Ssalto/DUACS :Status on the system upgrades and impact of the altimetry constellation events

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OSTST Venice, September 2012

Introduction

- Short status on DUACS NRT system: a lots of event in the altimetry constellation with impacts on DUACS product

- Duacs upgrades propositions for 2013

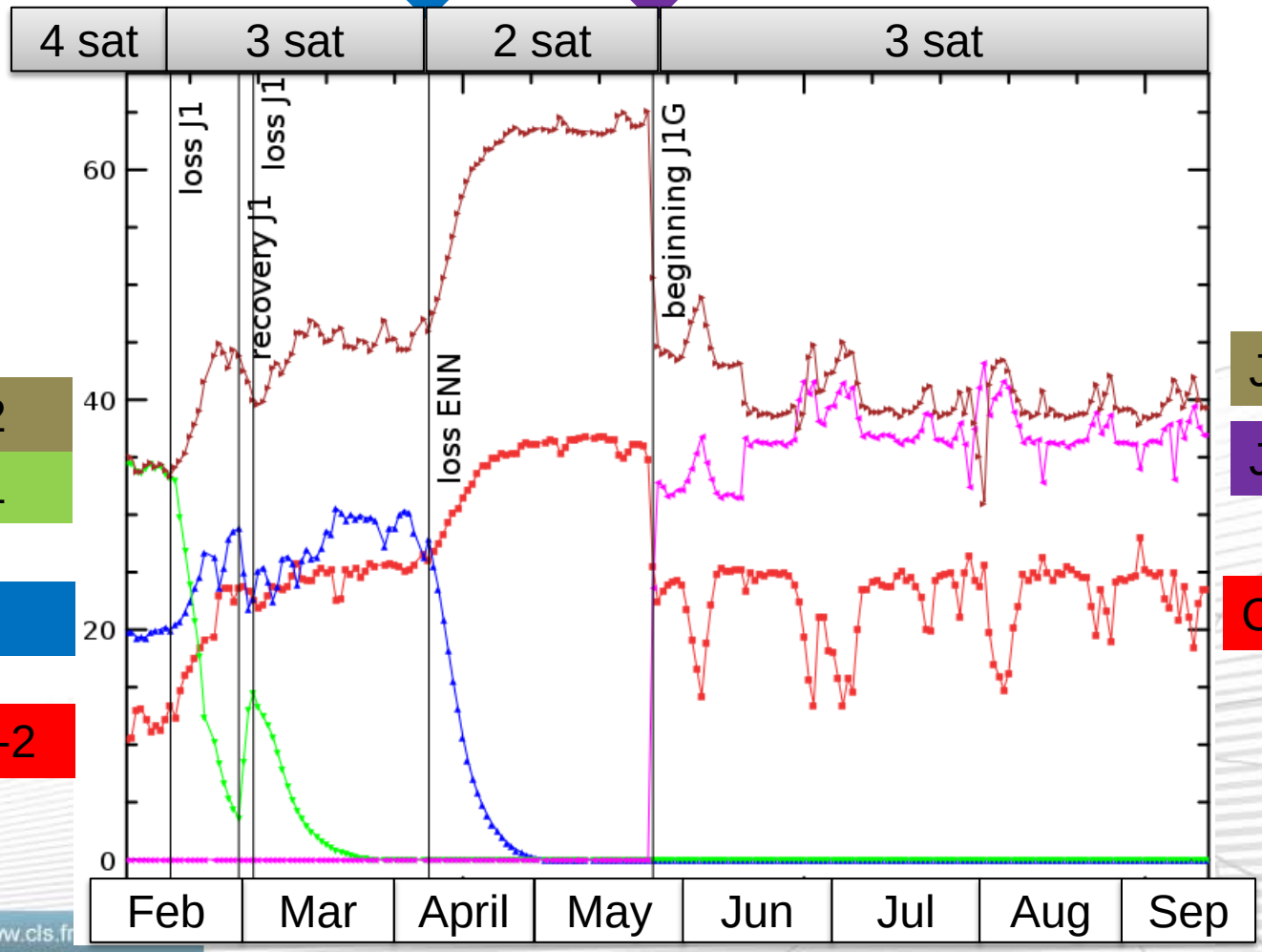
Status on DUACS NRT system: ***the constellation***

Jason-1 ~3 month gap

Envisat lost in 8 April

Jason-1 G Back 7 mai

Contribution of each satellite in the merged DUACS product for Latitudes (-60/60)



Jason-2

Jason-1

Envisat

Cryosat-2

Jason-2

Jason-1 G

Cryosat-2

Status on DUACS NRT system: ***the constellation***

•We lost the optimal sampling for NRT applications provided by the tandem phase J1+J2

•Cryosat-2 mitigate the lost of Envisat (Integration just in time!) but with a very hig probability to come back to the 2 satellites (J2+C2) situation

