

# MAPS: the Multi-mission Altimetry Processing Software

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## Abstract

Definition of altimetry virtual stations over inland water bodies requires a very specific processing composed of a refined selection of valid data for estimating water levels and possibly the correction of hooking effect. The Multi-mission Altimetry Processing Software (MAPS) offers the opportunity to end-user to define their own virtual stations using the altimetry data contained in the Geophysical Data Records (GDRs) for the most recent nadir-looking altimetry missions (i.e., Envisat, Jason-1, Jason-2, and Saral). Once achieved a coarse selection of the altimetry measurements present in the study zone using a kml file defined with Google Earth, altimetry heights are computed using the geophysical and environmental corrections for different type of surface (rivers and small lakes, great lakes, ocean, and coastal areas). A graphical user interface allows to visualize not only the altimetry heights derived from the different retracked ranges available for each mission (e.g., Ocean, Ice-1, Ice-2, Sea Ice, MLE-3) inside the study area, but also any corrections used and other parameters (e.g., backscattering coefficients) that can be useful for selecting the valid altimeter heights. Correction of the hooking effects can be performed on the selected or a part of the selected data at any cycle. The selection of the valid data can be saved at any time and reloaded. Time-series of altimeter heights are then computed based on the user's selection of the valid data and can be exported. This software, developed as a collaboration between LEGOS-OMP, GET-OMP, and EPOC-OASU will be soon available on the CTOH website: <http://ctoh.legos.obs-mip.fr>.

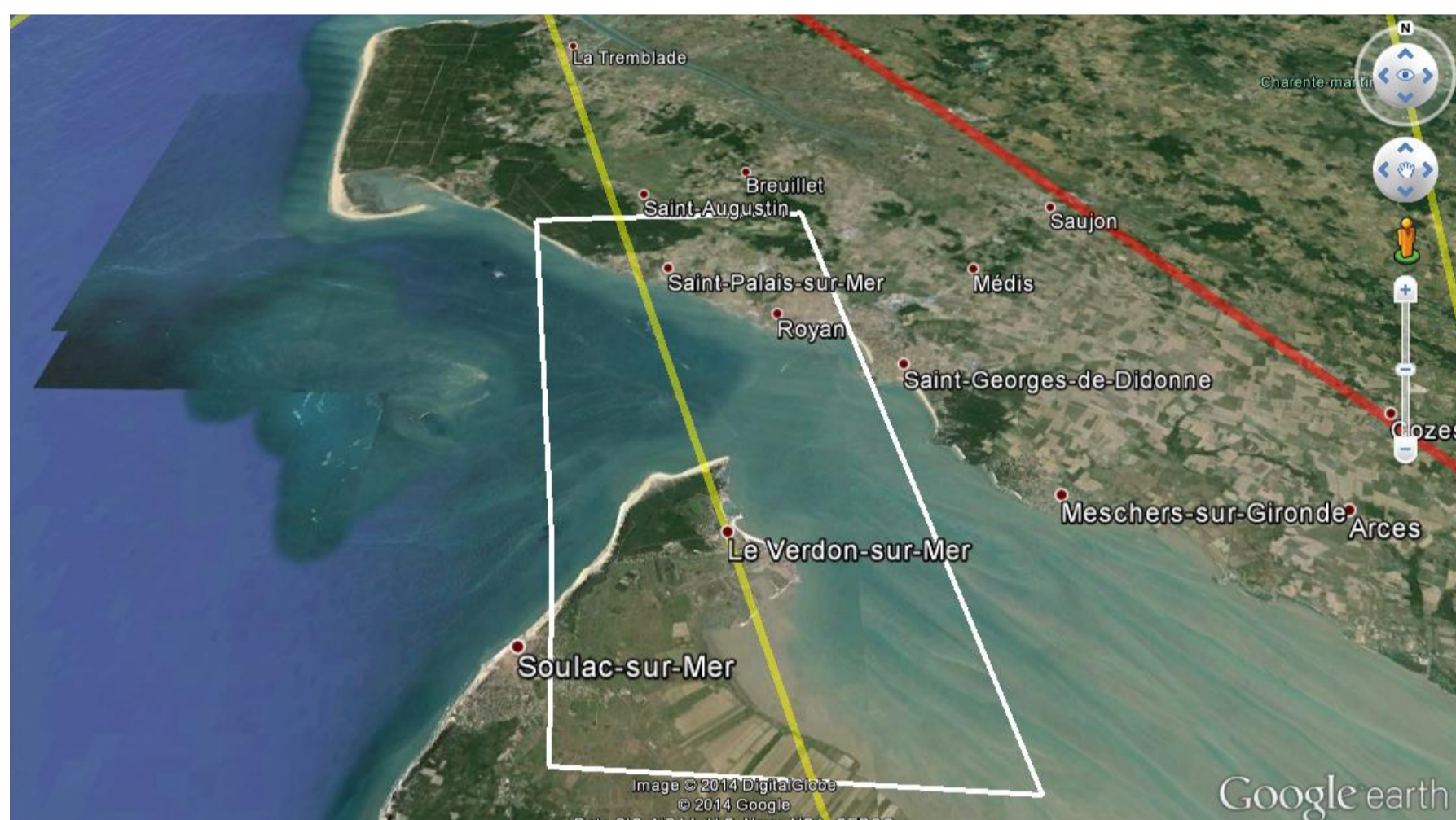
## The Multi-mission Altimetry Processing Software

