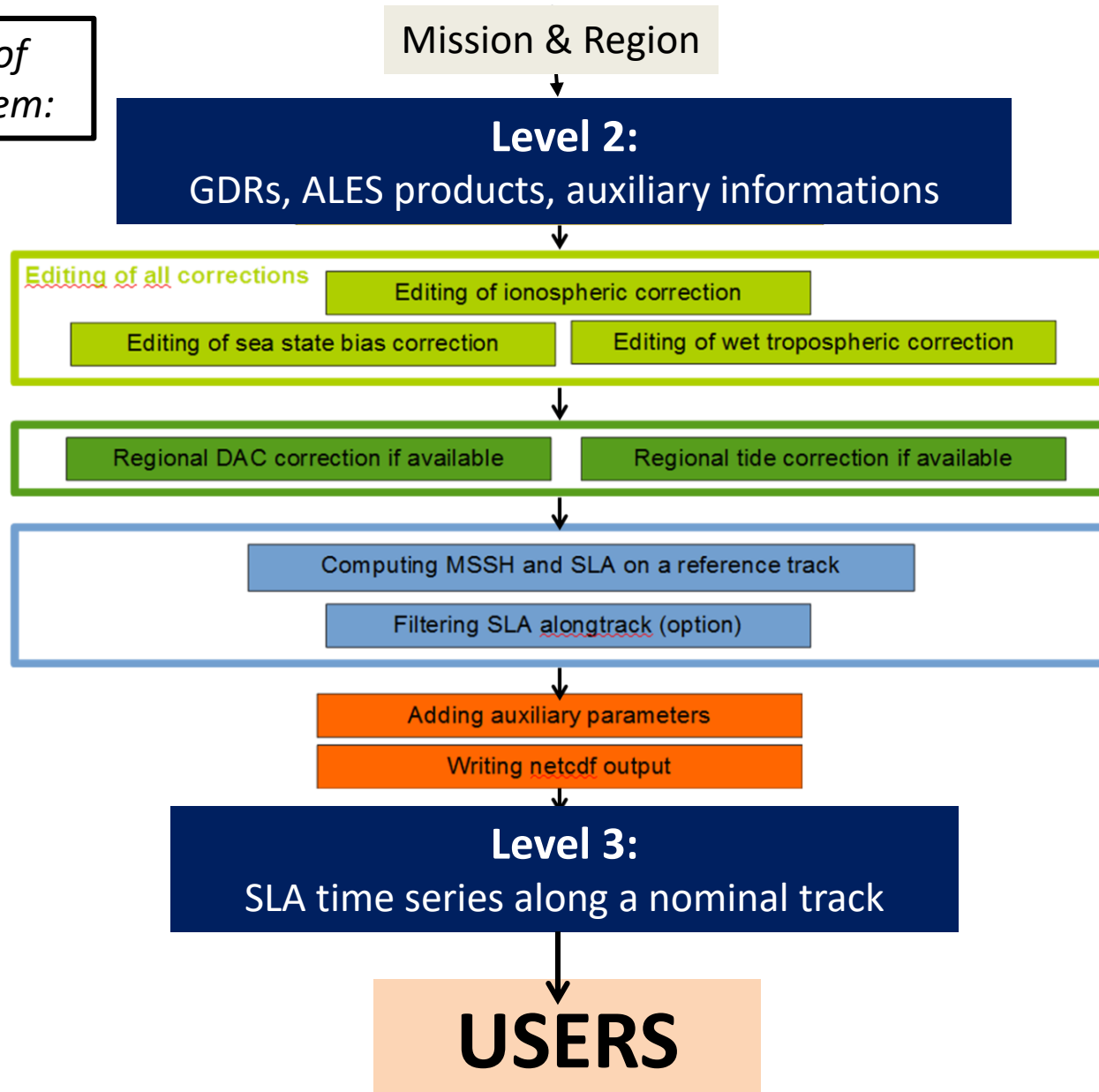


# The production system, the FCDR and ECV sea level products: overview and objectives

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*Processing steps of  
the X-TRACK system:*