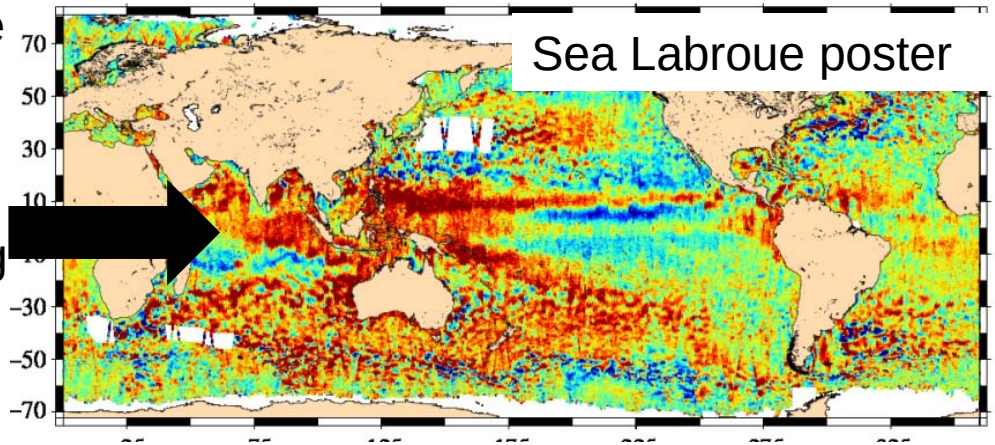
⇒Operational altimetry is very fragile

•**AltiKa** : **This mission MUST be successful** (launch, operations, data quality)

•**HY2A**: **Encouraging results.** HY2 is a valuable asset that would become critical for DUACS if another altimeter mission dies

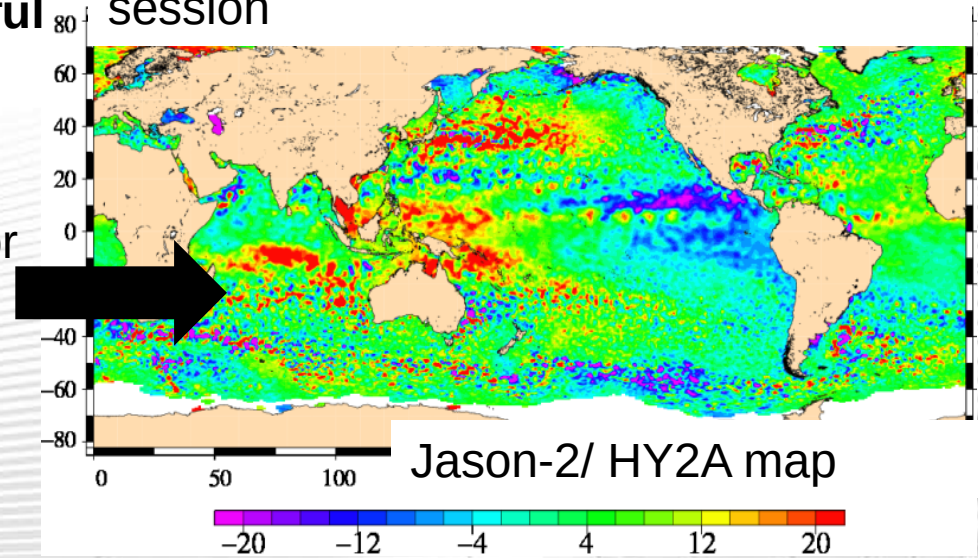
•**Sentinel-3 is needed !**

Cryosat-2 SLA Cycle 30 (May 2012) (cm)



Sea Labroue poster

Sea Legeais « HY2A and DUACS » presentation to day at 18h10 in Calval session



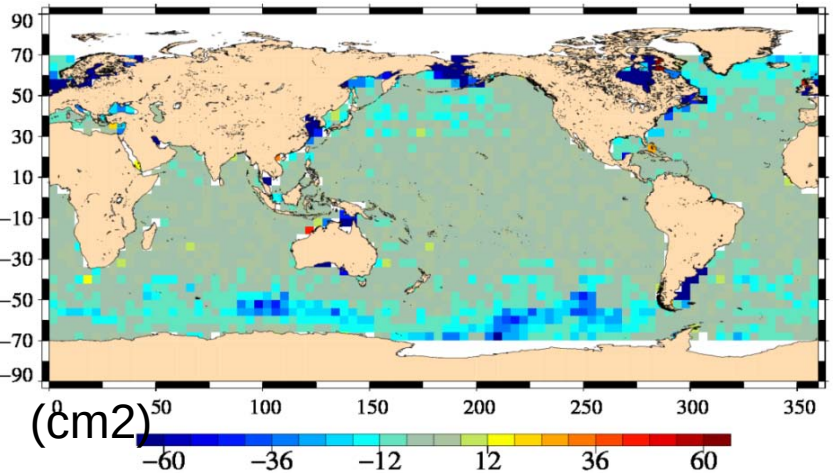
Jason-2/ HY2A map

DUACS upgrades in 2013: **RT/NRT system**

- **RT products on the fly**: still an experimental product, **Feedbacks are welcome**

- **New experimental product for assimilation** requested by MyOcean Model as part as the TAPAS initiative (Tailored Altimeter Products for Assimilation Systems) allowing users to adapt the physical content of the product to their need
  - 7km resolution products
  - Correction (DAC, …) available in the product to allow users to uncorrect the SLA

- **A DAC for Real Time products** :
  - Today: SLA computed using an invert Barometer for the HF atmospheric effects
  - Next year, we will upgrade our system to compute the RT SLA using a DAC correction instead



VAR(SSH-**DAC_forecast**) –
VAR(SSH-I**B_forecast**) for J2 (C62-103)

More than 20cm2 of variance reduction local
See L Carrere presentation in tide/HF session

DUACS upgrades in 2013: ***Reprocessing***

Why a complete reprocessing in 2013?

