Regional processing of altimetry data at the Centre of Topography of the Oceans and the Hydrosphere (CTOH)
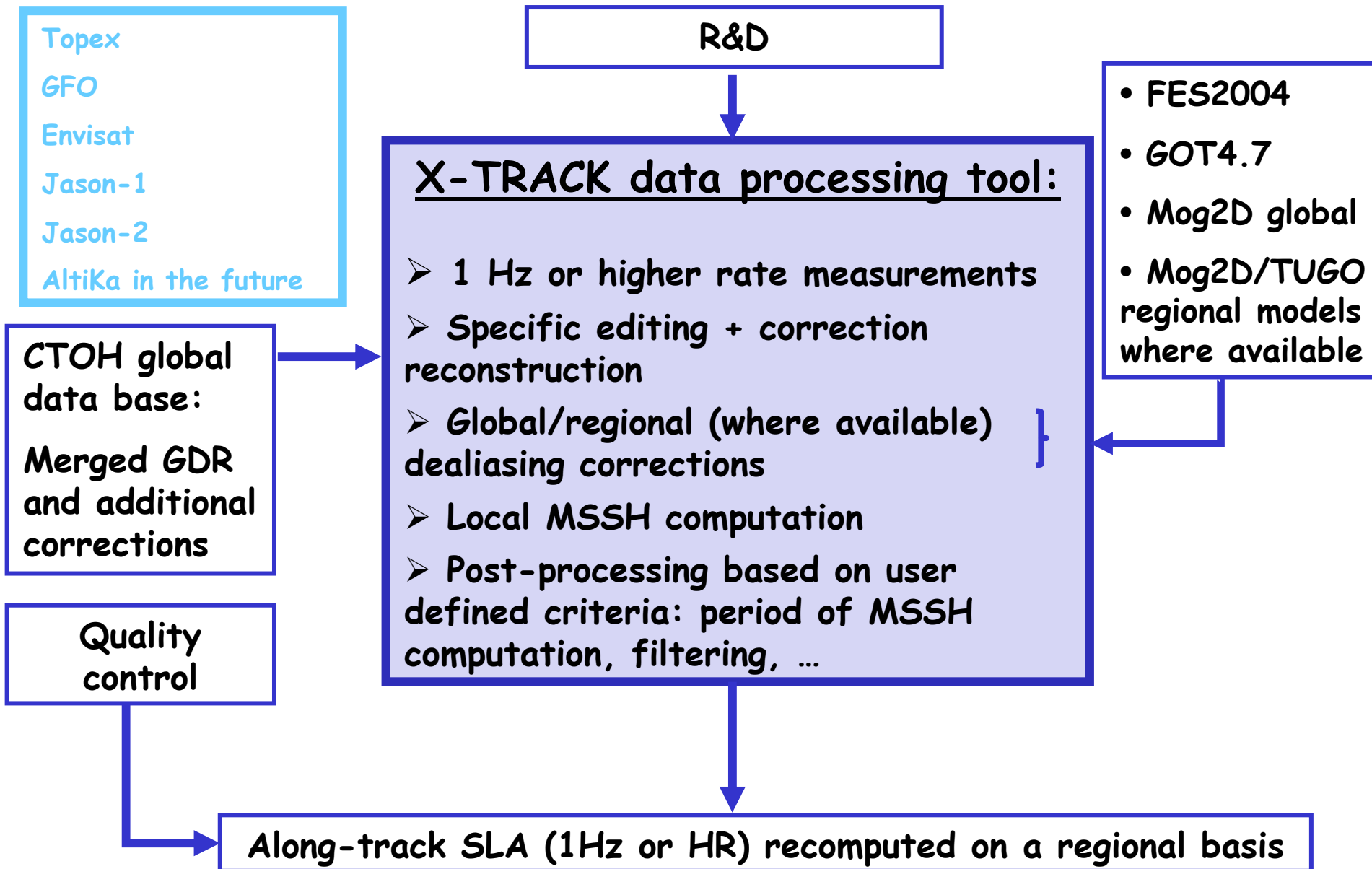
Florence Birol, Caroline Delebecque, Renaud Dussurget, Laurent Roblou, Sara Fleury, Rosemary Morrow, Fernando Niño and Blaise Picinbono
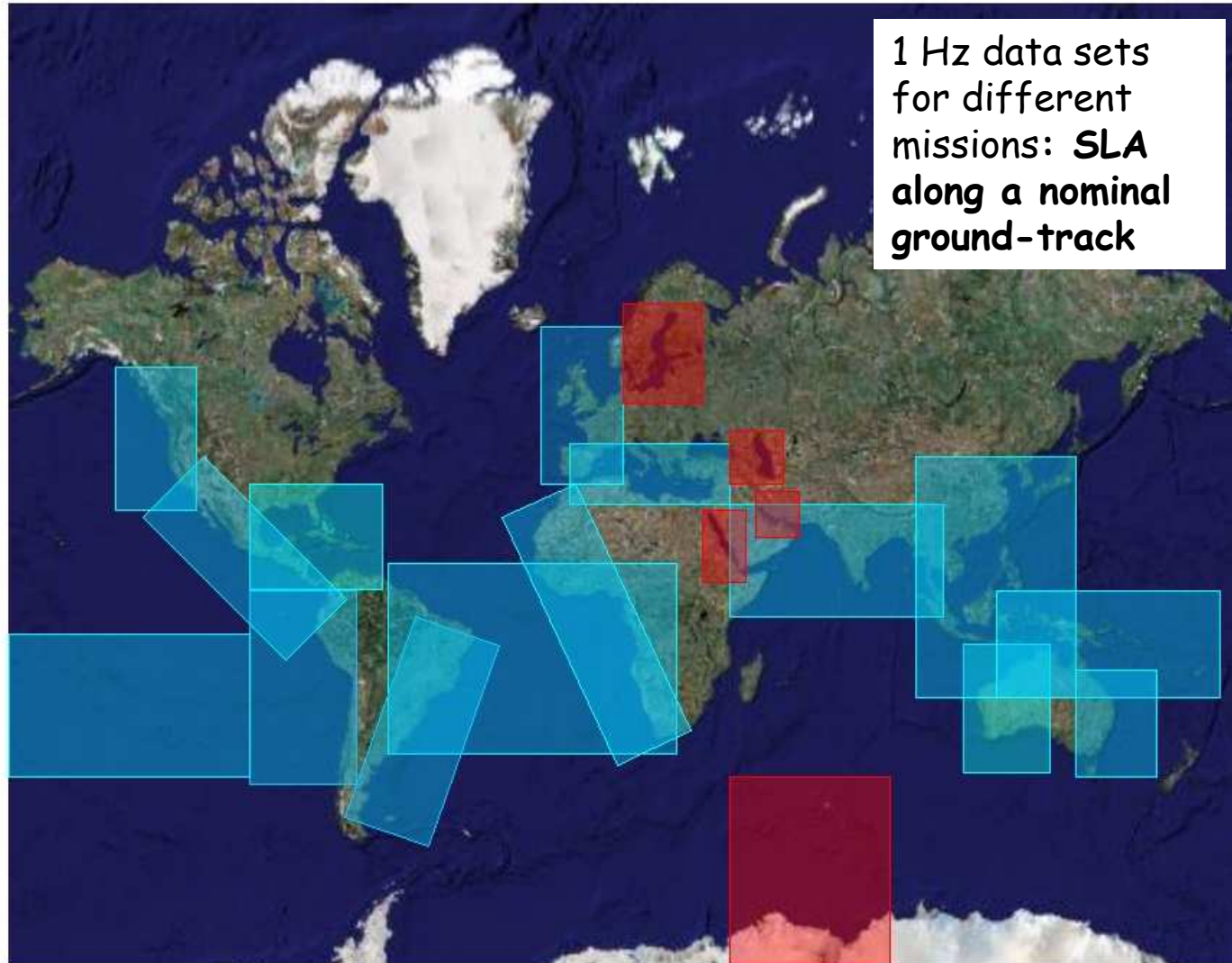
http://ctoh.legos.obs-mip.fr/

