atmospheric forcing each 3-hour by ECMWF fields.

- Weekly analysis : SAM2v1 assimilation component + bias correction in T,S and Incremental Analysis Update

- Assimilated observation : AVHRR-AMSR 1/4° SST; NRT Along track SLA from SSALTO/DUACS (Verified/Filtered/Subsampled/Corrected, IGDR/OGDR); In situ Temperature and salinity profiles from Coriolis; hybrid MSSH.

At the end of July, two analysis for the same week were done with and whithout the SARAL SLA observations assimilated, before they were routinely added as input of the systems.
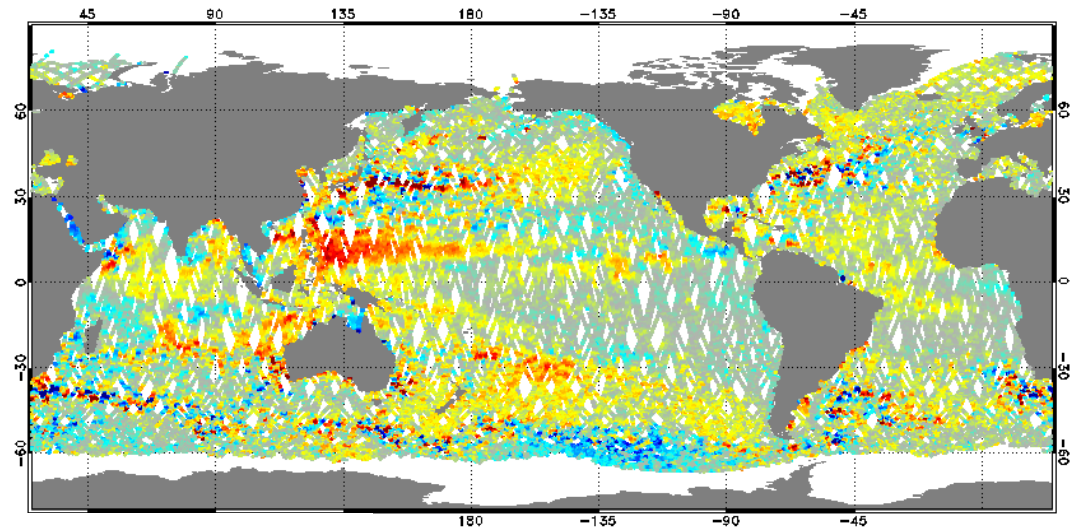
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Altimetry tracks

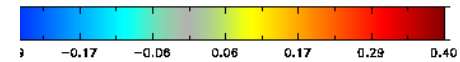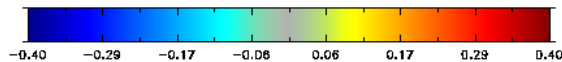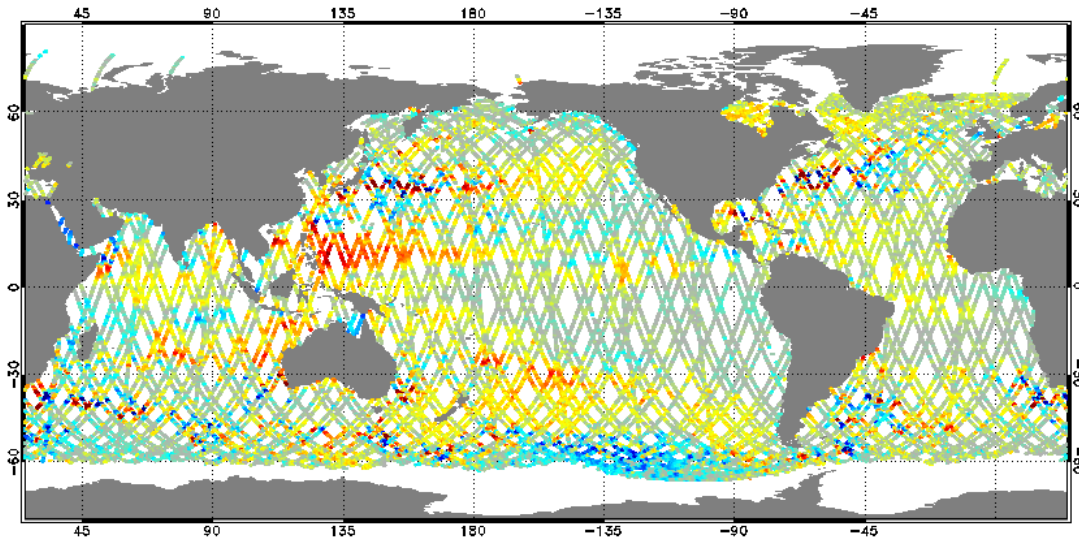Tracks during the last week of July 2013