- **A 20 year period precise altimetry time series**: more than 60 years of cumulated data from 10 sensors

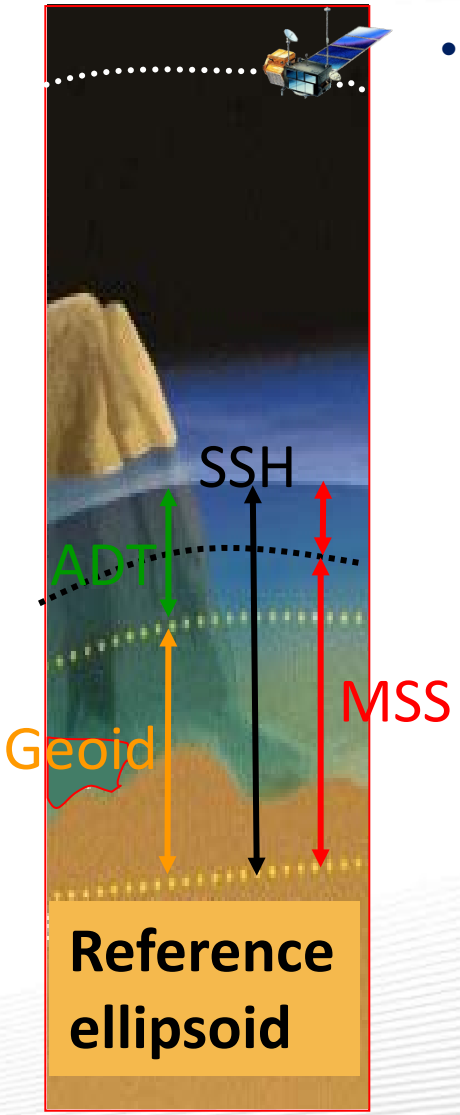
- **New GDR ESA & CNES reprocessing**: ENVISAT GDR2.1, Jason-2 GDR-D, REAPER…

- **New standard available**
  - Integration of R&D outputs: CNES SALP, ESA Sea Level CCI
  - FES 2012 ocean tide model, tentative CNES/CLS 2013 MDT
  - Dynamic Atmospheric correction available for the Real time Duacs products

- **SSHA referenced over 20 years (1993, 2012) instead of (1993, 1999)**

  ➔ better interannual signals and true oceanic anomalies

DUACS upgrades in 2013: **New reference period**



- The Ssalto/Duacs SL Anomalies products are historically referenced to the 7-year period [1993, 1999].

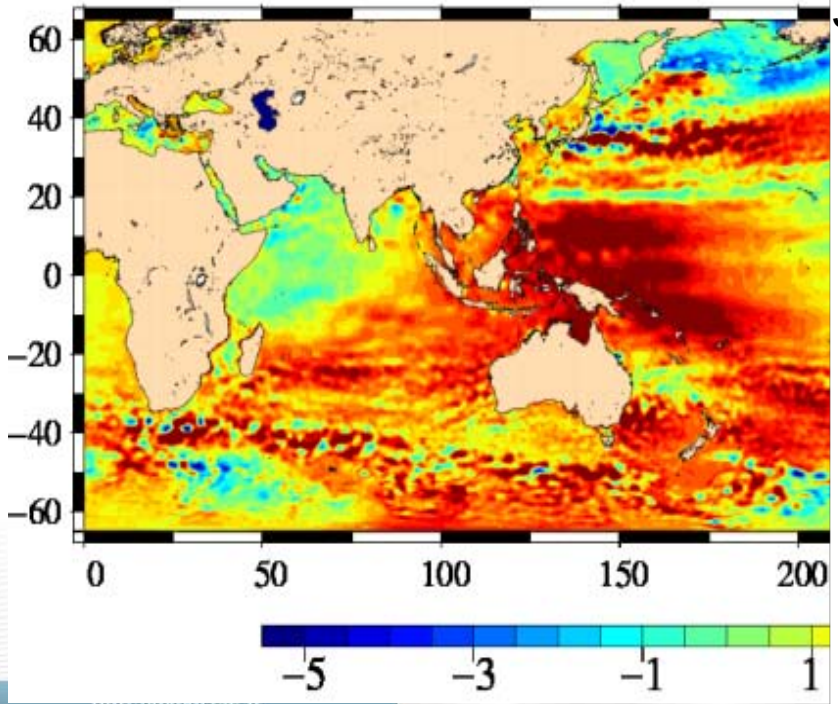
$$SLA = SSH - [MSS\ CNESCLS]_{93\text{-}99}$$

- As nearly 20 years of altimeter measurements are now available it is of high interest to change the reference period for a longer period which will lead to **better interannual signals and true oceanic anomalies**
- It is thus proposed to use a **[1993, 2012] period**.
- What is the impact on users?