CTOH coastal tools

Topex
GFO
Envisat
Jason-1
Jason-2
AltiKa in the future

R&D

- FES2004
- GOT4.7
- Mog2D global
- Mog2D/TUGO regional models where available

X-TRACK data processing tool:

➢ 1 Hz or higher rate measurements

➢ Specific editing + correction reconstruction

➢ Global/regional (where available) dealiasing corrections

➢ Local MSSH computation

➢ Post-processing based on user defined criteria: period of MSSH computation, filtering, …

CTOH global data base:

Merged GDR and additional corrections

Quality control

Along-track SLA (1Hz or HR) recomputed on a regional basis

CTOH regional research products

1 Hz data sets for different missions: **SLA along a nominal ground-track**
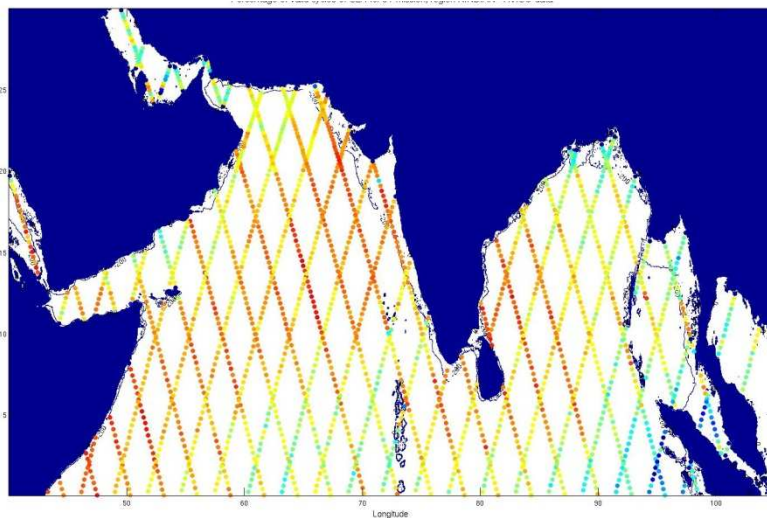
http://ctoh.legos.obs-mip.fr/products/coastal-products

