

## Altimeter Waveform Retracking Test Bench

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In the frame of the CNES SLOOP project aiming at improving the Jason open ocean products, many different retracking algorithms have been developed. In addition to the classical Maximum Likelihood Estimator solving for 3 or 4 parameters, SVD-MLE, Neural Network, Two-Passes, Least Square Error, Bayesian and dedicated rain retracking algorithms have been implemented. The need to precisely validate and cross-calibrate these algorithms then clearly appeared and we developed a retracking test bench able to help us to determine the main features, advantages, drawbacks and the main discrepancies between all these algorithms. We present here this validation test bench, able to be run on Jason data but also on any other altimeter data set, either on 10Hz, 20Hz, 40Hz data or on 1Hz data from Topex, ERS1/2, Envisat, Jason-1 and Jason-2, Cyrosat and Alti-Ka missions. The illustrations presented in this poster have been taken from various studies founded by CNES or ESA and performed in CLS during the course of 2010.



### Exemple of MLE3/MLE4 comparison on Jason-2

Spectrum Analysis (HR/LR)

#### Waveforms Analysis (HR)

#### Estimates Analyis (HR/LR)

#### Cartography Analysis (HR/LR)

Differences of ranges (Ku-band Etude\_MLE3\_C019\_1Hz







# -- WF -- MLE3 model -- MLE4 model WAR 150 - ME-3 MWW Matther





STD of mean waveform for SWH = 2n

STD of Waveform STD of SVD Wavefor

Mean Waveform

**STD of Waveform** 

STD of Waveform

STD of SVD Wavefor

STD of SVD Waveform

STD of mean waveform for SWH = 3n

STD of Waveform
STD of SVD Waveform

Mean Wavefor

Mean Wavefo

STD of Waveform

STD of SVD Wavef

STD of Waveform

STD of SVD Wavefor



Jason-1 - Cycle 188 - Class Repartition





#### As a conclusion, this tool is a very useful tool :

- to develop new algorithms (waveform filtering, classification, retracking, compression) and to analyse their performances to tests new parametrizations of these algorithms
- to detect potential problems in the waveform processing (on board and on ground)
- to compare the performances of two different algorithms (and to compare with official products) (at high and low resolutions)
- to compare the performances of two differents alimeters
- to analyse the performances of a new mission at instrumental levels (level 1 and level 2)

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