ALCIOM : Altimetry Calibration with In-situ Ocean Measurements
Extension to non dedicated « CalVal » sites

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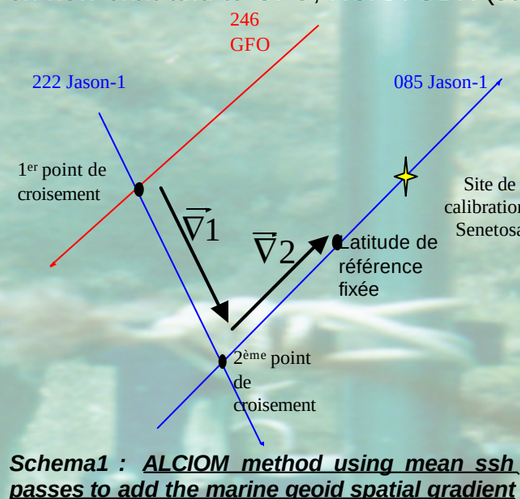
CONTEXT & IDEA

- In-situ calibration of altimeter sea surface height (ssh) is usually done at the vertical of a dedicated Cal/Val site, by directly comparing altimetric data with in-situ sea level data (tide gauge) One restriction is that only measurements which belong to the pass overflying the in situ records area are used. The need to increase the number of altimetric data used is doubled by the interest of using a set of satellites to propose a quantitative and absolute answer to efforts involved in altimetric missions. By enlarging the CalVal are, the data density is increased but we have to take into account of two main effects that interfere in the ssh bias determination : the geoid slope and the ocean dynamics. It sets too the problem of the measures co-localisation.

- The idea : Extend the principle of in-situ calibration by using satellites passes located far from the calval site. We propose to extend to several calibration opportunities far from the coastal tide gauges. This allows to connect off shore altimetric data with in-situ records.

METHOD

The method brings back to the calval site, a distant altimetric ssh by following a path defined by the succession of known mean passes that permit to reach the in situ measurement taking into account of spatial gradient due to the marine geoid. The method has been first tested with Jason-1 data set, then applied to TOPEX-POSEIDON on new orbit and to GFO, NOAA GDR (schema 1, figure 1)



Schema1 : ALCIOM method using mean ssh passes to add the marine geoid spatial gradient

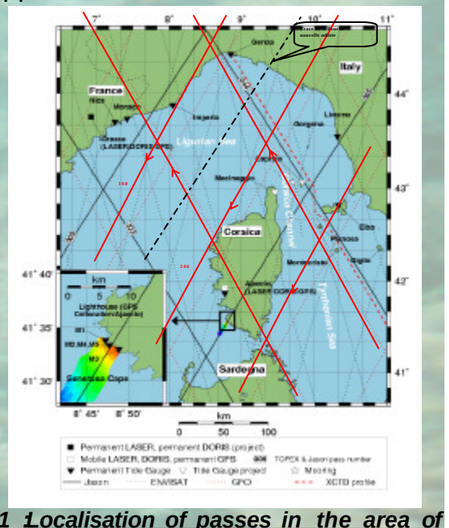


Figure1 : Localisation of passes in the area of Senetosa CalVal site GFO (red), JASON (black,-) and ENVISAT (black---)

I

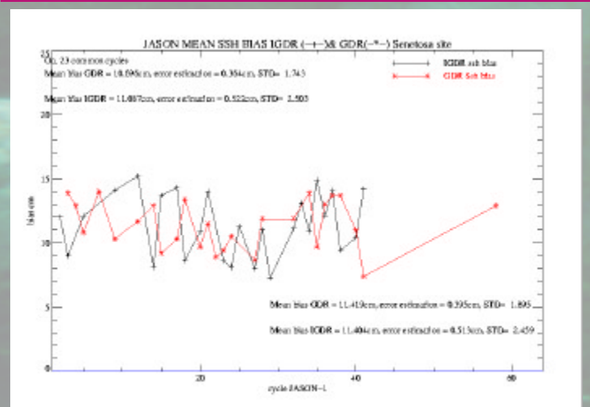


Fig2 : *Ssh Biais validated with Jason-1 data*

II

Tab 1 : Ssh Biais coastal pass are in green. Off shore pass are in blue

At Senetosa Site	N cycles	Mean (cm)	Std(cm)
USING JASON-1GDR (POE)			
Pass 085	41	11.2+/-0.6	1.89
Pass 085+ ocean dyna slope	39	10.9+/-0.6	1.80
Pass 009	9	11.7	2.3
Pass 009+ ocean dyna slope	9	11.3	2.3
USING GFO GDR (NOAA)			
Pass 246	32	5.8	3.3
Pass 246+ ocean dyna slope	21	5.3	3.0
Pass 160	48	8.5	9.1
Pass 160+ ocean dyna slope	22	6.4	6.1

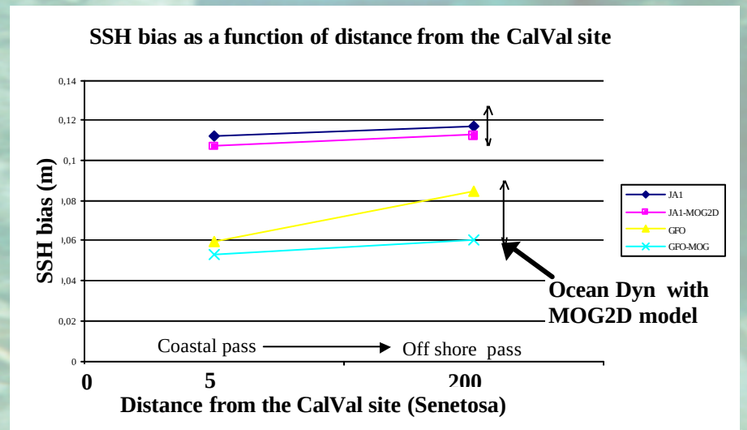
Sigma bloom

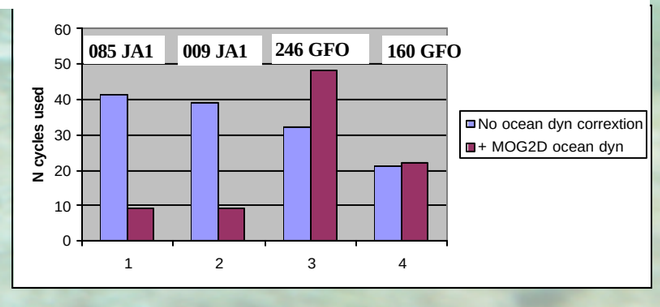
Cycles n° : 1,16,22,30,42,47,49, 50,51

Comparison with a global CalVal estimation for same time period cycles GFO 62-115 (J.Lillibridge personal comm., NOAA)

Biais = 7 cm , std=12cm

III





IV

Ocean dynamics differential effect which is becoming larger as the distance from the site is increasing. It is corrected by using ocean numerical MOG2D model (F.Lyard,LEGOS).This method was first tested at the Senetosa site (Corsica) with a Jason-1 data set then, applied to Topex-Poseidon on its new orbit and to GFO, using NOAA-GDR. Such a method is applicable to any altimetric satellite, assuming that there is an accurate mean altimetric profile available over the CalVal site to connect off-shore altimetric data with in-situ data.

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