Example of the North Indian Ocean

Standard product – Jason 1

CTOH - Jason 1

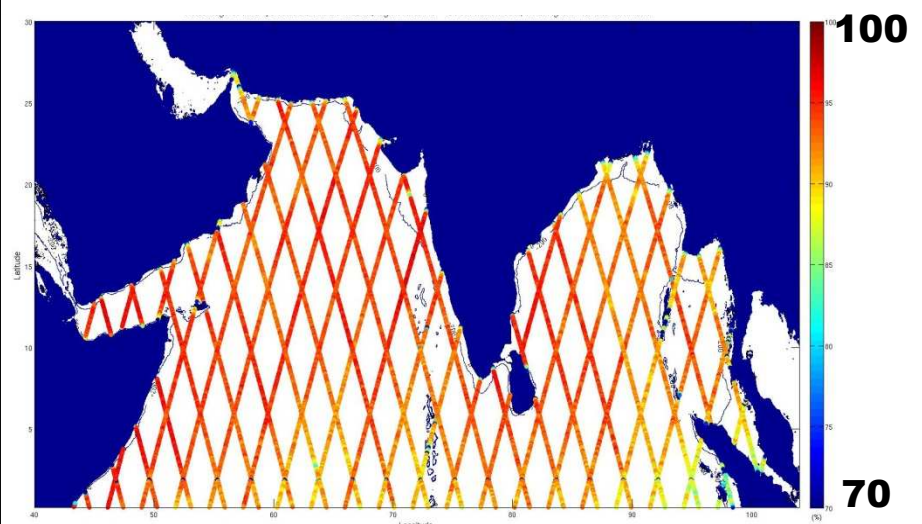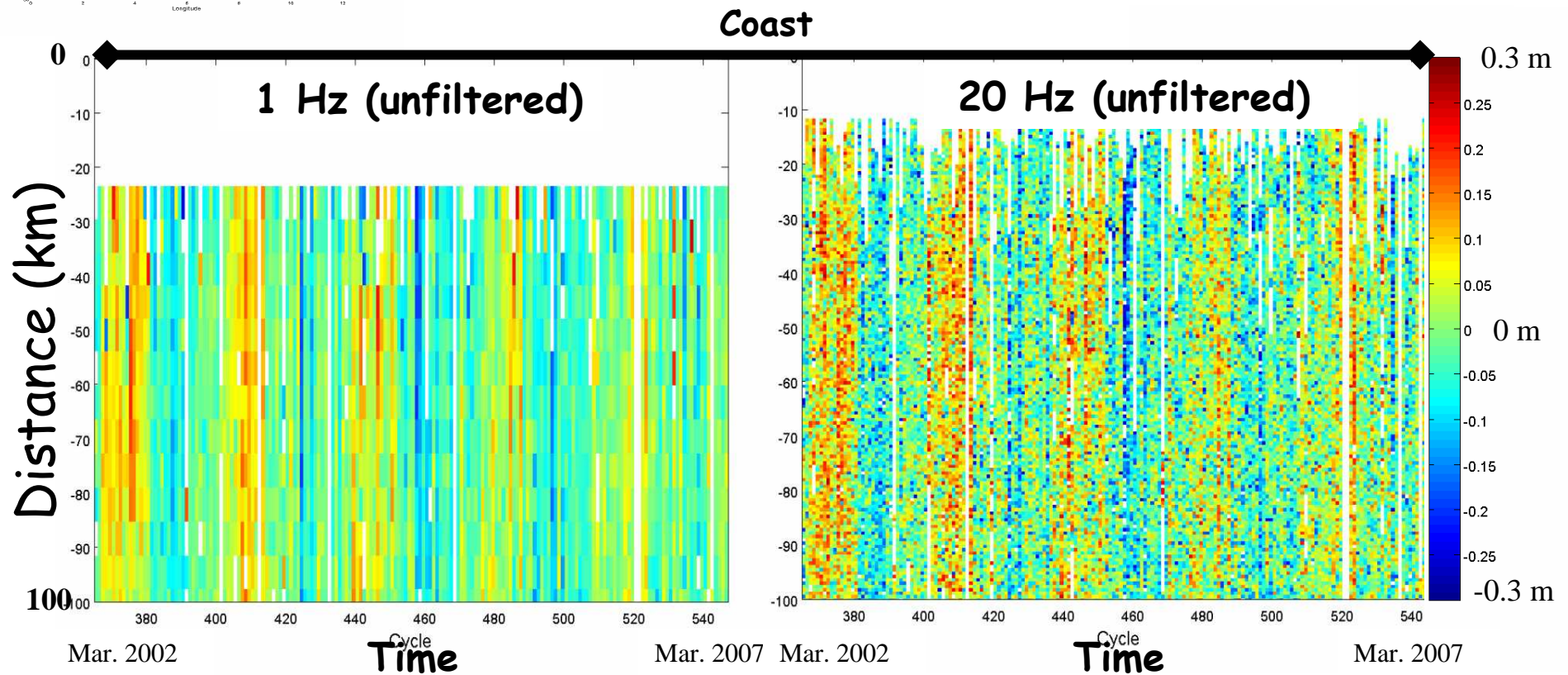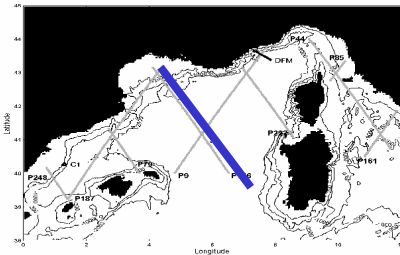**% of available data**