*Processing steps of  
the X-TRACK system:*

Mission & Region



**Level 2:**

GDRs, ALES products, auxiliary informations



Processing system adapted for the SL\_CCI  
Bridging Phase Project :

- From 1Hz to 20Hz measurements
- From MLE4 ocean retracker to ALES coastal retracker (Passaro et al., 2014)
- ALES SSB correction (Passaro et al., 2018)

**Level 3:**

SLA time series along a nominal track



**USERS**

*Processing steps of  
the X-TRACK system:*

Mission & Region



**Level 2:**

GDRs, ALES products, auxiliary informations



**Geophysical corrections :**

- Impact studies
- Set of corrections adapted for coastal & climate applications



Adding auxiliary parameters

Writing netcdf output



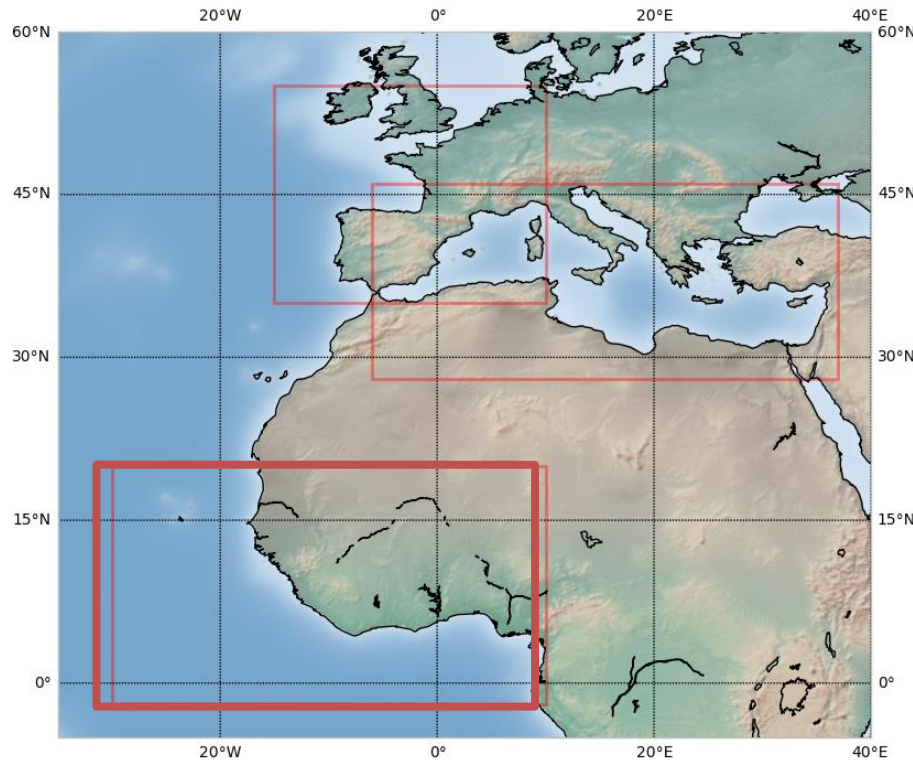
**Level 3:**

SLA time series along a nominal track



**USERS**

## 3 pilot regions



## 2 altimeter missions

### ❑ Jason-1

Cycle 1 (2002/01) to 259 (2009/01)

### ❑ Jason-2

Cycle 1 (2008/07) to 292/293  
(2016/06, depending of the region)

*What has been done in the ESA SL\_CCI Bridging Phase:*

- **X-TRACK processing software:**

- Adapt the algorithm to ALES product provided by TUM (format & inputs)
- Define the set of corrections & interpolation/extrapolation at 20 Hz
- Define/adapt the X-TRACK editing for ALES & for 20Hz measurements
- Adapt the MSSH computation to 20 Hz data
- Adapt the post-processing step