           - with AltiKa

- without AltiKa

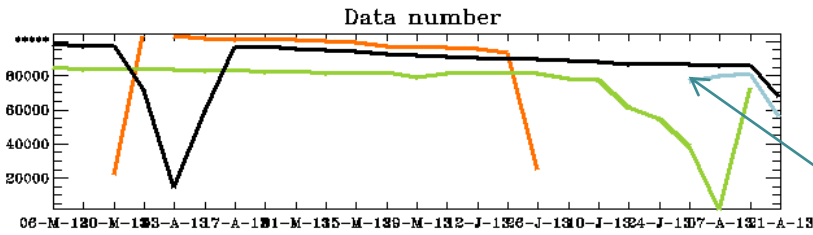obs altimetric sla data : TRACK SLA on 31-07-2013

obs altimetric sla data : TRACK SLA on 31-07-2013
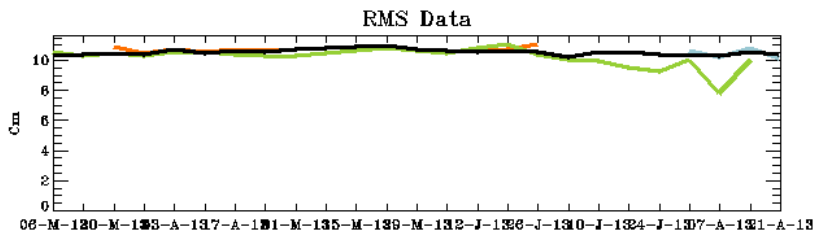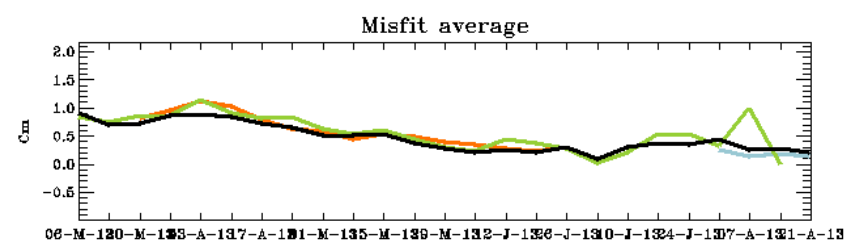
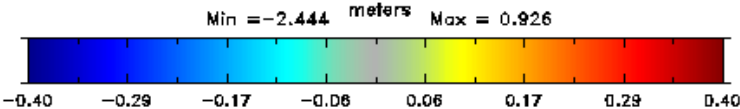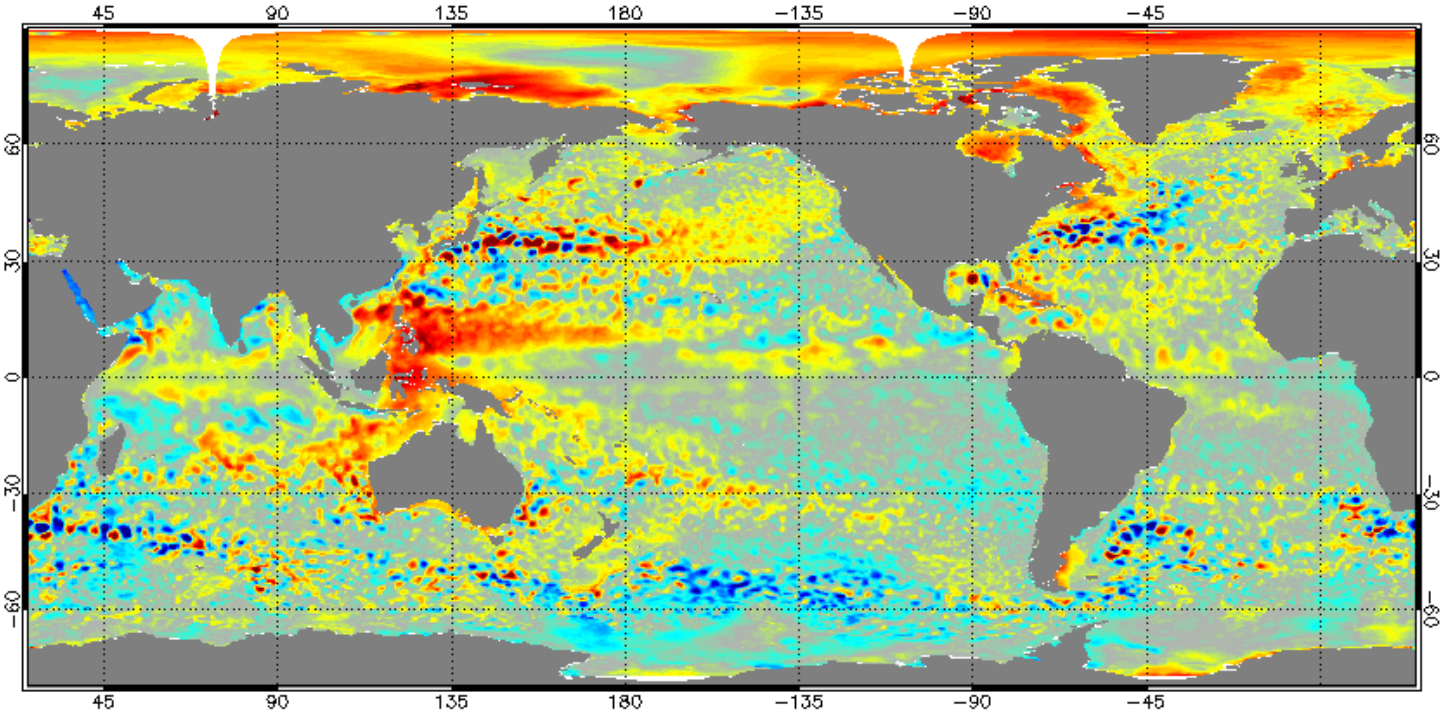Arrival of the Cryosat2 SLA