RMS(SLA) in m
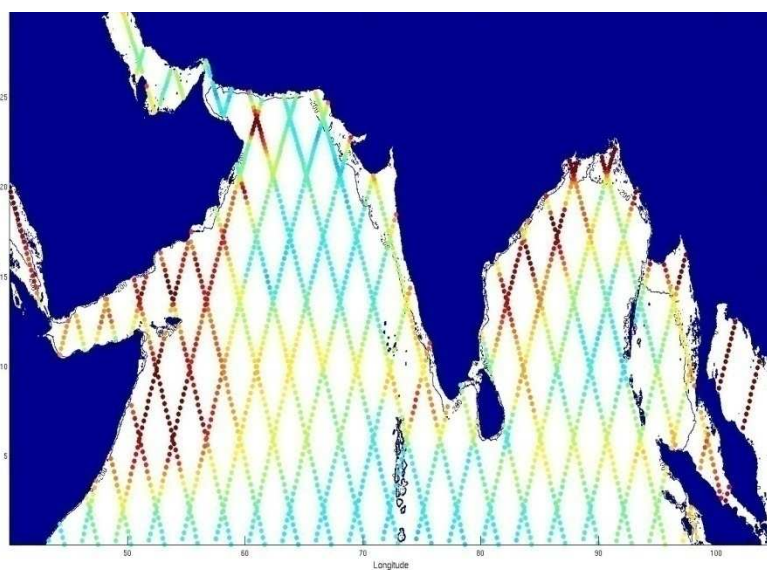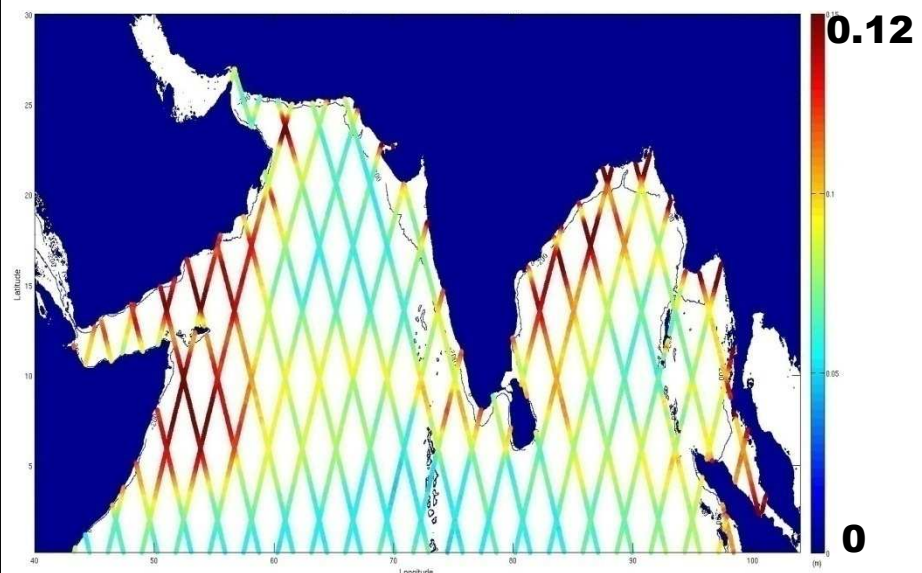
Reprocessing alongtrack data – Working with 10-20 Hz data