- **X-TRACK/ALES 20Hz L3 product:**

- Compute a first release of the product for the 3 test areas and for Jason-1 & Jason-2 (September 2018)
- Internal validation & test on performance
- Combine Jason-1 & Jason-2 in a single product
- Provide the product to partners for validation and analysis: LEGOS, CNR, NOC/SKYMAT
- Test on different corrections
- Compute a second release of the product for the 3 test areas and for Jason-1 & Jason-2 (February 2019)

### *Geophysical corrections:*

Corrections	Hz	XT/AL Release 1	XT/AL Release 2
Ionosphere	1 Hz extrapolated at 20Hz	GDR From dual-frequency altimeter range measurements	
Dry troposphere	1 Hz extrapolated at 20Hz	GDR From ECMWF model	
Wet troposphere	1 Hz extrapolated at 20Hz	GDR radiometer wet tropospheric correction	GPD+ wet tropospheric correction (Fernandes et al., 2016)
Sea state bias	20 Hz	ALES SSB (Passaro et al., 2018)	
Solid tides	1 Hz extrapolated at 20Hz	CTOH From tide potential model (Schureman 1958)	RADS From tide potential model (Cartwright and Taylor, 1971)
Pole tides	1 Hz extrapolated at 20Hz	GDR From Wahr, 1985	
Loading effect	1 Hz extrapolated at 20Hz	CTOH FES1999 (Lefèvre et al., 2002)	RADS FES2014a
Atmospheric Correction	1 Hz extrapolated at 20Hz	DAC from CTOH	DAC from RADS
Ocean Tide	1 Hz extrapolated at 20Hz	CTOH FES 2012 (Carrère et al., 2012)	RADS FES2014b global tidal model

*Performance*

**For each region and for both Jason-1 & Jason-2,**

**3 data sets are compared:**

- X-TRACK 1Hz: the standard 1-Hz X-TRACK product computed from the 1-Hz measurements provided from GDRs products (MLE4 retracker),
- X-TRACK 20Hz: a 20-Hz X-TRACK product version computed from the 20-Hz measurements provided from GDRs products (MLE4 retracker),
- the combined 20-Hz ALES/X-TRACK product: computed from the 20-Hz measurements retracked with ALES (called XT/AL 20Hz hereinafter).

The same geophysical corrections, except for XT/AL 20Hz, where the ALES SSB is used.



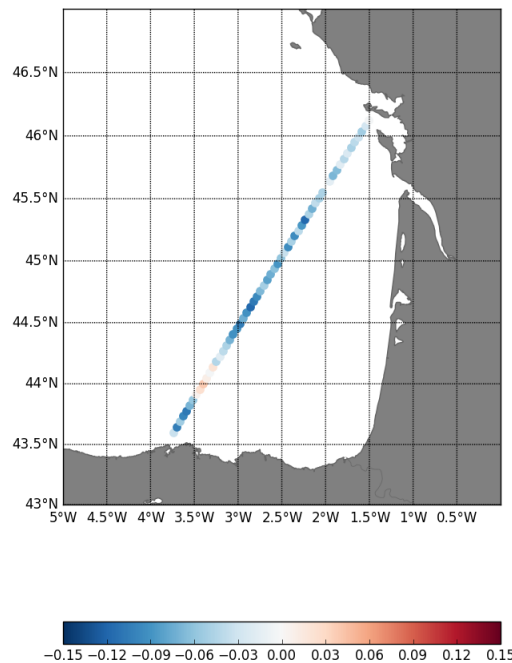
Mean distance to the coast (ghssh) of the first point available - SUMMARY