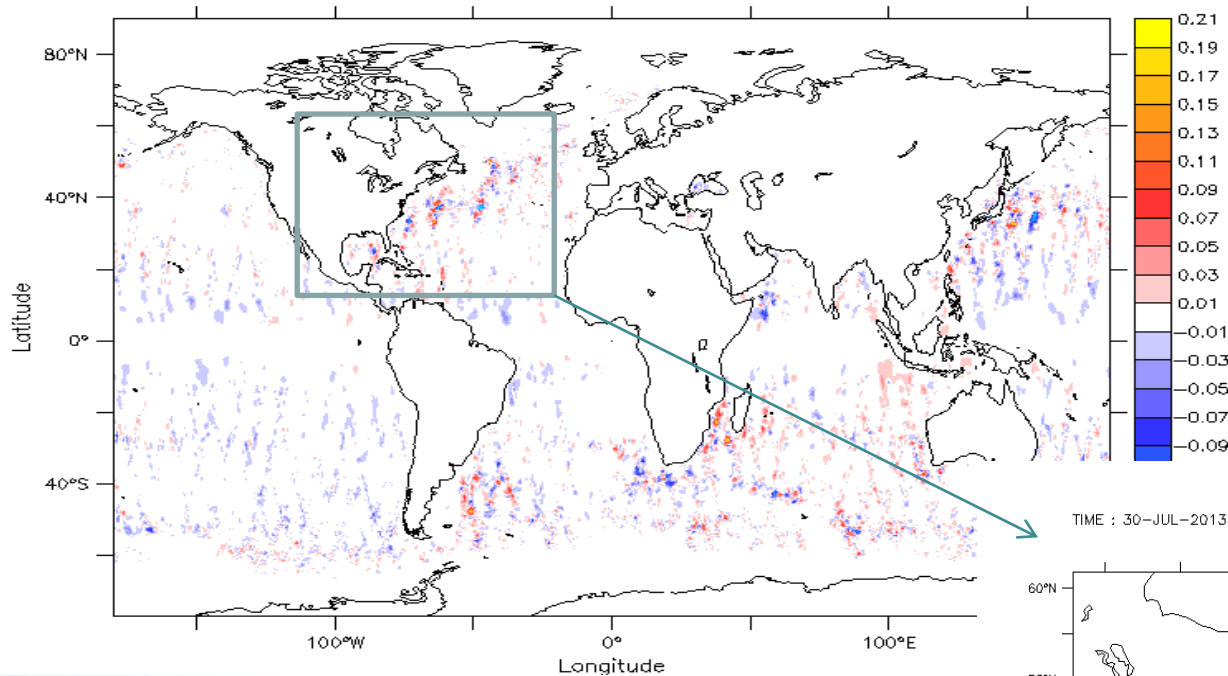Misfit = Observed SLA – forecasted SLA
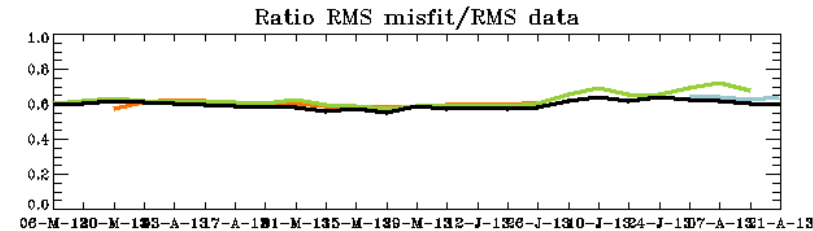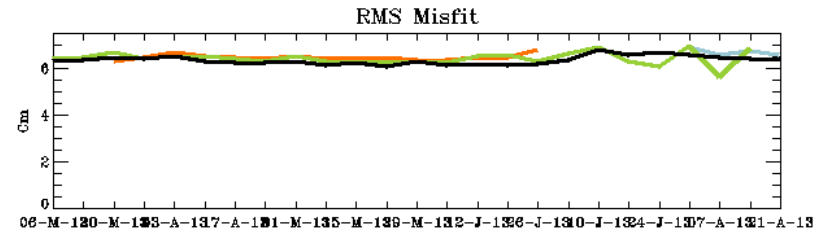
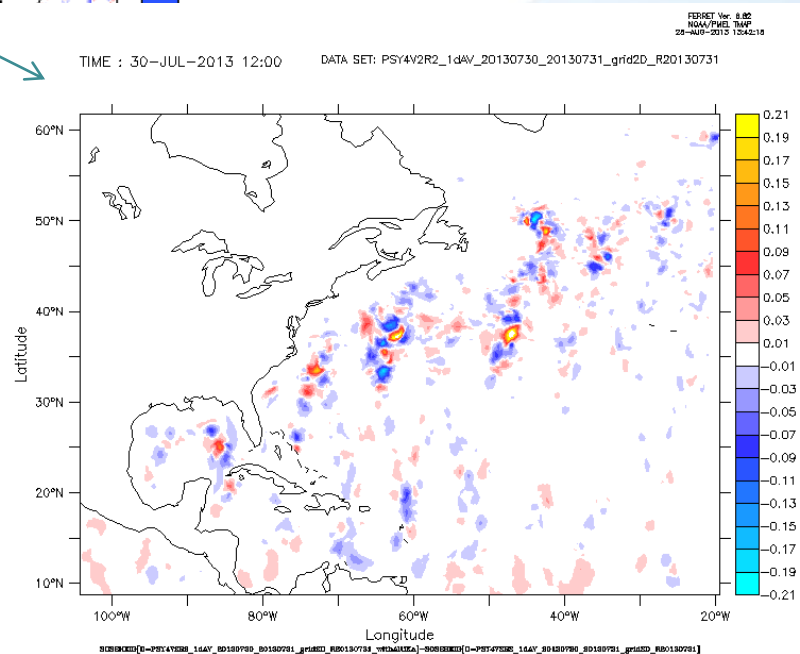# First PSY4 analysis with SARAL/AltiKa SLA