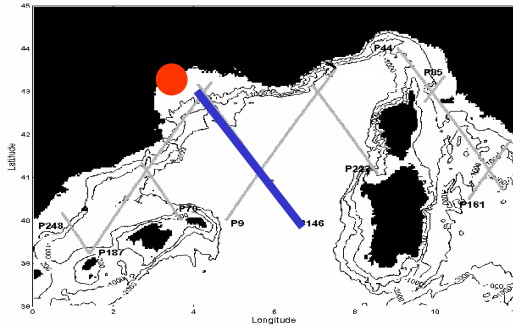Coastal & near-shore processes need high resolution sea level observations 1-100 km!

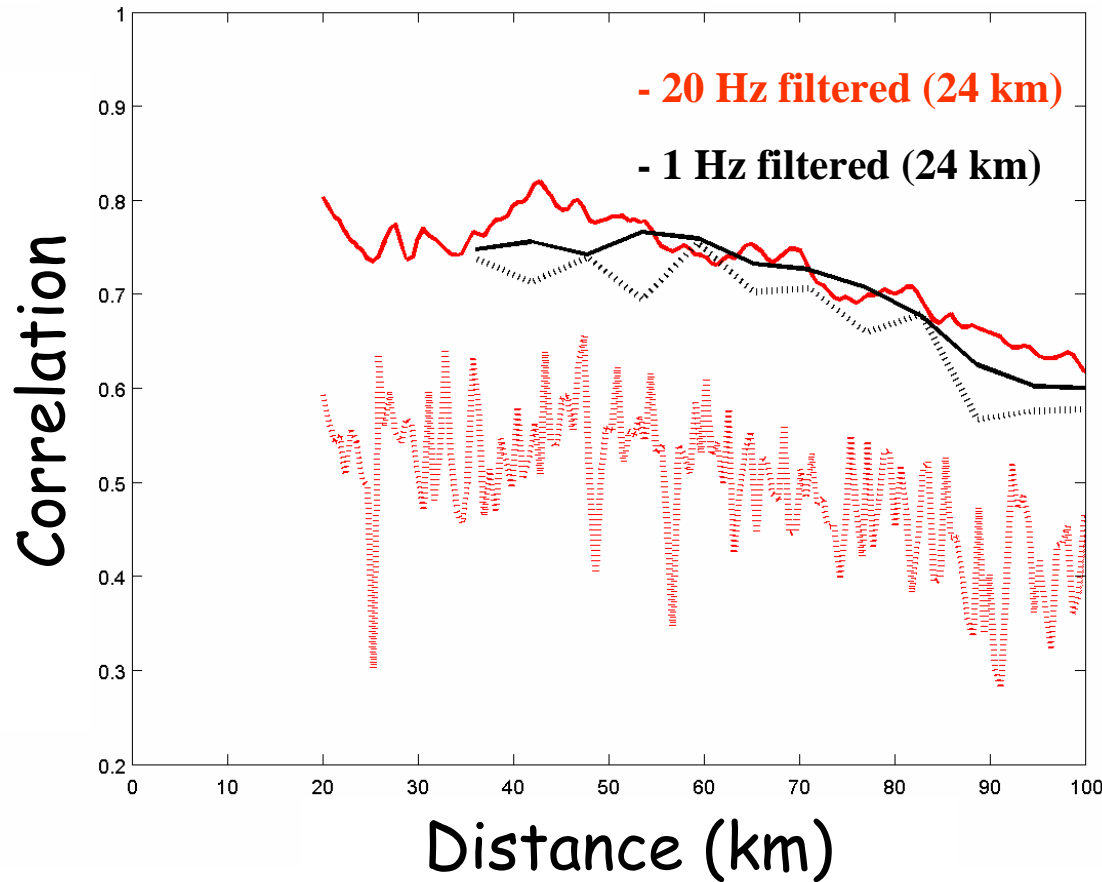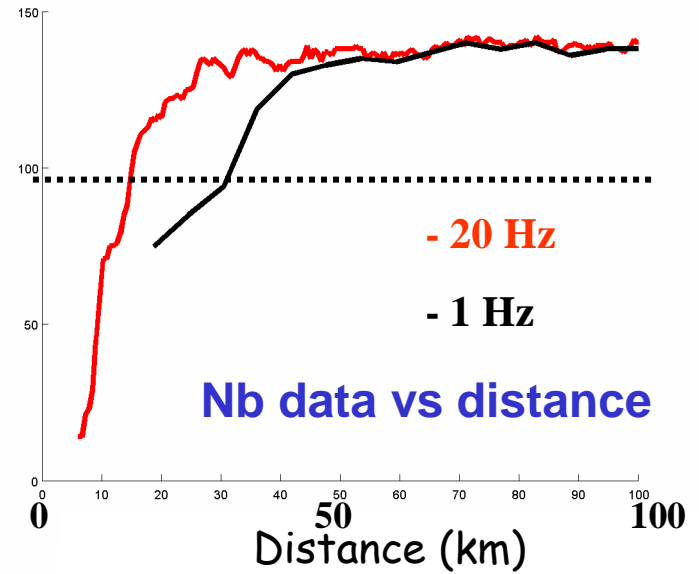**SLA vs distance from coast – Jason 1 track 146**

Many different groups working on this problem (PISTACH, COASTALT, CTOH, RADS, ...)