**> 80% valid (in km)**

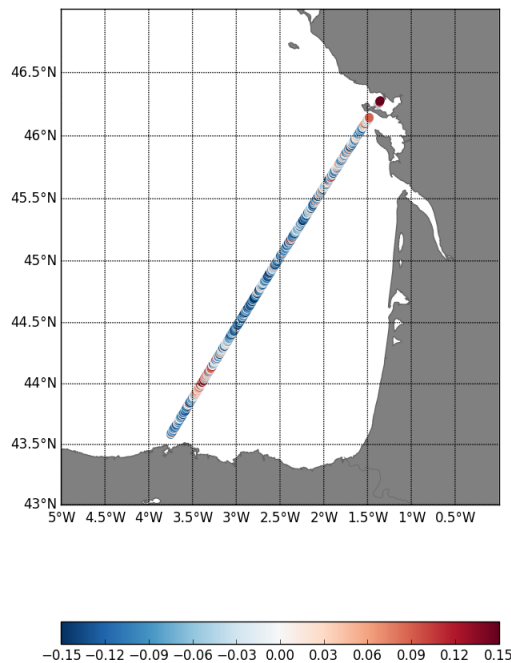
Region	Mission	XT 1Hz	XT 20Hz	XT/AL 20Hz
MEDSEA	J1	6,9	4,2	3,4
	J2	5,2	1,4	1,2
NEA	J1	6,2	4,1	3,9
	J2	5,8	1,9	1,9
WAF	J1	9,3	6,1	4,8
	J2	7,6	4,5	3,4
ALL	J1	<b>7,47</b>	<b>4,8</b>	<b>4,03</b>
	J2	<b>6,2</b>	<b>2,6</b>	<b>2,17</b>

### *XTRACK/ALES 20Hz SLA vs standard X-TRACK 1Hz SLA*

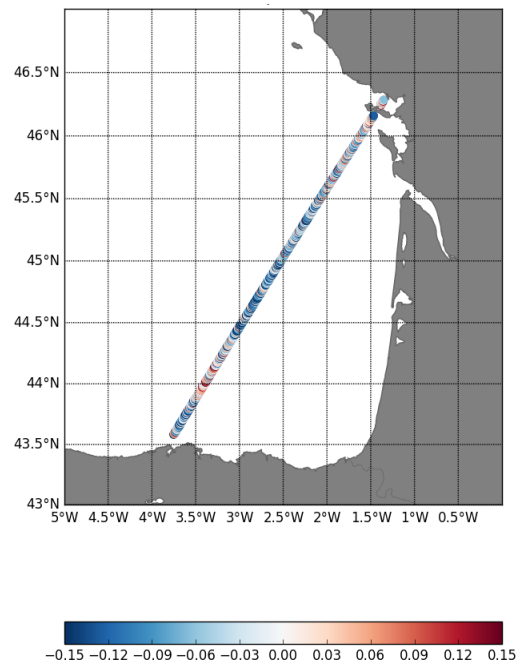
Example of Jason2 SLA – track 213 in Bay of Biscay - cycle 100



X-TRACK 1Hz



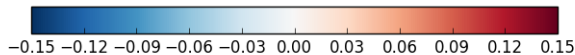
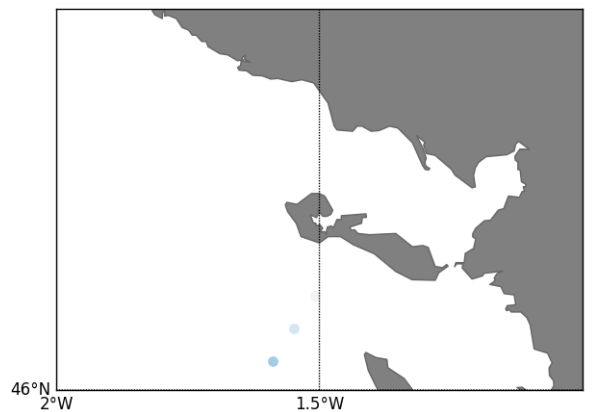
X-TRACK 20Hz



