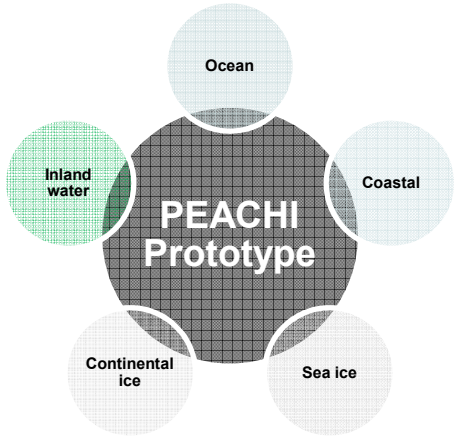
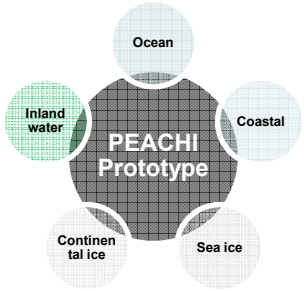


Using SARAL/AltiKa to improve Ka-band altimeter measurements for coastal zones, hydrology and ice : the PEACHI prototype

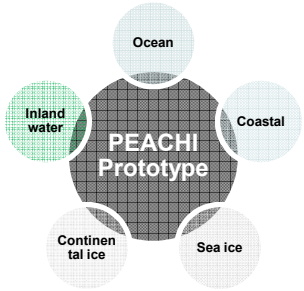
G. Valladeau, P.Thibaut : Collecte Localisation Satellite, France
A. Guillot, N.Picot : Centre National d'Etudes Spatiales, France

& the PEACHI team (CLS, CNES, LEGOS)



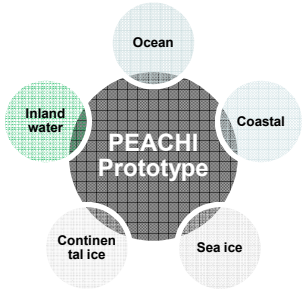
The PEACHI project

- Analyze and improve dedicated processings relative to the Ka band, especially for the SARAL mission
- Validate and implement the existing algorithms before their application in the operational products
- Process new algorithms and parameters linked to scientific applications (coastal areas, surface hydrology, rain cells, continental and sea ice, ...)
- Ensure both complementarity and continuity with the altimeter products provided in the open ocean

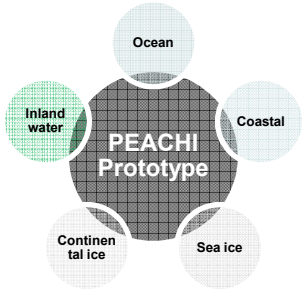


Presentation outline

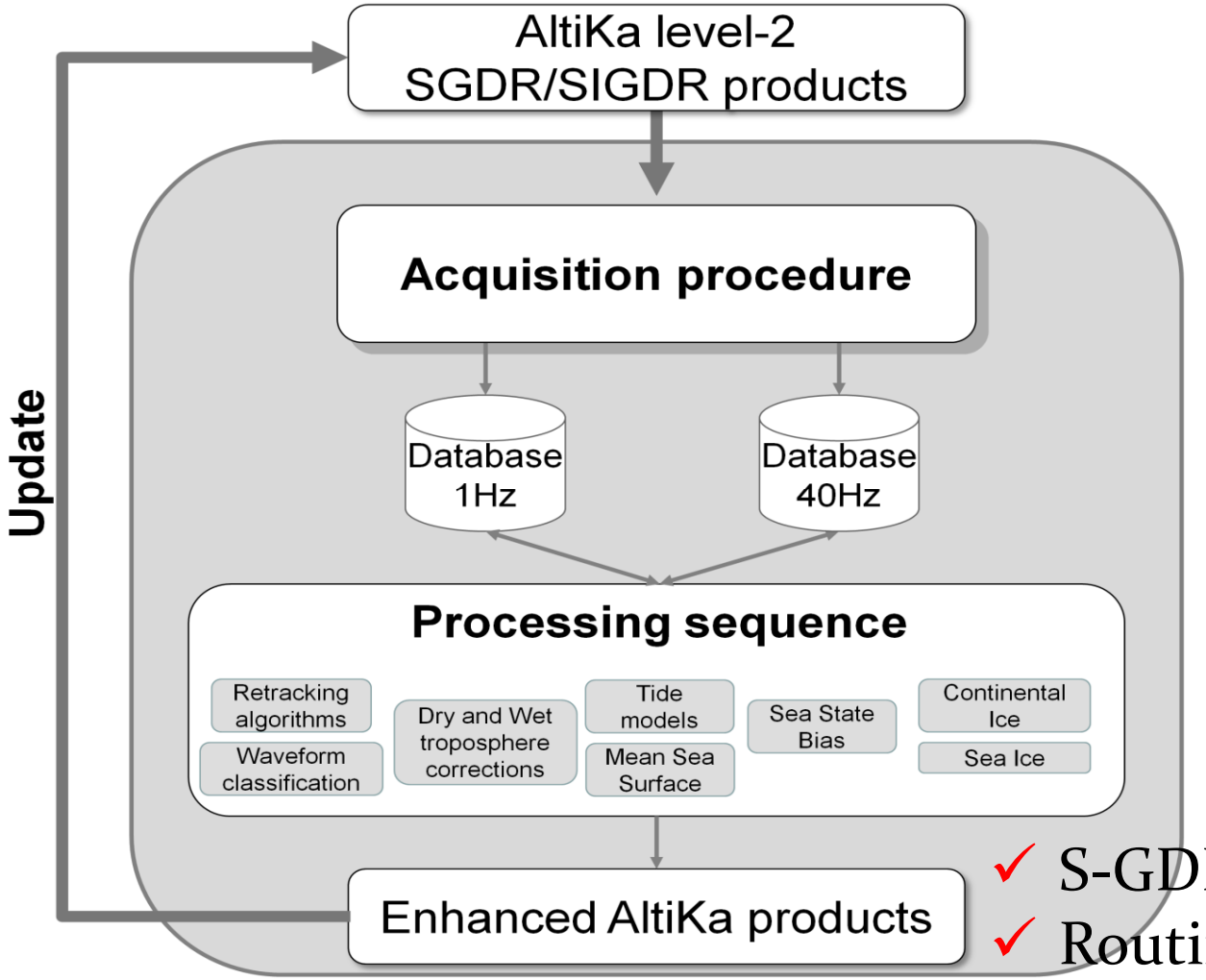
- The PEACHI prototype
- PEACHI altimeter processing
- Radiometer performances
- Availability and Access to algorithms and products from the PEACHI prototype



