Suggestion of a common exercise for in situ CalVal and data consistency

JASON

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Highlights

❑ Proposal of exercise to compare and synthesize sea surface height (ssh) bias results from in situ CalVal methods.

❑ **Aim :** To analyse the results from CalVal sites on a computing basis as comparable as possible.

To try to make easier the comparisons between ssh bias from different CalVal sites.

❑ **It requires:** a plan of exchanges and analyses of results from different works on CalVal missions.

❑ The definition of a common protocol to compute ssh bias (epoch, corrections choices, ...)

❑ the implementation and realization of the CalVal exercise

❑ The synthesis of results after each OSTST meeting.

❑ The analyse of results and its diffusion to the CalVal teams.

❑ This action participates to **Margins Altimetry Projects** (MAP), initiated by POC, CTOH, LEGOS, NOVELTIS,

Point 1 : Data Selection from altimetry and in situ records

Interest for common choices: In a first step, **we propose to fix computing constraints** (ex: versions of instrumental & geophysical corrections). This should give a **common framework** for ssh bias computing with conditions as homogeneous as possible. This exchange plan will be built with the participant CalVal teams. It'll be proposed to be applied before OSTST future meetings. The bias analysis at different sites should be made easier. By the geophysical conditions and different types of in situ instruments used, specific to the calval sites, departures between bias could be observed. That's why data selection the most comparable possible is a help for reach a consensus on Ssh bias estimation provided by in situ CalVal technique.

Satellite name :	Data source : (I)GDR, OSDR, MGDR.	Site name :	Localisation : Lat, lon
Variable	Source & proposed version	(un)activated option	Specific treatment (filtering, etc)
Altimetric parameters			
Orbit	Ex: POE	x	
range	Retracking version, GDR default, ...	x	
Corrected KU range		x	
Net instrumental correction		x	
Wet tropo		x	
Dry tropo		x	
Iono	Jason, doris,...	x	
Inverse barometer		x	
Ocean tide	(ocean_sol_tide_ 1 or 2, external file or none(o))	x	
Load tide		x	
Solid tide		x	
Polar tide		x	
ssb	Model EBM4, non parametric	x	
Frequency	1Hz (default frequency), 10 or 20 Hz (built)		

Satellite name :	Data source : (I)GDR, OSDR, MGDR.	Site name :	Localisation : Lat, lon
Variable	Source & version	(un)activated option	Specific treatment (filtering, etc)
In situ parameters			
Type of data	Ex: Tide gauge	x	
Mean sea level	Source of data	x	
Geoid	Source of data	x	
Geodetic references			
Ref. ellipsoid for altimetric data	Ex : topex	wgs84	grs80		
Ref. ellipsoid for in situ data			
Work Ref. ellipsoid			
Add lines for other parameters			

Point 2 : In situ CalVal methods description

For each CalVal site, introduce the Team, the Technique to compute the ssh bias and possible Local Corrections.

➢**Team:** Ex: CNES and OCA teams   **calibration method:** Absolute calibration. Single pass method AND multi passes methods.

Description: Co localisation between altimetric measures and tide gauges records + Extrapolation on a coastal mean sea surface slope obtained from GPS catamaran technique.
•Tide gauges time series are computed on an absolute referenced ellipsoid.
•SSH Altimetry is computing at 20 Hz or 1 Hz. 20 Hz data are built from1Hz data.
•Local corrections: meteo station to get local atmospheric pressure for sea level computing from pressure tide gauge and to get local measures for tropospheric path delay.
•Choice 1: SSH from altimetry is computed using the closest approach method. SSH cross track gradient is considered (P. Bonnefond et al.)
•Choice2 : Altimetric points are selected along track from the selected satellite pass. A reference point is chosen between valid points from satellite pass and the tide gauge point. (Y. Ménard, G. Jan et al.) Additional local correction : Regional barotropic ocean dynamics from T-UGO model (*F.Lyard et al. POC-LEGOS*) with an average spatial resolution of 4km (in place of point 1: ocean tide and inverse barometer corrections)
•SSH Bias obtained by : [SSH from altimetry - SSH from tide gauges].