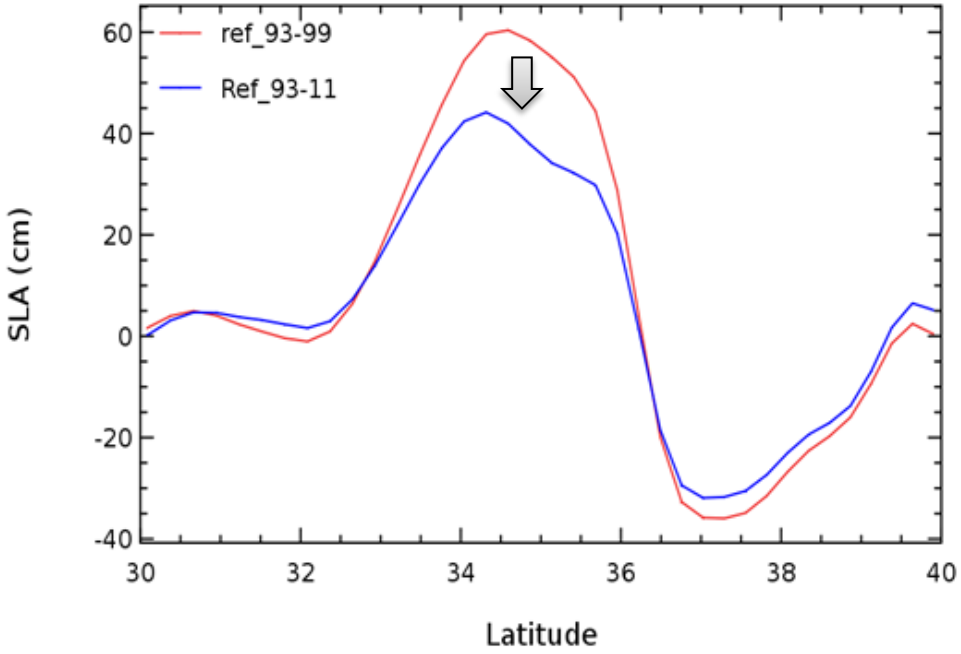
DUACS upgrades in 2013: **New reference period**

- Impact on the users:
  - ✓ Spatial impact on the mean for all SLA along track and gridded products: up to 5cm regional biases
  - ✓ No temporal impact, no impact on ADT, no impact on MSL Trends
- But a correction file will be proposed in order to allow the user to stay on the current reference period

[93-99] to [93-2011] impact (cm)



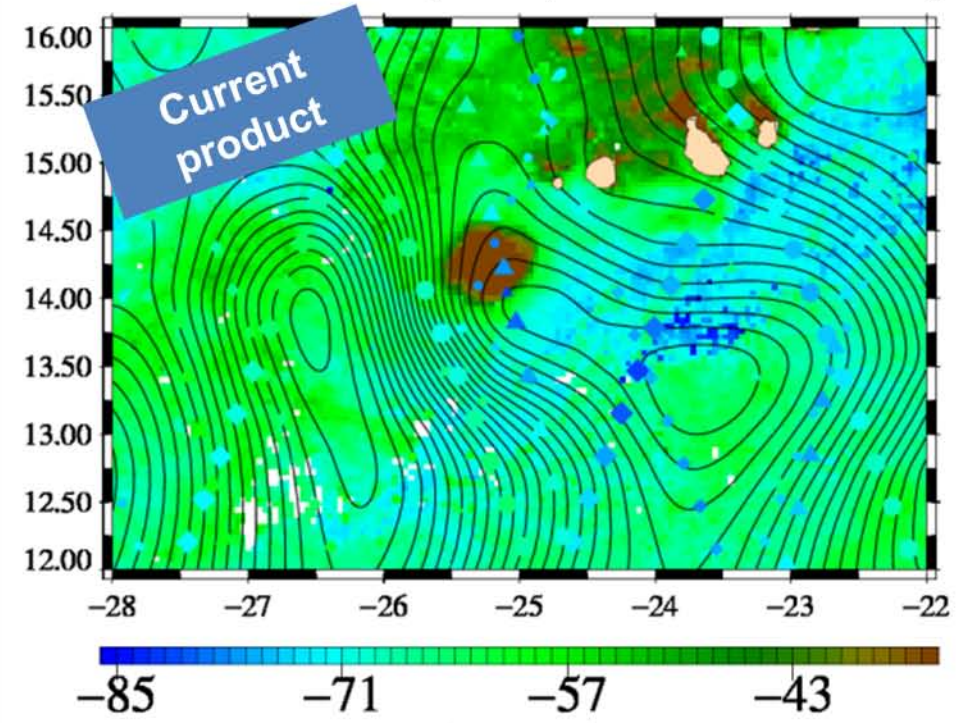
J1 pass crossing the Kuroshio in December 2011