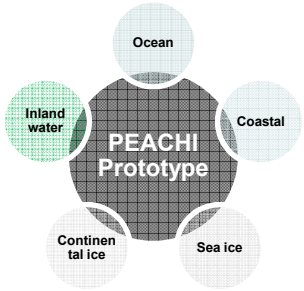
The PEACHI prototype



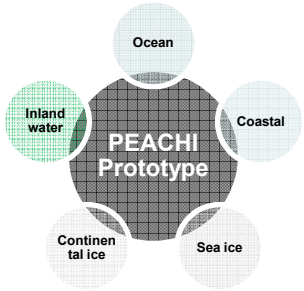
The PEACHI prototype



- ✓ S-GDR and S-IGDR
- ✓ Routinely performed



PEACHI altimeter processing



PEACHI altimeter processing

AltiKa

40Hz

Waveforms

WF Classification

Reference products

Waveforms retracking

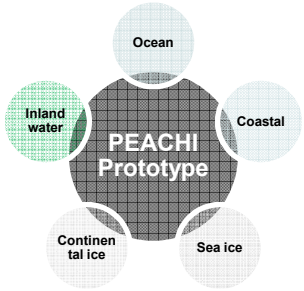
MLE-4 | IceNew | 2 steps | MLE-3 | Red-3 | BAGP | Ice-2 | Ice-1 | Sealce

Ocean | Coastal | Ice and Hydrology

High Rate Database (40Hz)

Compression 40Hz → 1Hz

Low Rate Database (1Hz)



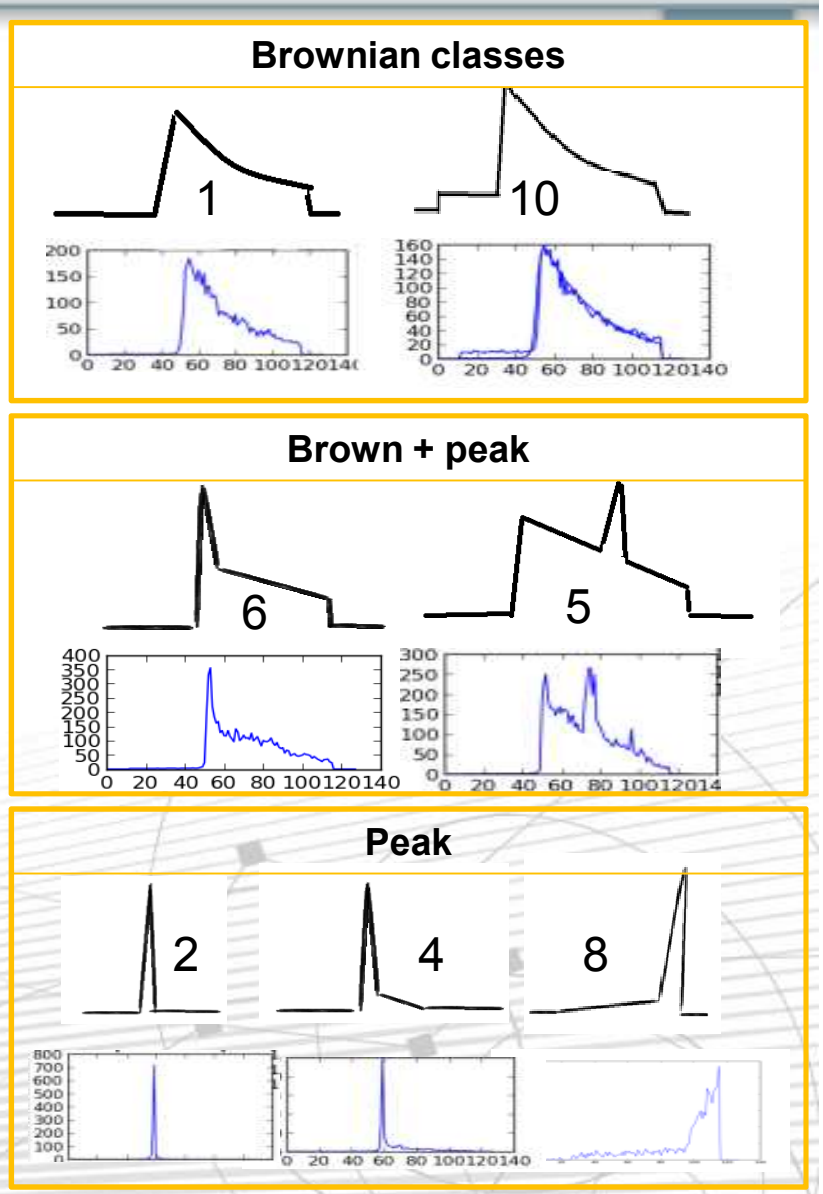
Waveforms classification

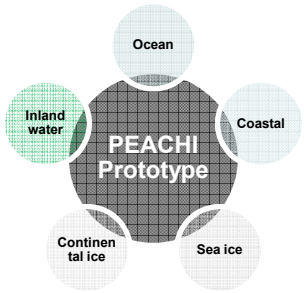
- Better characterize the WFs:

  → **Separate surface types** (ocean, land, coastal areas, surface hydrology, blooms, ice, ...)