Model SLA on july 31 2013

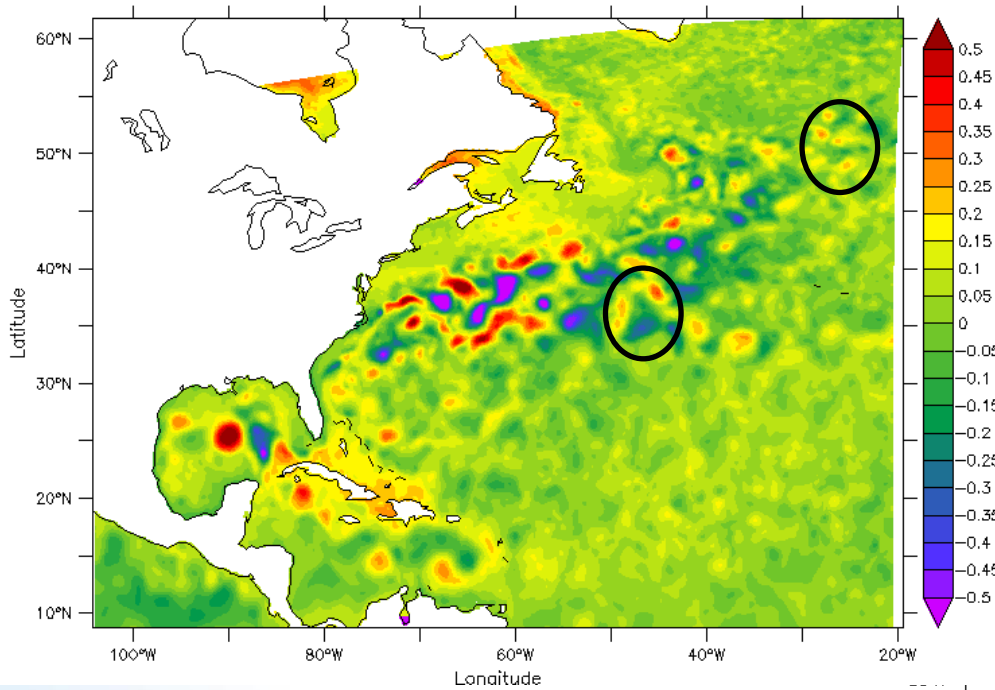# Influence of the AltiKa SLA on the model SSH