A software designed to "easily" build virtual stations over inland water bodies. Source code is in MATLAB. An executable that can be used with free MATLAB Compiler Runtime will be soon available at the CTOH. This software permits to build time-series of altimetry-based water level using Geophysical Data Records (GDR) files in netcdf format available at CTOH and AVISO+ through a Graphical User Interface (GUI) (Frappart et al., under revision). Data processing is composed of three main steps:

- a coarse delineation of the virtual stations using Google Earth. The polyline is saved in a kml file that is then loaded in MAPS
- a refined selection of the valid altimetry data. Profiles of altimeter heights are displayed for each cycle. Outliers and measurements over non-water surfaces are eliminated based on visual inspection.
- the computation of the water level time-series from the selected altimetry heights using median and mean estimates for any available tracker.

### Coarse Selection of the study zone

Saved in a kml file used by MAPS to filter out the data not included in the polygon.



Example in the Gironde estuary under ENVISAT/SARAL track 839 (in yellow).

### Input

\* Add data from GDR files in netcdf format or from a previous selection in csv format.

Mission available: Jason-1, Jason-2, ENVISAT, SARAL

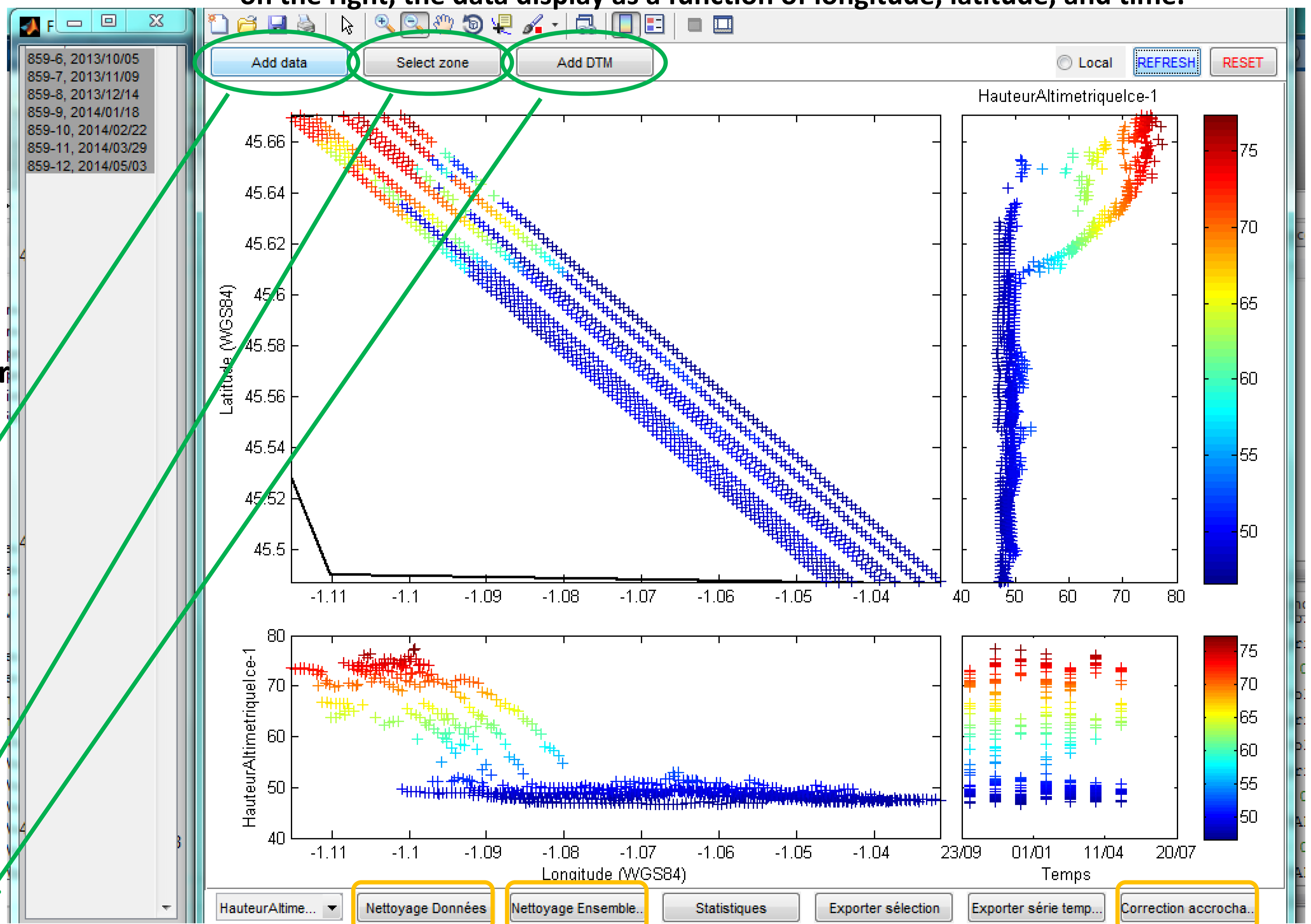
Applications with suited corrections: Rivers and small lakes, large lakes, ocean