  → **Highlight the different echoes** (brownian, peaks, ...)

  → **Improve** the retracking algorithms

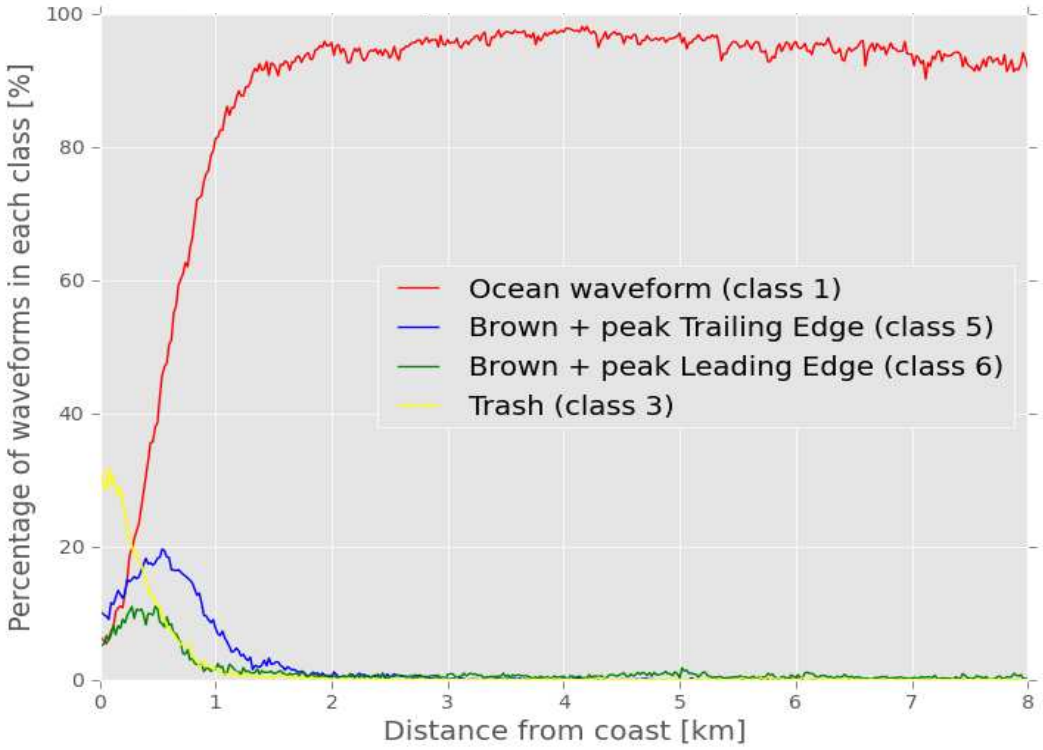




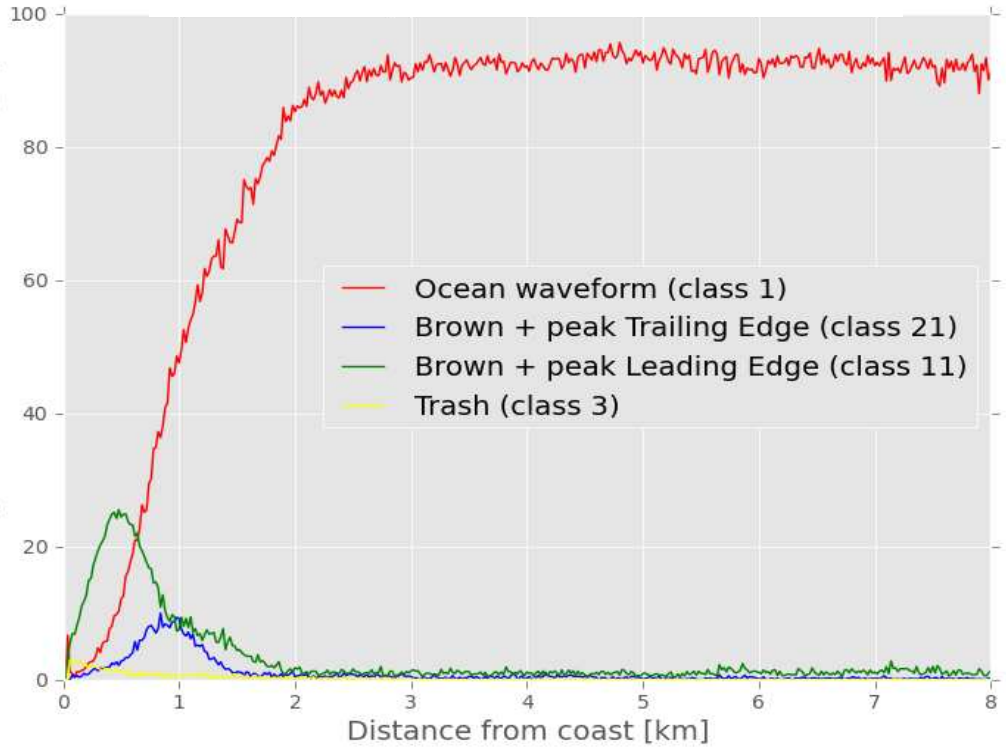
Altimeter coastal perfomances

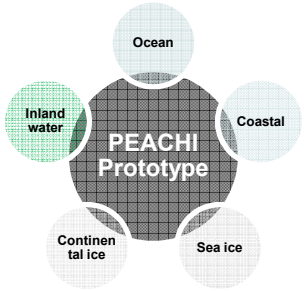
- Comparing to Jason-2 classification in coastal areas, AltiKa ocean WFs accounts for most of the WFs closer to the coast