On the last week of july,
2 analysis were done :
one with the
SARAL/AltiKa SLA
and one without

Differences between the model SSH without
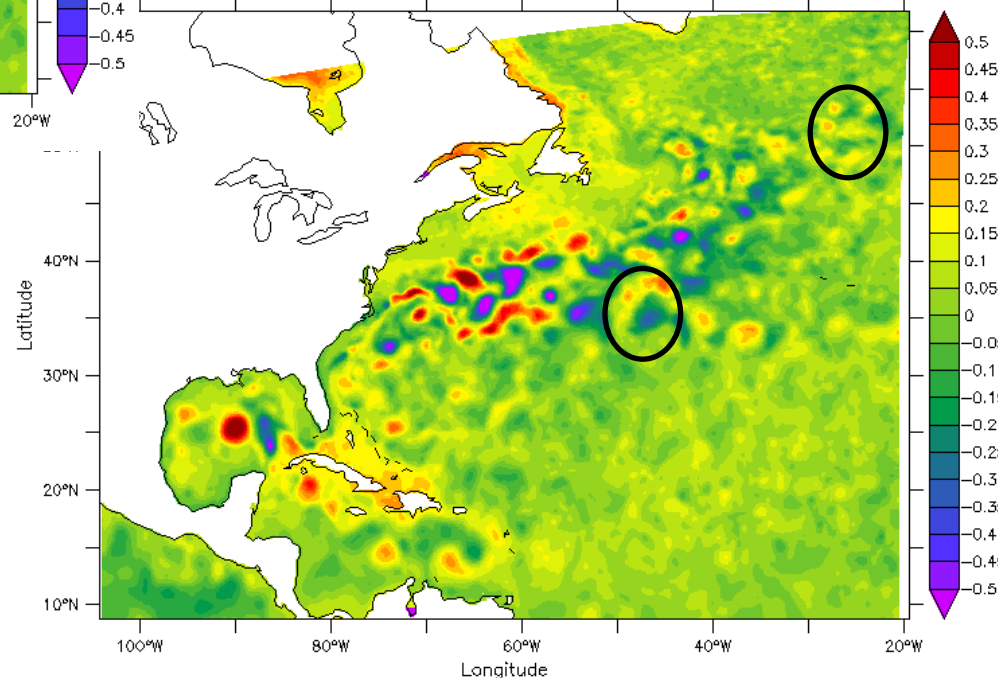SARAL/AltiKa SLA assimilated and not, at the
end of the first week.

Analysed model SLA with and without SARAL SLA

Model SLA without AltiKa SLA assimilated

Model SLA with AltiKa SLA assimilated

Conclusion and perspectives

- Successfull use of this new SLA data:
    - No technical problem to load those new data files in the operational systems,
    - Model – observation misfit statistics similar to the Jason2 (no incoherency, rejection…)
- Assimilation increments (not shown) do not exhibit incoherent structure under the new tracks of AltiKa, when assimilited, compared to the analysis with only Jason 2 and Cryosat 2.
- The analysed model fields benefit from this additional data source: small scale information are added, mainly changing the shape and intensity of eddies. Those changes remain small compared to the SSH signal itself, showing that the model and observed SLA are coherent. No large scale bias identified so far.
- Alti-Ka SLA will help to insure a good quality level of the Mercator Ocean analysis by providing precise SLA and keeping a 3-satellite constellation.

This is a first quick verification of the system response to AltiKa SLA. Further investigation of the SARAL/AltiKa SLA impact are needed. They will be conducted with longer time series of ocean analysis. Analysed ocean field should be evaluated against independent observations.

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