Reprocessing alongtrack data – Working with 10-20 Hz data
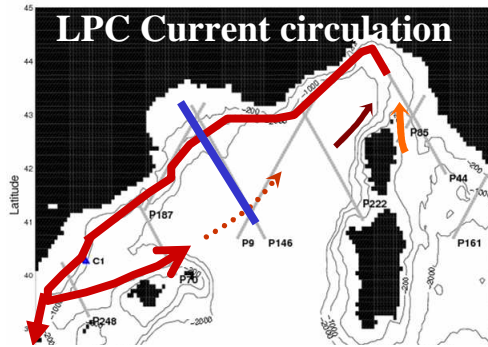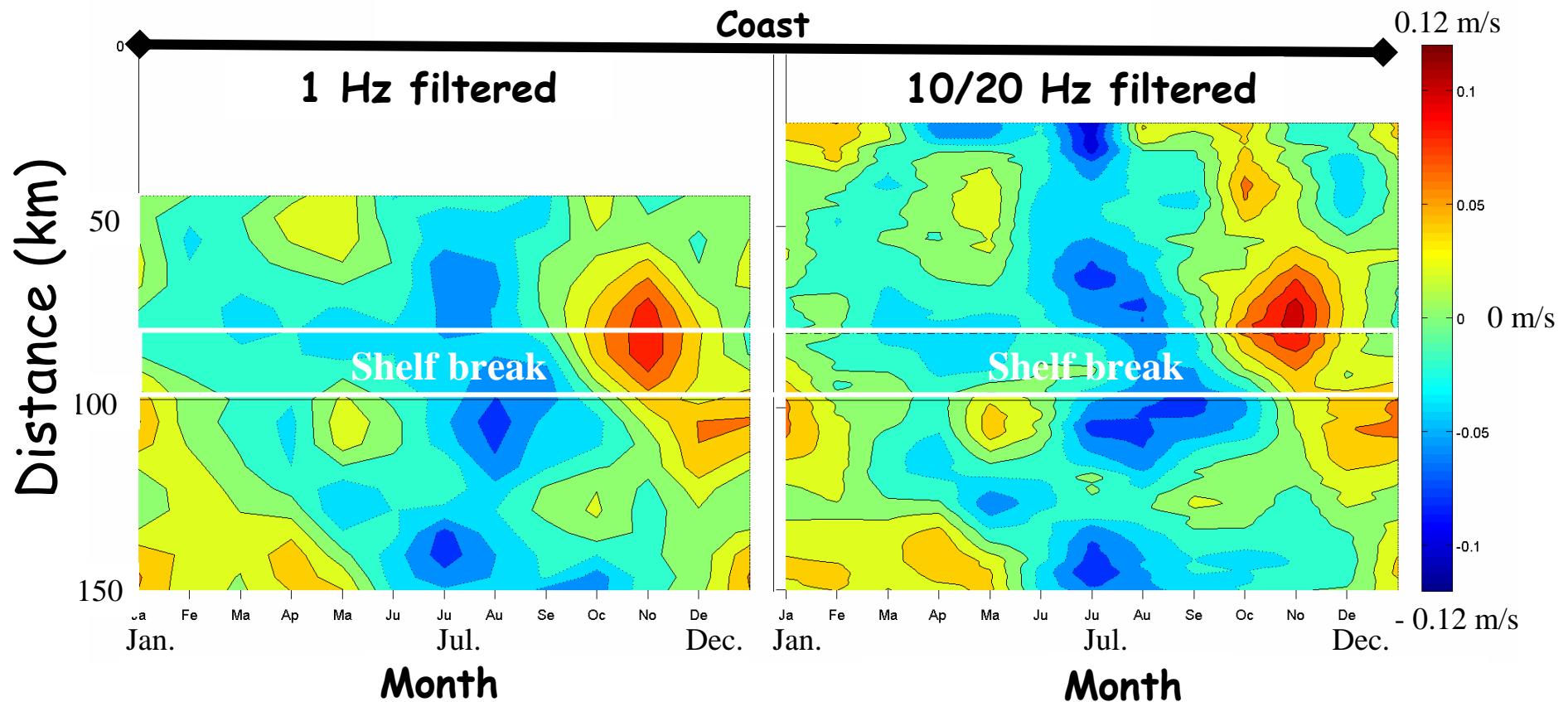
Jason 1 track 146