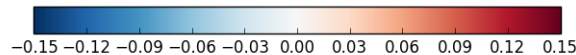
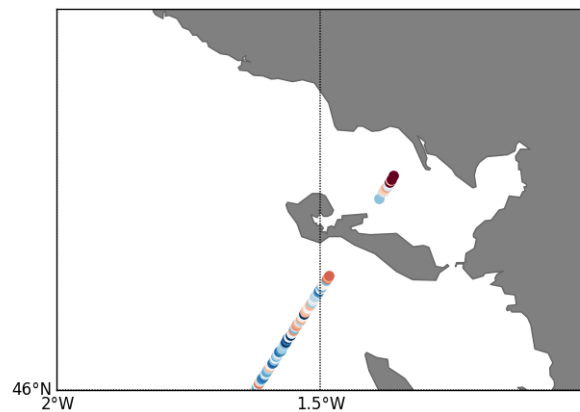
XT/ALES 20Hz

### *XTRACK/ALES 20Hz SLA vs standard X-TRACK 1Hz SLA*

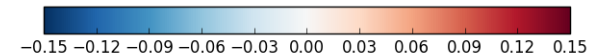
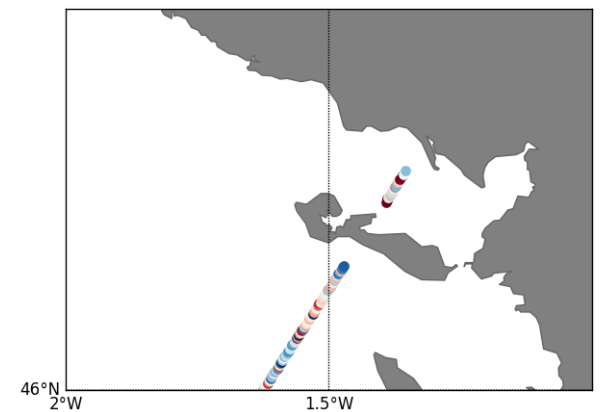
Example of Jason2 SLA – track 213 around Oleron Island - cycle 100