AltiKa



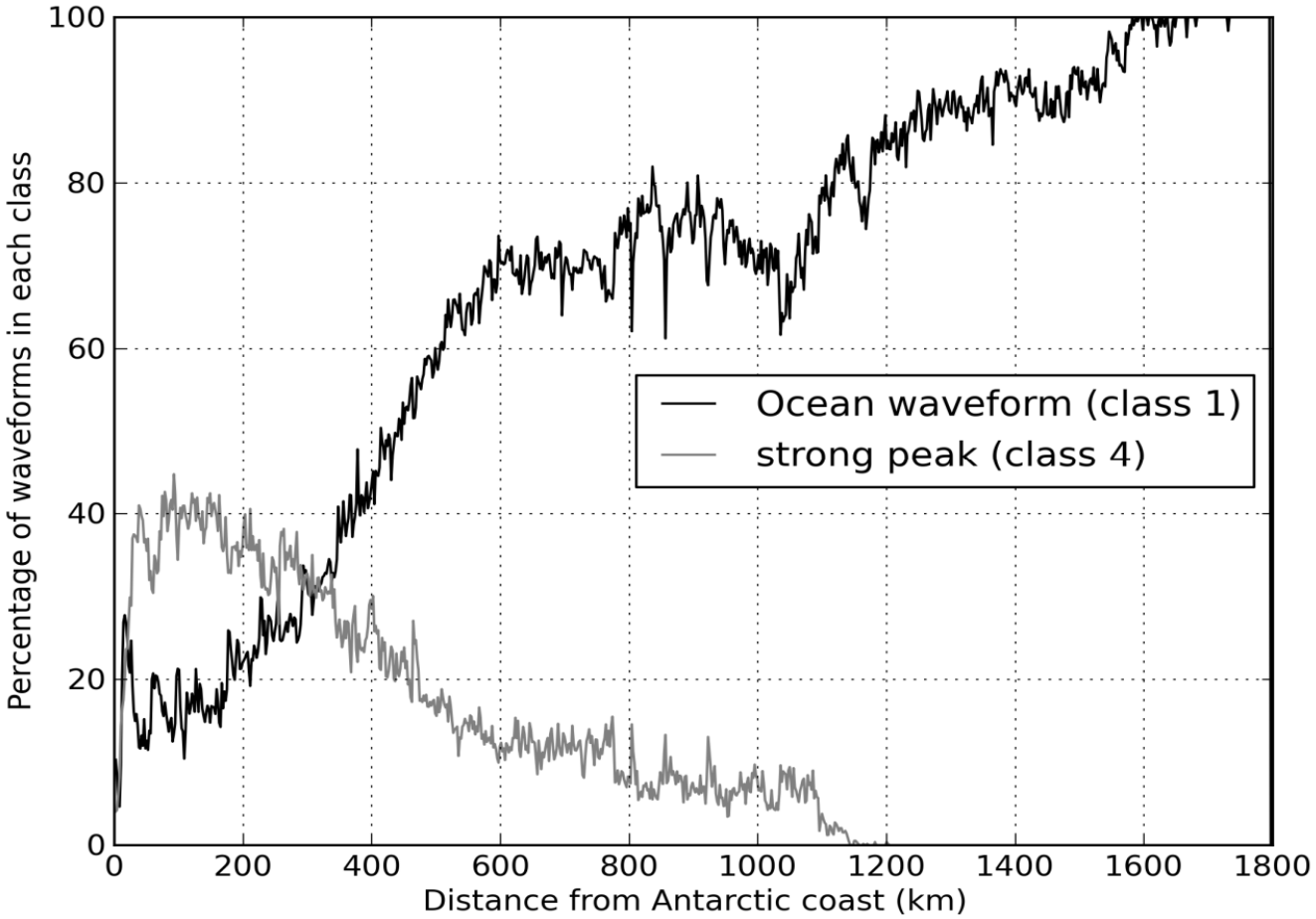
Jason-2

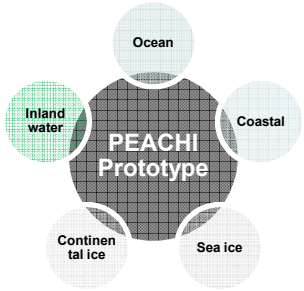




WFs behavior over polar regions

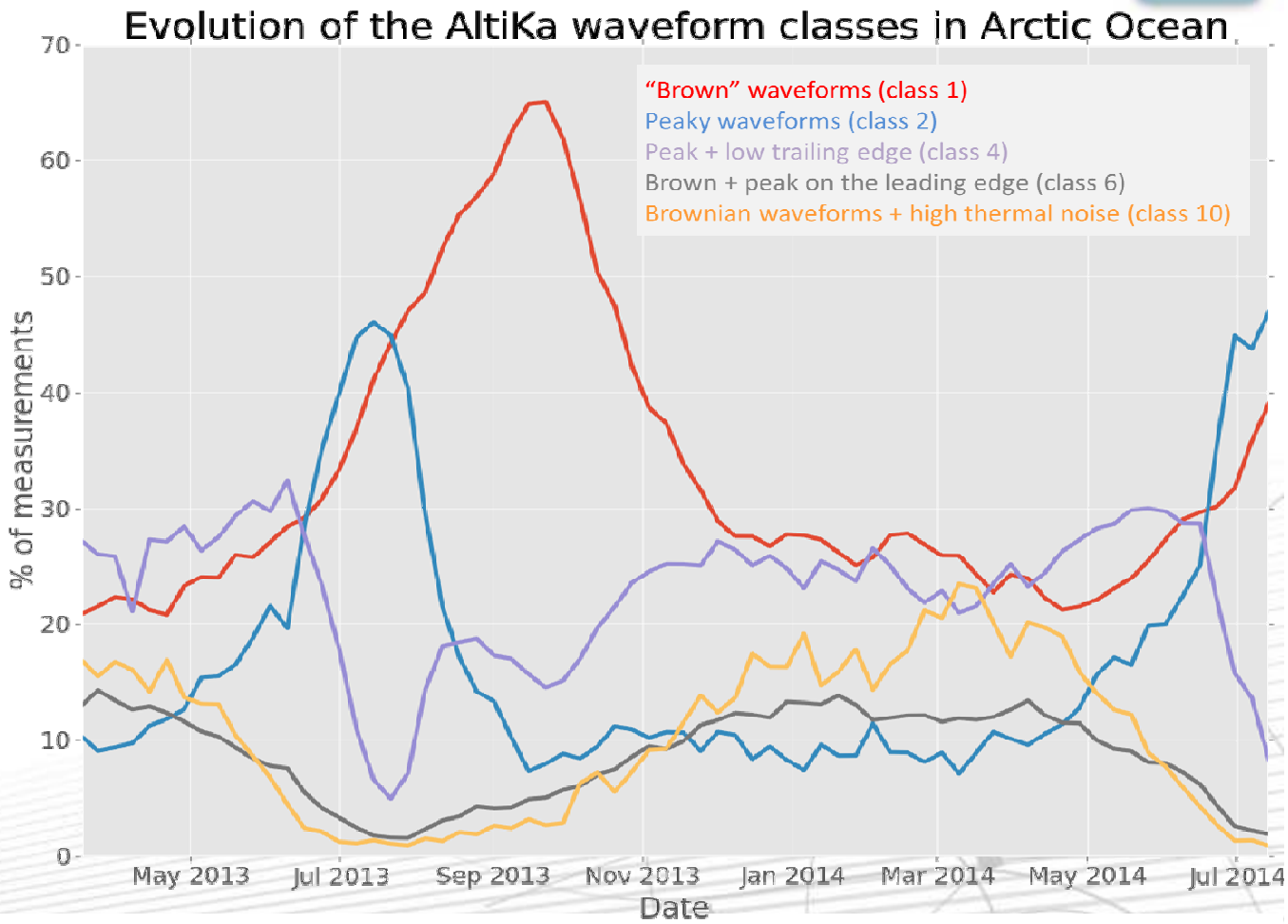
- Complementarity between oceanic and sea ice waveforms



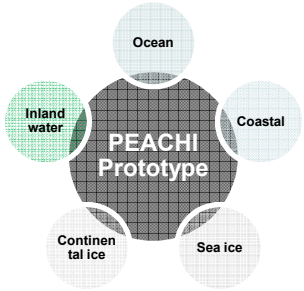


WFs behavior over polar regions

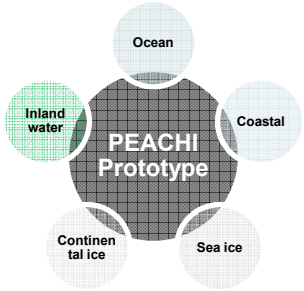
- Complementarity between oceanic and sea ice waveforms
- The waveforms classification is clearly able to differentiate between ocean and ice regions



➢ See poster session for results on sea ice
(« Processing sea ice measurements using WF classification »)