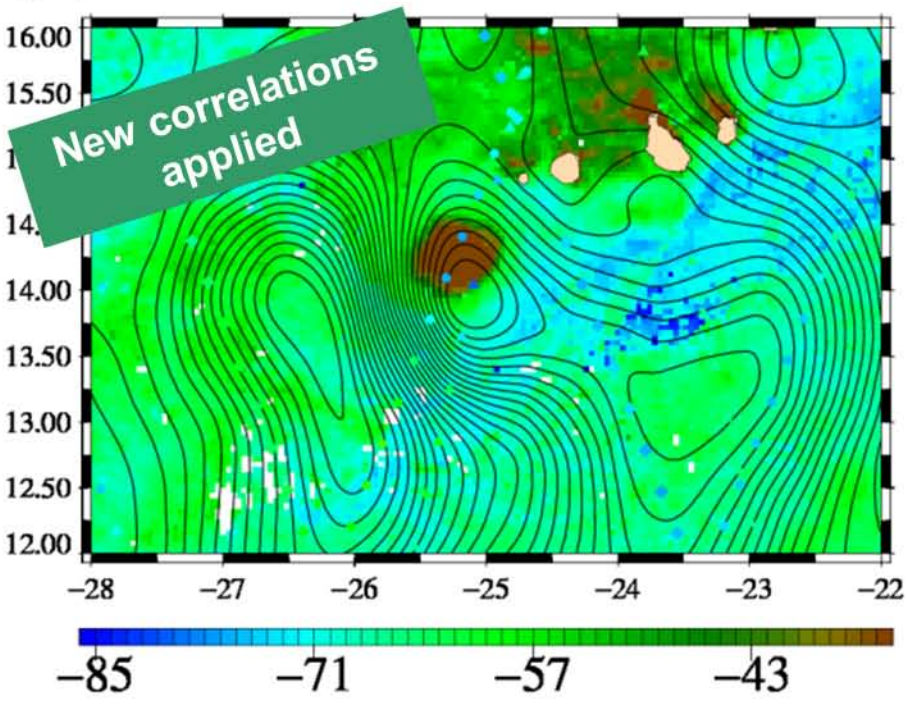


DUACS upgrades in 2013: **New merging tuning**

- New merging parametrization
  - Better continuity between missions
  - New filtering wavelenght for along-track products
  - New correlation scales for gridded products

SLA (lines) and ocean color (image) on the 20/11/2011

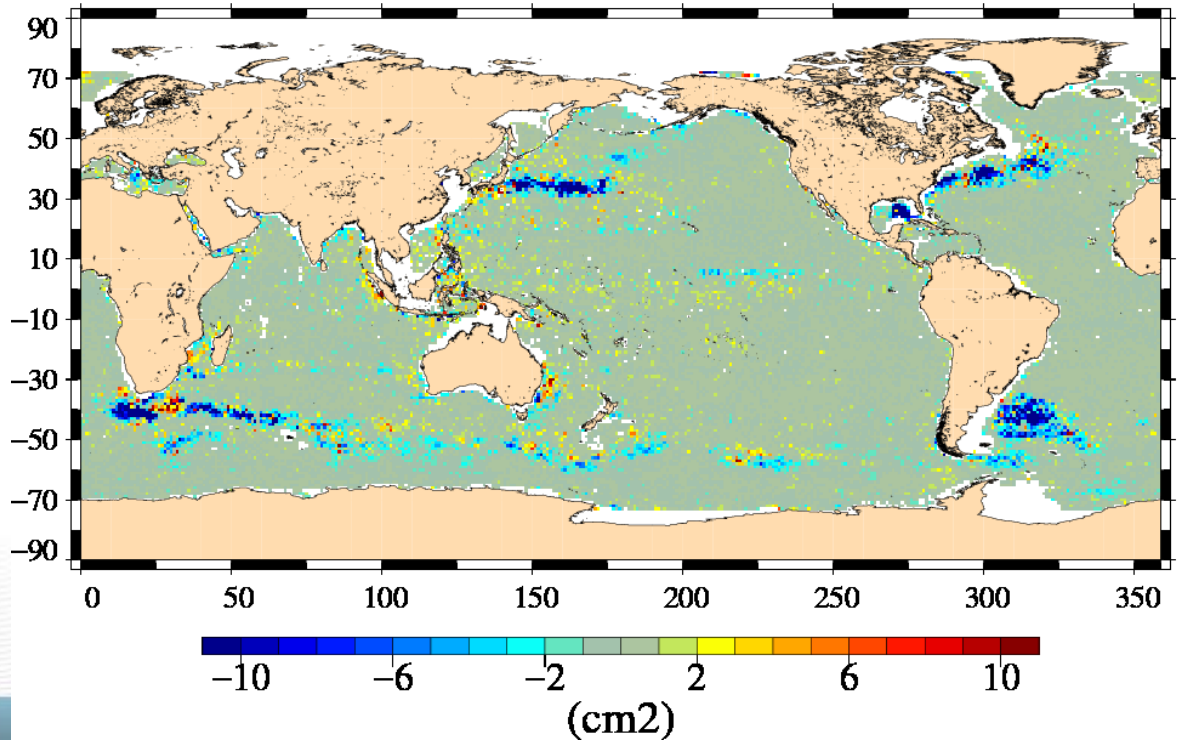




DUACS upgrades in 2013: **New merging tuning**

- New merging parametrization
  - Better continuity between missions
  - New filtering wavelenght for along-track data
  - New correlation scales

VAR(GFO – Merged[J1,EN]) – VAR(GFO – Merged[J1,EN])
New Correlations – Old Correlations



➔ The new version of the correlation scales improves (in blue) the coherence between the SLA maps and independent along-track data. The variance of the differences is reduced by near 10 cm². In high variability areas.