Jan. 2002 - Dec. 2005

- 20 Hz

- 1 Hz

Nb data vs distance

Distance (km)

- 20 Hz filtered (24 km)

- 1 Hz filtered (24 km)

Correlation

Distance (km)

Altimeter vs tide gauge SLA

Reprocessing alongtrack data – Working with 10-20 Hz data
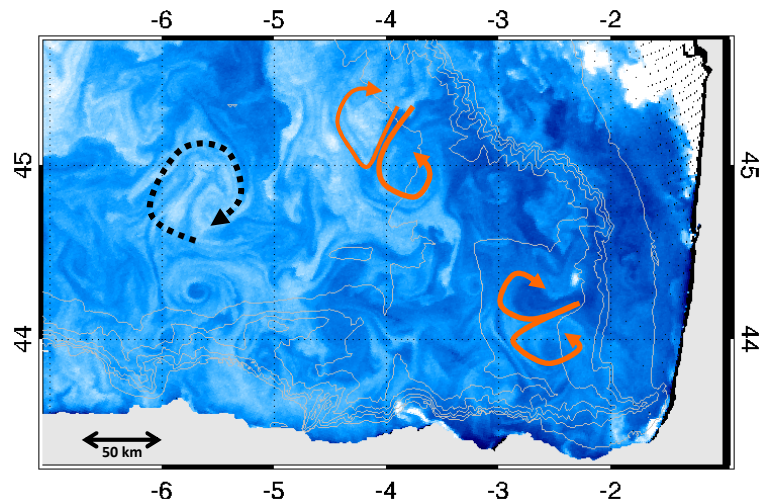
LPC Current circulation

Monthly climatology of:
Cross-track geostrophic current anomalies (altimetry T/P & Jason-1 over the period 1993-2008)

Altimetry current vs distance from coast – Track 146

Coast

0.12 m/s

1 Hz filtered

10/20 Hz filtered

Distance (km)

Shelf break

Shelf break

0 m/s

Jan.   Jul.   Dec.

Jan.   Jul.   Dec.

- 0.12 m/s

Month

Month

Observability of mesoscale dynamics in 2D gridded SLA maps

MODIS Aqua Pseudo-color image - 18/03/2003

Gridded multi-mission maps for regional application (Bay of Biscay):

→ **Finer-scale structures in regional maps**

Steeper gradients

Dipoles visible near slope

XTRACK-OI

AVISO MSLA
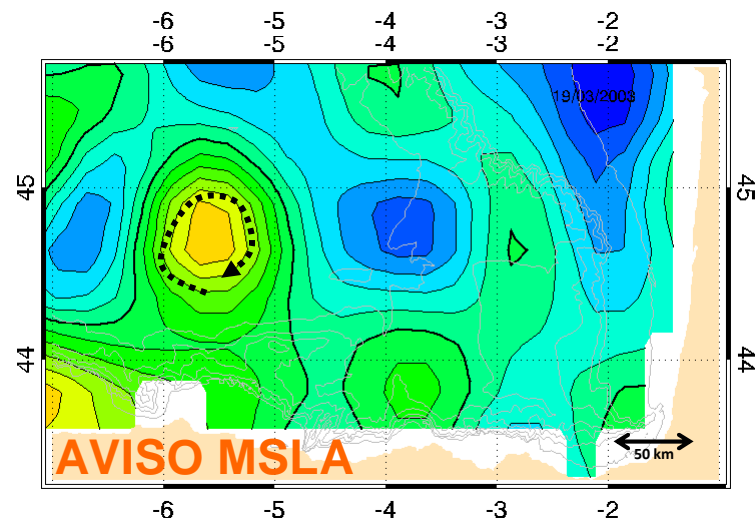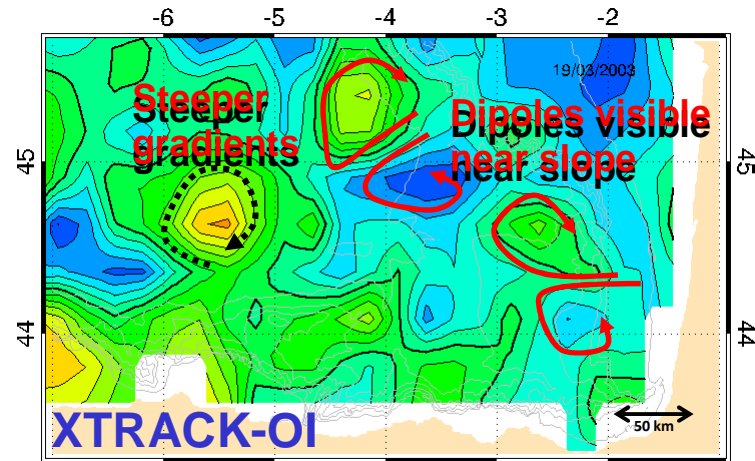
From Dussurget et al., 2011