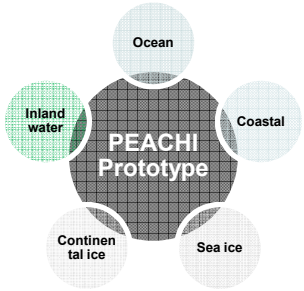
Radiometer performances



Radiometer performances

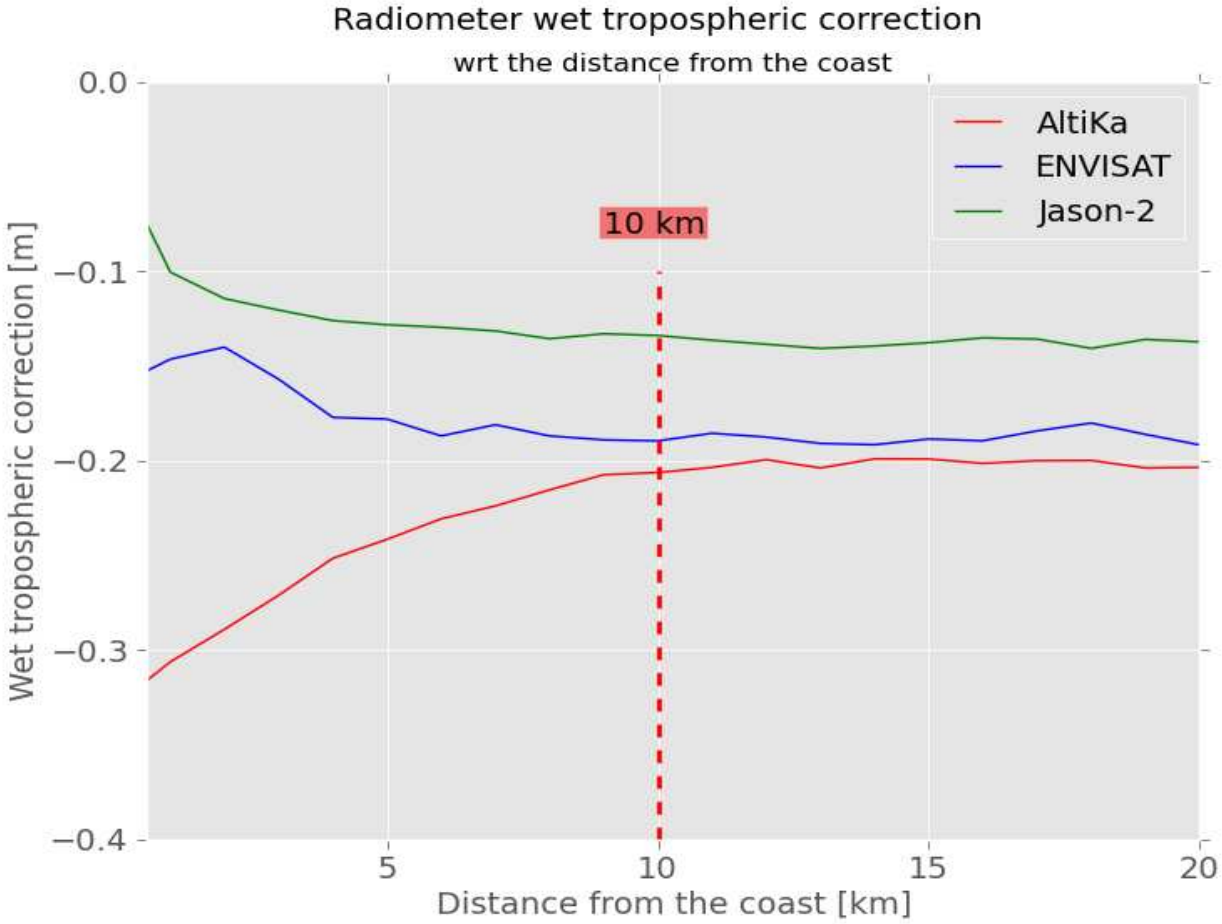
Objectives of the PEACHI project concerning the radiometer:

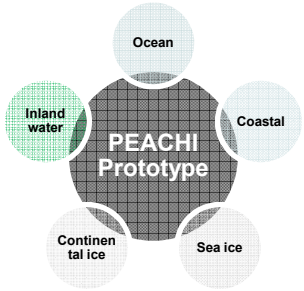
- Assess radiometer performance over coastal areas
- Compute a modelled tropospheric correction specifically tuned to hydrological studies
- Improve the quality of the wet tropospheric correction retrieval over the open ocean:
  - → study of atmospheric attenuation
  - → correction of the saturation of hot calibration counts



Radiometer coastal assessment

- AltiKa wet tropospheric correction shows no contamination up to 10 km from the coast