Data frequency, resolution, format, nomenclature

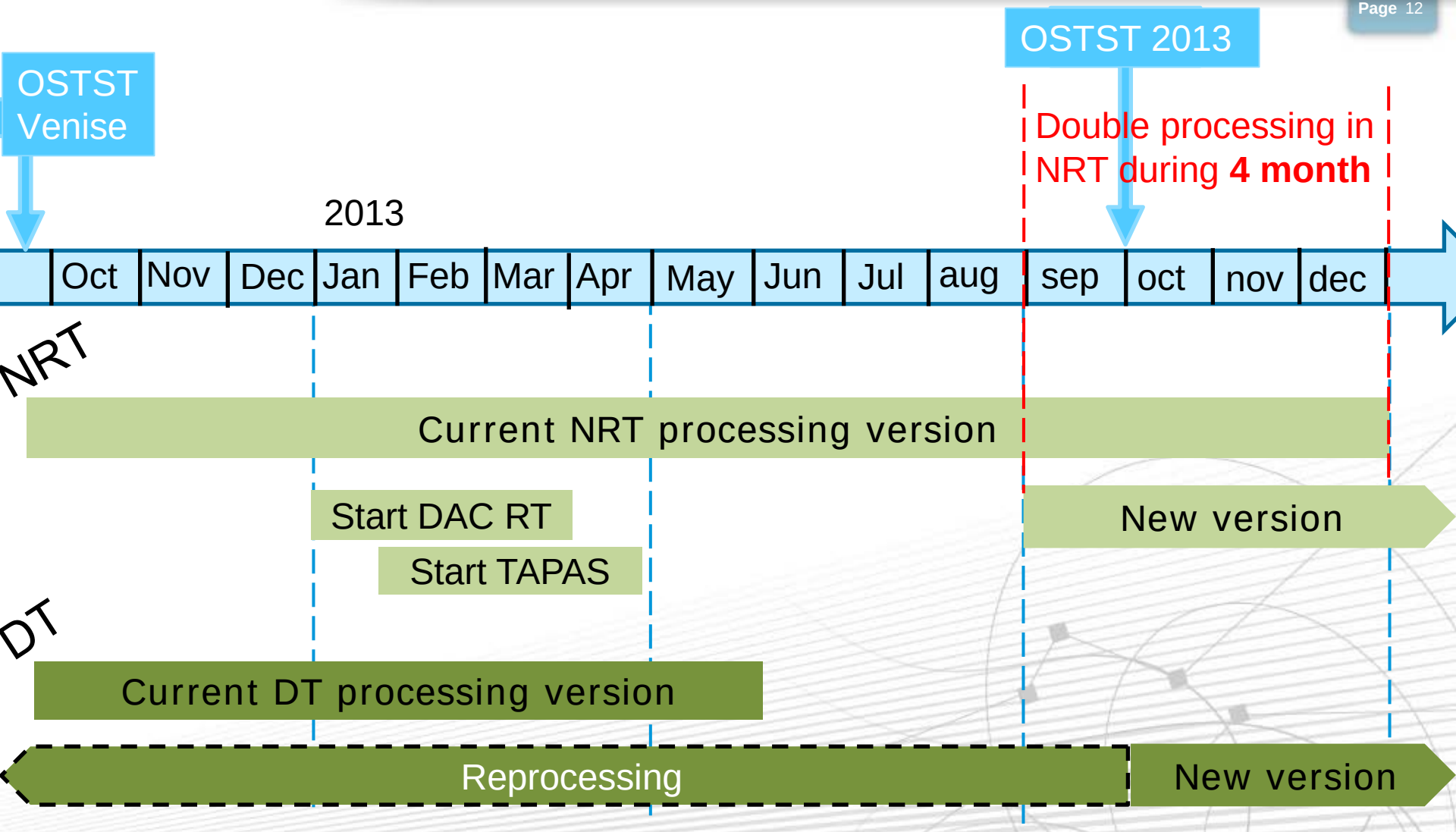
- **Daily DT product?** Experimental so far. What is the added value for the users? Existing results, papers obtained with this dataset?

- **MSLA gridded product resolution** and projection:
  - Today: product exists at 1/3° Mercator and ¼° regular grids
  - ¼ resolution is more standard among the oceanography community
  - Proposition: stop the 1/3rd degree

- **Format**:
  - Today Netcdf specific Aviso format
  - Proposition to change for a Netcdf CF format

- **Naming**: several change
  - Aviso FTP to be reorganized
  - Ref / Upd naming to be changed

DUACS upgrades in 2013: **Planning**

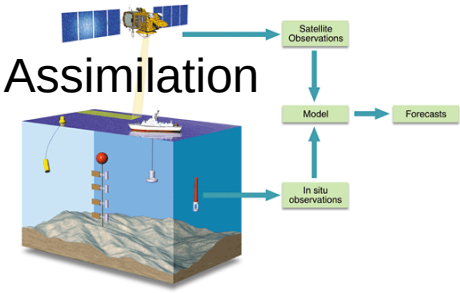


DUACS upgrades in 2013: **In summary**

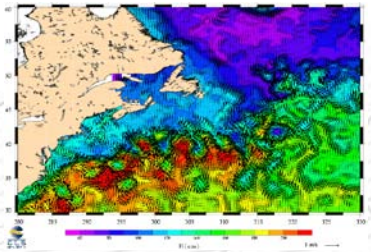
In 2013 several upgrades to improve DUACS Sea Level product quality for the various applications

- DAC correction for DUACS RT SLA
- Change of the reference period
- Improved standards and merging parameterization
- Changes in product catalogue / resolution proposed
- New nomenclature and format
- a complete reprocessing taking into account these changes