Observability of mesoscale dynamics in 2D gridded SLA maps

Spatial Power Spectrum (2002-2005)
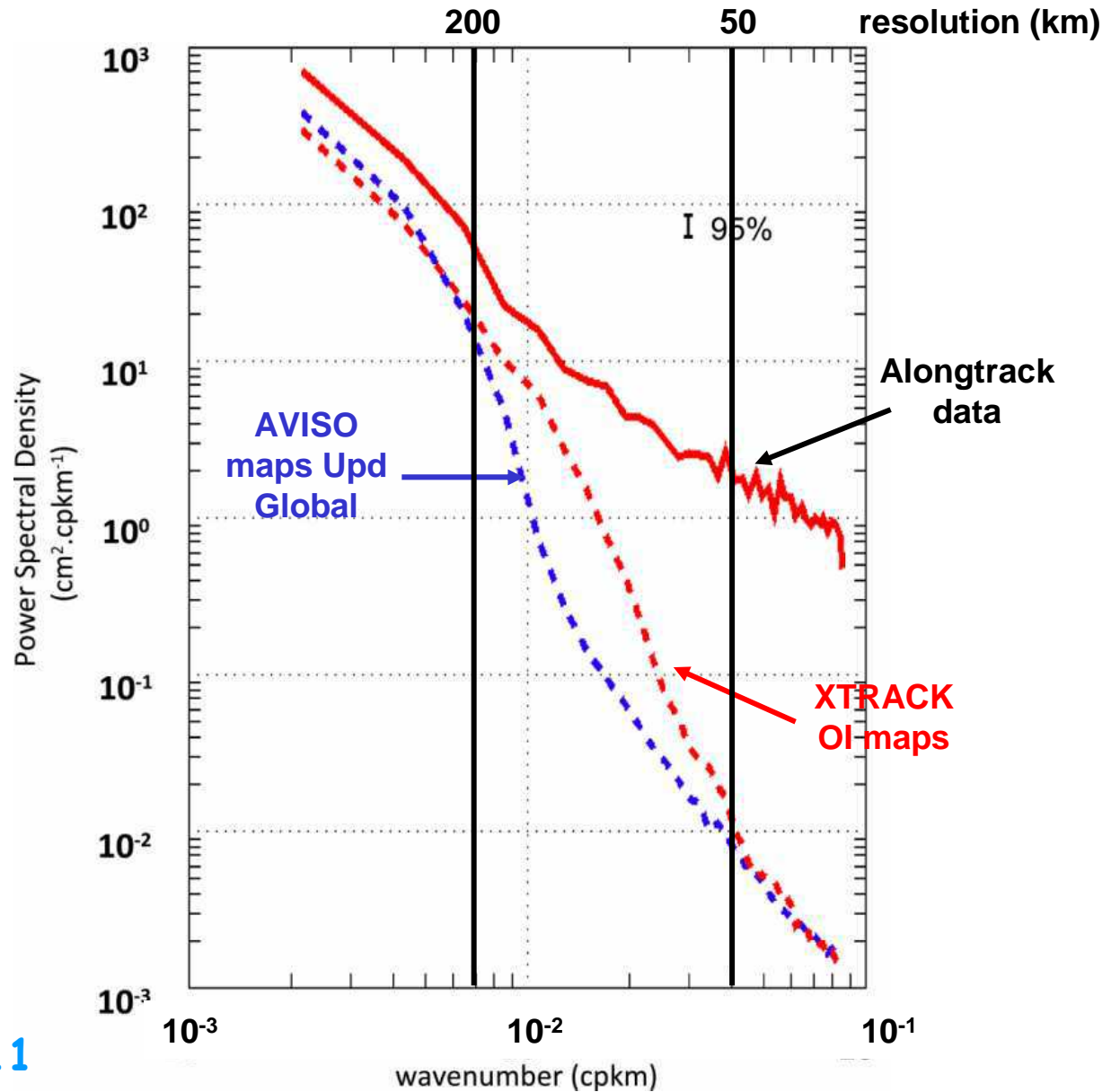
From Dussurget et al., 2011

Perspectives

➢ Regional CAL/VAL activities: analysis of AltiKa performance.

➢ Work on optimal processing and post-processing strategy for AltiKa altimetric data in marginal seas.

➢ Add Altika data in our regional archives.

➢ Development of advanced multi-satellite altimetric products for marginal seas.

➢ Analysis and characterisation of the sea level variability (mesoscale and sub-mesoscale) observed in the coastal regions.