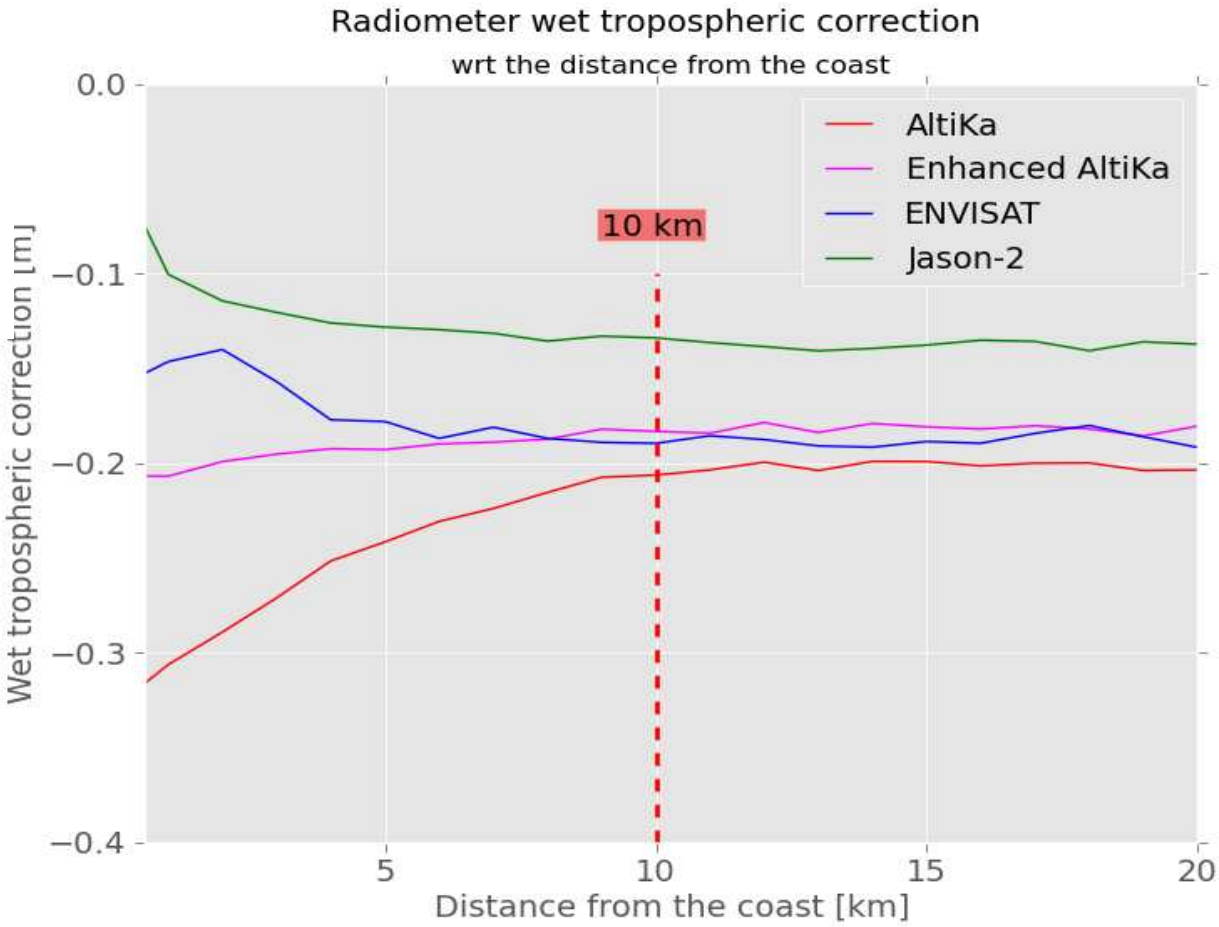


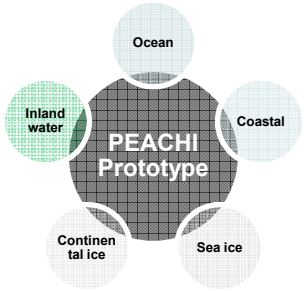


Radiometer coastal assessment

- AltiKa wet tropospheric correction shows no contamination up to 10 km from the coast

- Applying Envisat extrapolation method provide decontaminated BT and thus valid wet tropospheric correction closer to the coast

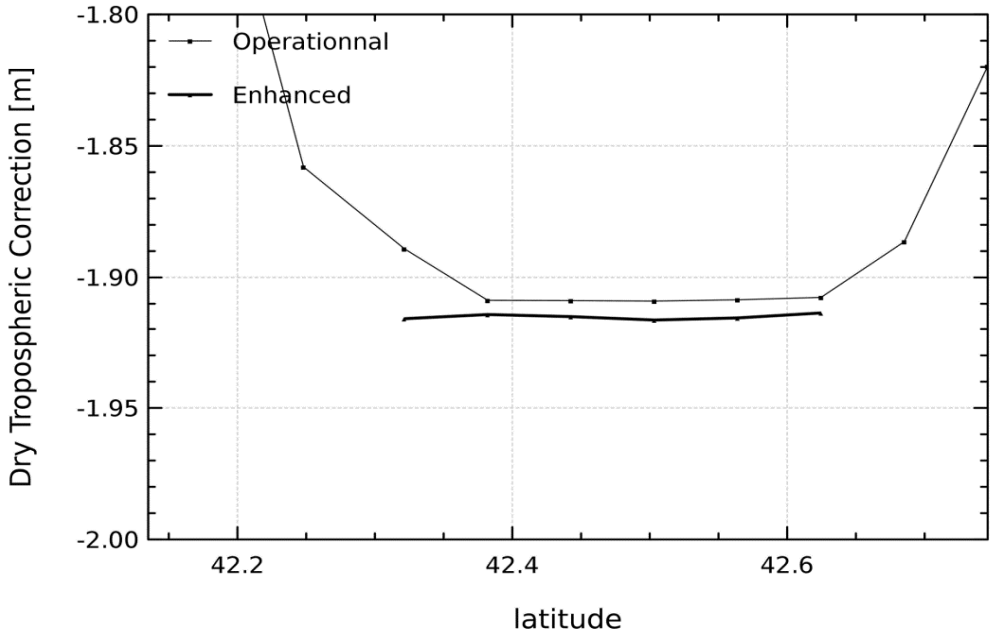


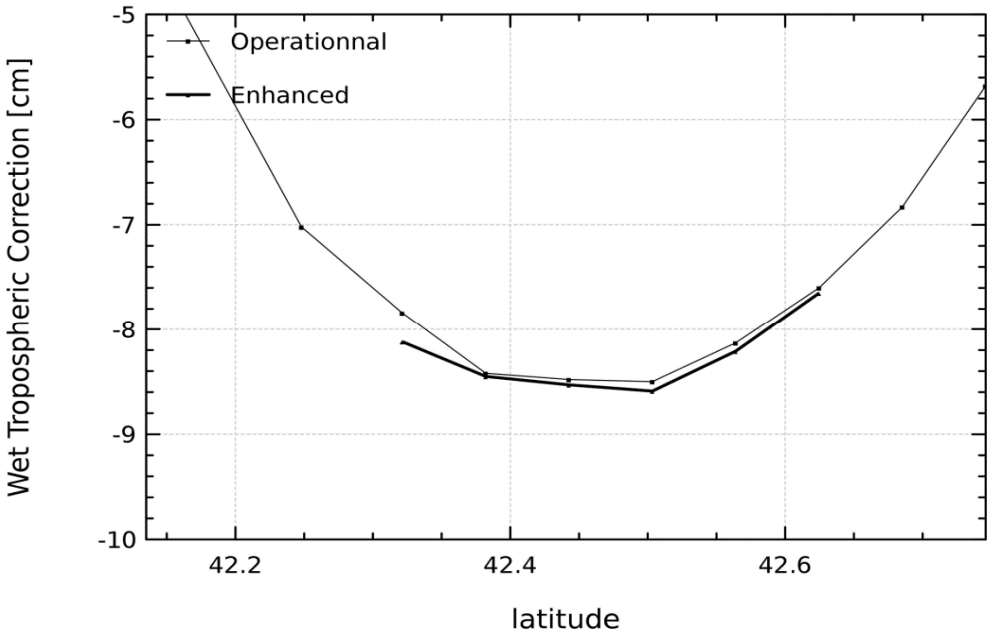


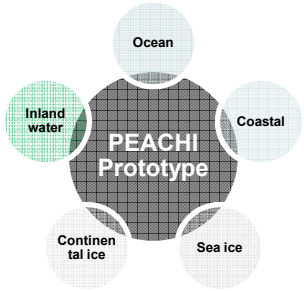
Hydrological studies

- Lake Issik Kul: northern and southern shores dominated by the Tian Shan Mountains with altitudes over 4000 m