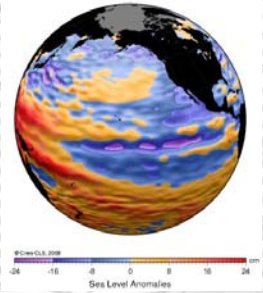
Assimilation



Mesoscale



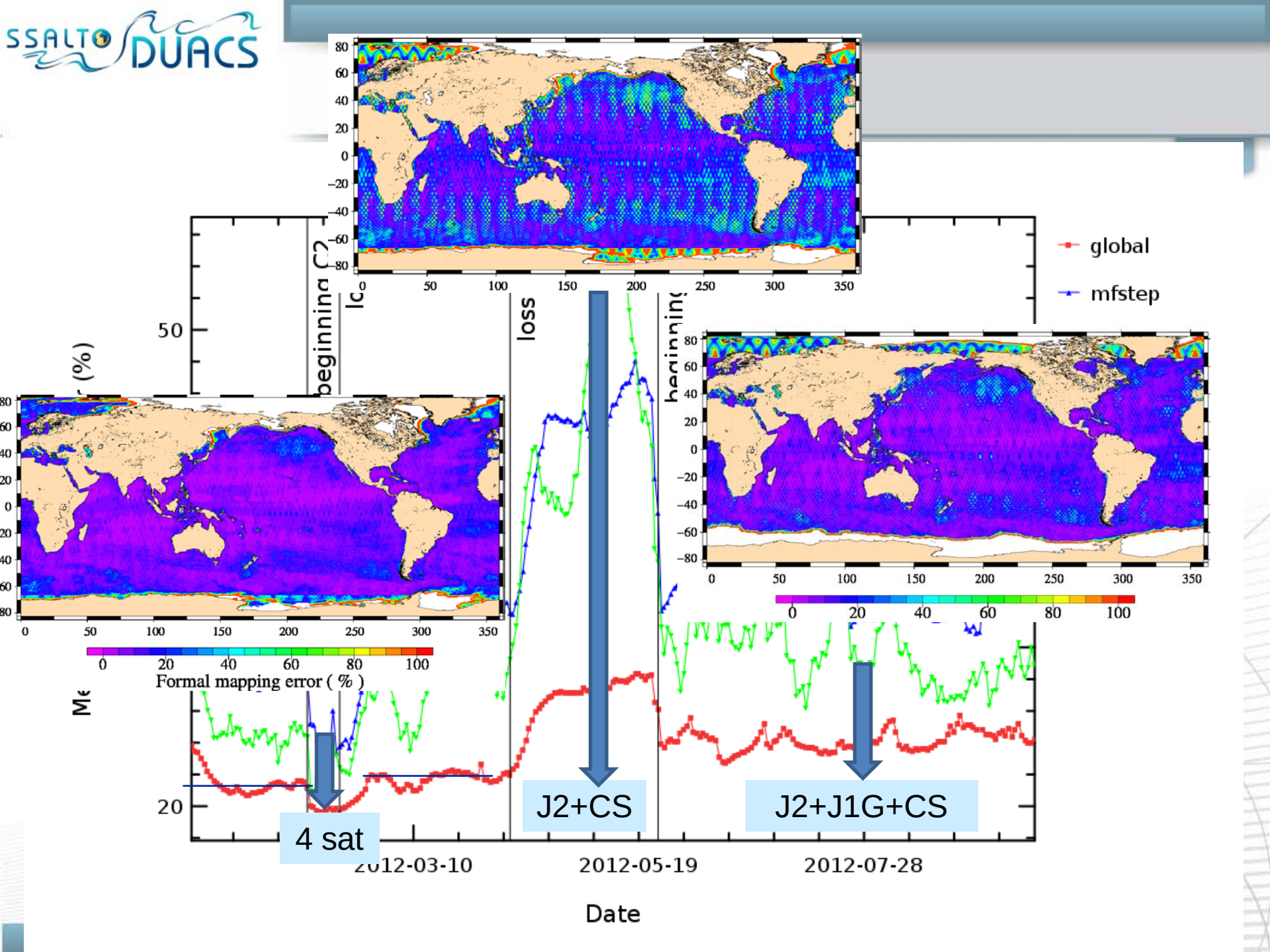
Climate



Any feedbacks, any propositions ?