\* Import kml file (shape and possibly trajectory) to select the data in the study zone

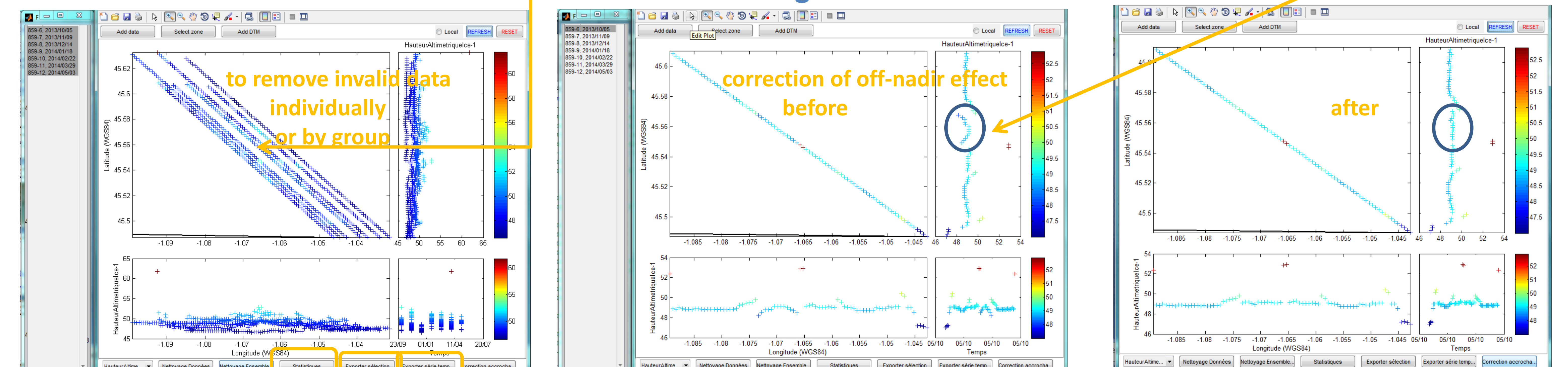
\* Over some regions, possibility to load a DEM or an image

### Graphical User Interface

Two windows: on the left, the selected cycles for SARAL track 859, and the corresponding date on the right, the data display as a function of longitude, latitude, and time.



### From altimeter heights to water levels



\* Compute statistics per cycle and display time-series

\* Export data selection and time-series of water levels in .csv

### To come soon

Other LRM missions (T/P, ERS-2, GFO), SAR missions (Cryosat-2), SSH and SLA

### Reference

Frappart et al., Preliminary assessment of SARAL/AltiKa observations over the Ganges-Brahmaputra and Irrawaddy rivers, Marine Geodesy, under revision