- Differences between operational and enhanced products highlight the importance of true altitude in the computation of tropospheric corrections







Availability and Access to algorithms and products from the PEACHI prototype

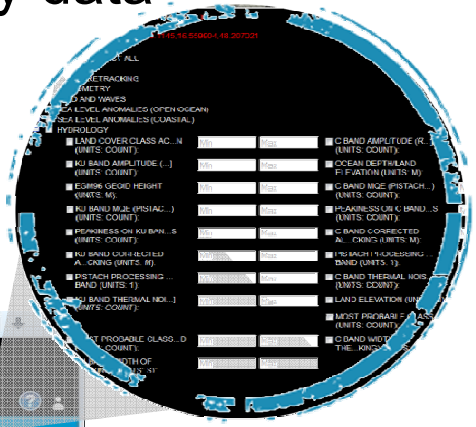
Category	Algorithms available	Coming soon
Altimeter processing	MLE3, 2-steps, BAGP, Red3, IceNew	Numerical retracking, DCORE
	Waveform classification	Ice dedicated WF classification
	Compression 40Hz → 1Hz	
Wind speed		2D wind speed (σ0, SWH)
SSB	2D SSB (SWH, wind speed)	2D SSB (2D wind speed, refined wet tropo)
Radiometer algorithms	3D derived tropospheric correction	Atmospheric attenuation, corrected brightness temperatures, coastal radiometer correction
Mean Sea Surface	DTU 2010	New DTU MSS
Tide Models	DTU10, FES2012	FES2014

Online Data Extraction Service

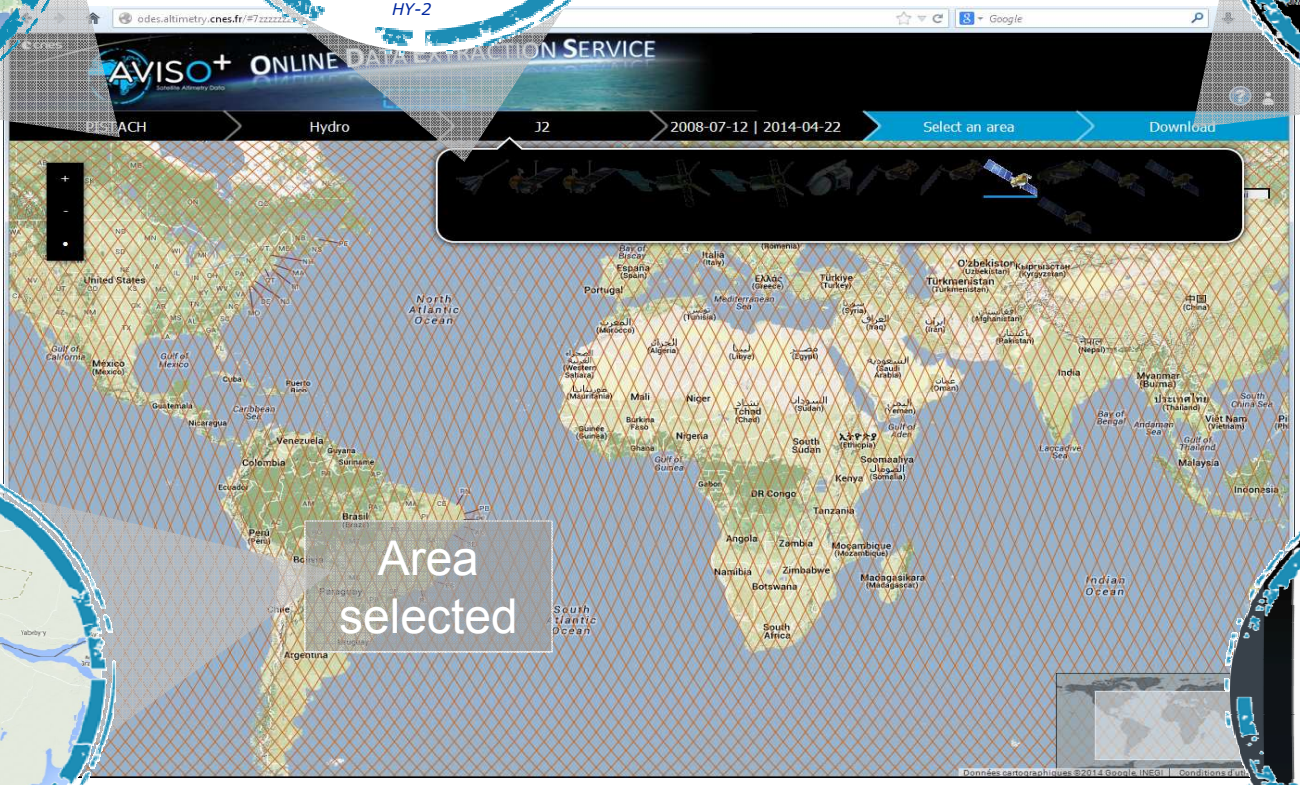
An interactive interface with expert & innovative altimetry data

Classical & Innovative products

Selection of missions



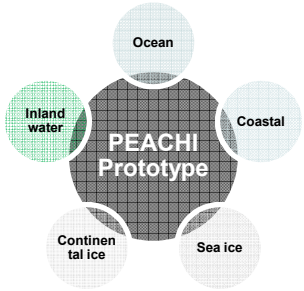
Selection of parameters at download



FTP "on-the-fly"

http://odes.altimetry.cnes.fr

No waiting, nor size limit



Thank you for your attention !