X-TRACK 1Hz



X-TRACK 20Hz

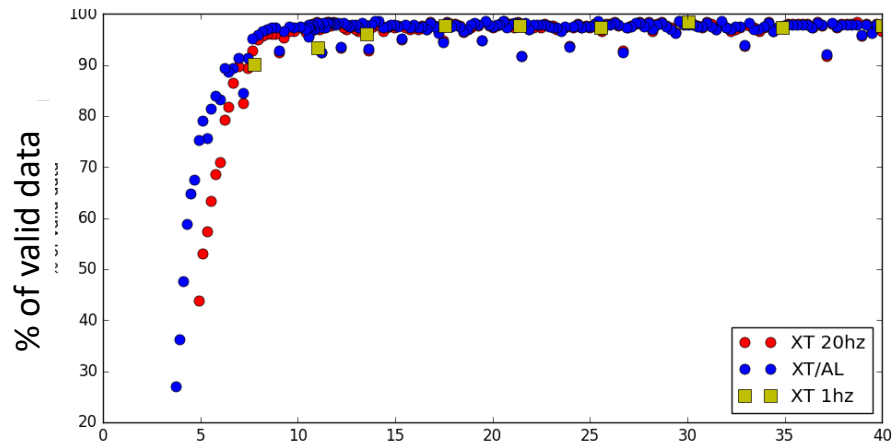


XT/ALES 20Hz

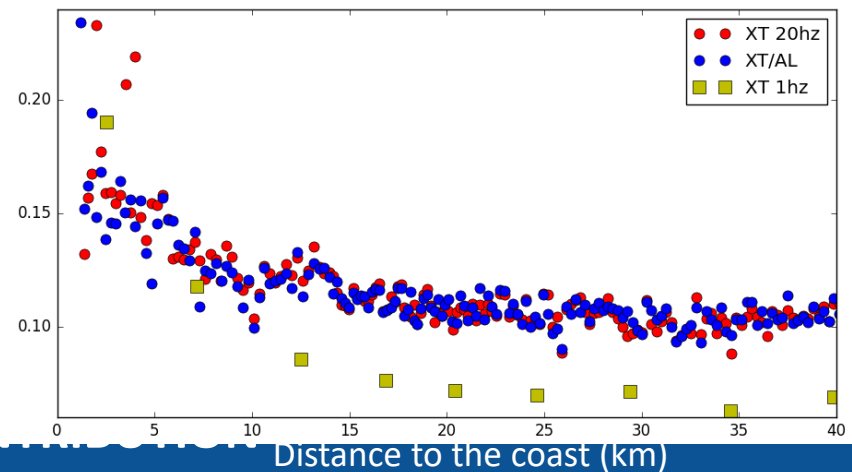
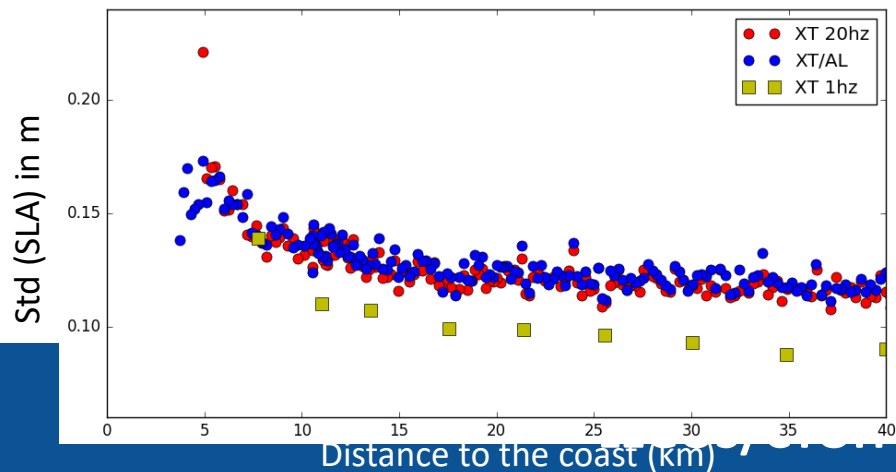
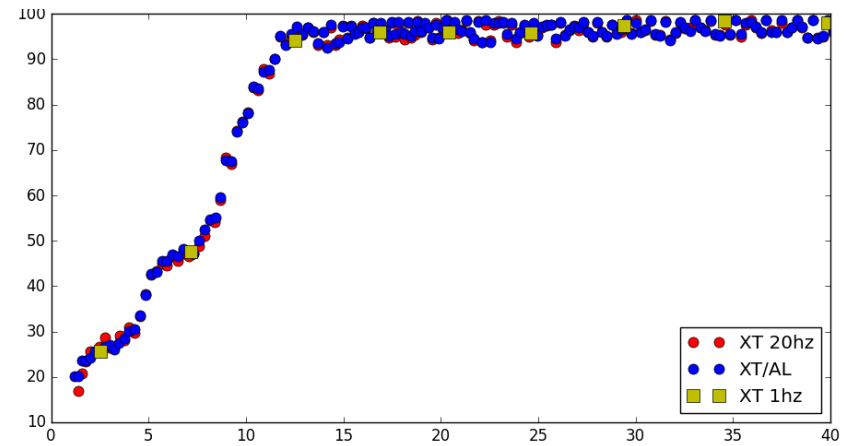
### *XTRACK/ALES 20Hz SLA vs standard X-TRACK 1Hz SLA*

Example of Jason2 SLA – track 20 near Gibraltar - cycle 100

Northern coastal area



Southern coastal area



Work planed

☐ Improve the processing system

- corrections of pb that may be identified during the SL-CCI Bridging Phase (bias and better inter-mission calibration)
- optimization of the set of corrections
- optimization of the editing
- computation of a quality flag parameter

☐ Adapt the processing system

- more altimetry missions
- more regions
- SAR altimetry data

☐ An homogeneous multi-mission coastal altimetry product:

- inter-calibration between the different missions
- development of a regional mapping approach optimized for coastal altimetry

☐ Regular product improvement & releases