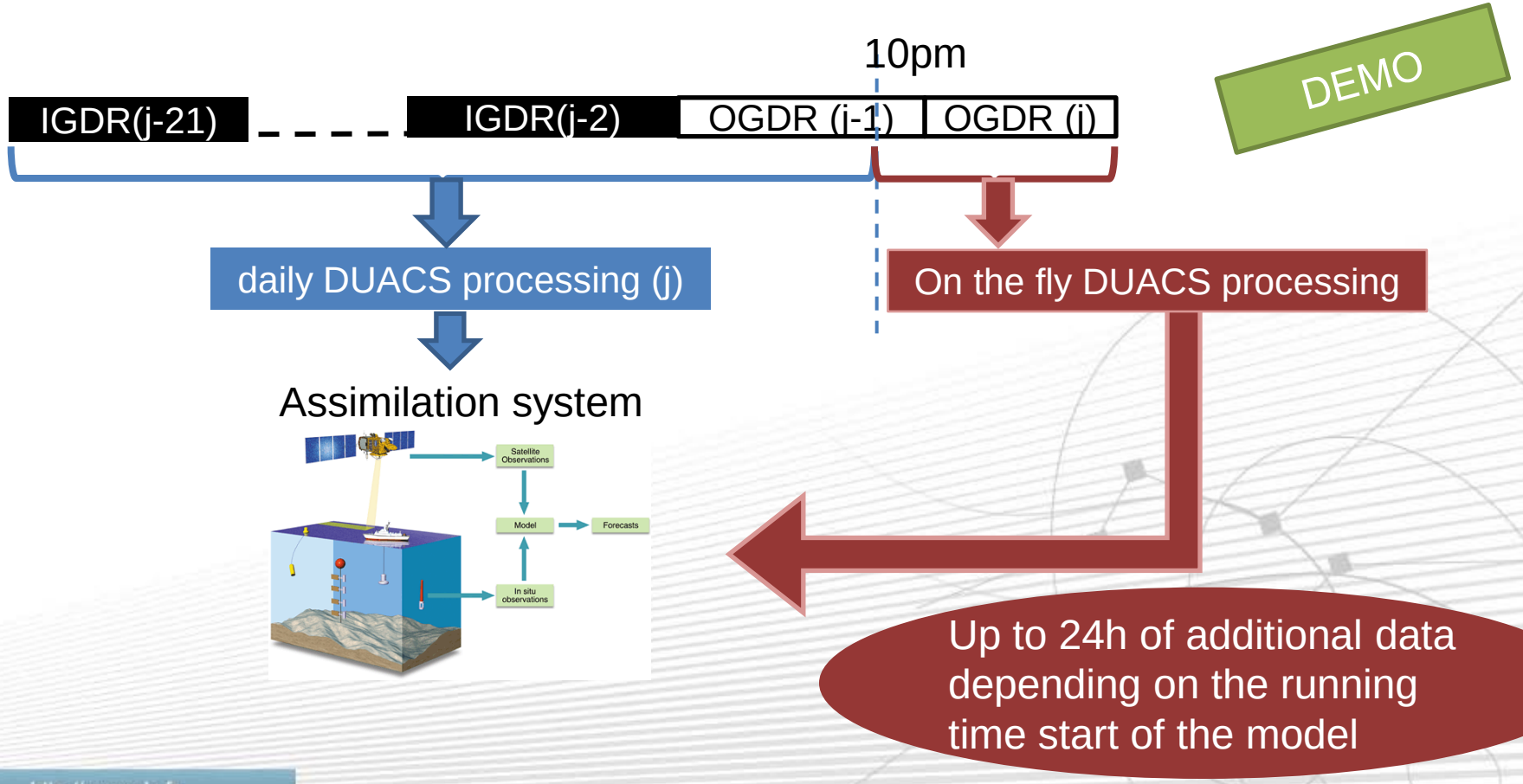
aviso@oceanobs.com

Back up slides


SSALTO DUACS
global
mfstep
loss
Formal mapping error (%)
4 sat
J2+CS
J2+J1G+CS
2012-03-10
2012-05-19
2012-07-28
Date

"On the fly" experimental product

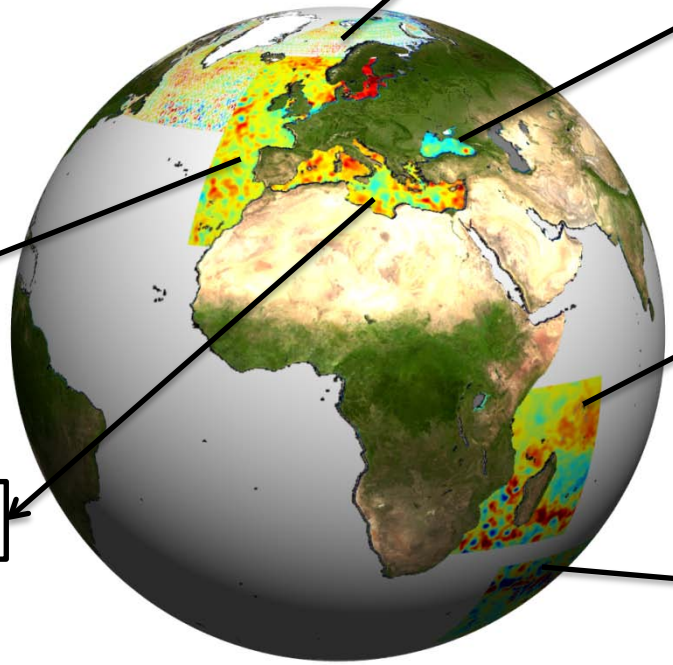
- Since september 2012 experimental product on the fly RT product based on the last (<24h) OGDR product
- These products are potentially vey useful for operational assimilation system
- **Please send us your Feedback on these products !!**



Duacs Regional products

For a status on Duacs regional products, see Isabelle **Pujol et al posters**

- « Ssalto/Duacs: Towards regional products »
- « A Kerguelen regional SeaLevel product to support the KEOPS2 experiment »



Arctic product since January 2012

Black sea product

Europe product since January 2012

Mozambic product since March 2011

Med Sea product

Kerguelen product Sep 2011-jun 2012