➢**Team:**   **calibration method** :   **description:**

Point 3 : Choice of common criteria and unused cycles

Criteria	Satellite name: ex: Jason-1	Satellite version: ex GDRb	Satellite pass n°:	CalVal site:
	Frequency :	Backscatter coeff. Limits (db):	Other criteria:	Other criteria:
Unused cycles	**In case of cycle non usable : identification of the problem**			
1				Ex: sigma0 bloom
20				Ex: non valid wet tropo
...				

Jason-1 ascending passes n°9, 85,187
Jason-1 descending passes n°44, 70, 222
Jason-1 passes N°19, 109
Jason-1 passes n°43, 206
HARVEST
Jason-1 ascending passes n°47, 149, 225
Jason-1 descending passes n°12,88,164
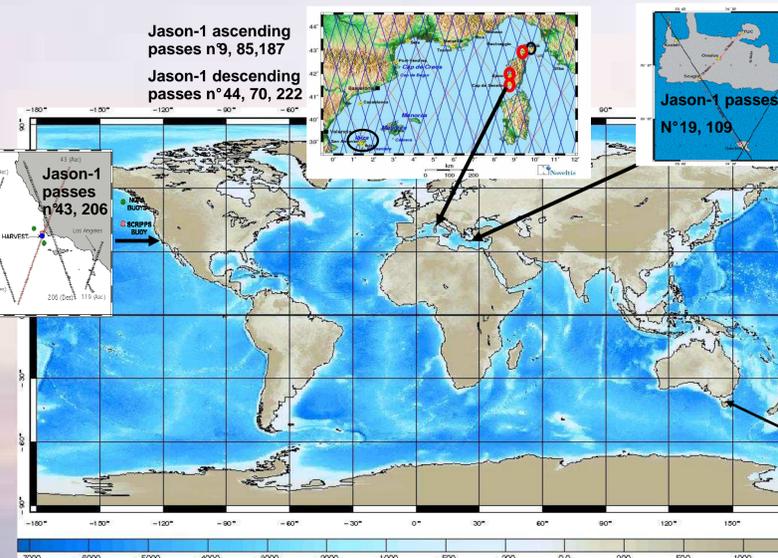
Source figure: Xscan software (F. Lyard et al.) : global bathymetry from POC-LEGOS database

Open list of CalVal sites   **Teams**
❑Australia,Tasmania   Univ. Tasmania, CSIRO et al. (Bass strait)
❑California (Harvest)   JPL
❑Corsica (Senetosa)   CNES,OCA,NOVELTIS, et al.
❑Crete (Gavdos)   JCET et al.
❑Ibiza   UPC, ICC, Puertos del Estados

Point 4: Reporting errors estimates and validation phase

Measure precision		Site:
Instrument	origin or/and type of measures	precision /error (mm)
Tide gauge	Pressure sensor, radar sensor, acoustic, …	+- 10
GPS	Aschtech, other	+-1
other type of instruments		

➡ **+ Description of the variables validation methods and analysis of the validated data results**

Point 5: Statistics on ssh bias results on a common epoch

Results	Satellite name :	CalVal site :			
	Mean & error (mm)	Std (mm)	N tide gauge(s)	% of cycles operated (vs; selected cycles)	Sat pass number
Ssh bias					xxx
Ssh bias					yyy (if several passes are used)
Ssh bias					zzz (if several passes are used)
	Satellite name :	CalVal site :			
	Mean & error (mm)	Std (mm)	N tide gauge(s)	% of cycles operated (vs; selected cycles)	Sat pass number
Ssh bias					
	Satellite name :	CalVal site :			
	Mean & error (mm)	Std (mm)	N tide gauge(s)	% of cycles operated (vs; selected cycles)	Sat pass number
Ssh bias					

All sites results	Satellite name :	CalVal site :			
SSH bias consistency (on a common epoch to be defined for the calval exercise)					
	Mean & error (mm)	Std (mm)	N tide gauge(s)	Ssh bias drift	% of cycles operated
Ssh bias					
Ascending passes					
Descending passes					

✷ *Synthesis interpretation of variations*

✷ *Validation of the synthesis in order to reach a consensus on SSH bias value*

✷ *Ssh bias diffusion to the next OSTST*

See other posters associated to the Margins Altimetry Projects (MAP)