ASSESSMENT OF JASON-2 ORBIT QUALITY USING SSH CROSS-CALIBRATION WITH JASON-1 AND ENVISAT

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Introduction : This poster aims at shownning results from the Sea Level Height Cross-over analysis to enlight geographically related patterns or behaviors signing on the ocean altimetric observations using the 3 precise altimetric missions Envisat (EN), Jason-1 (J1) and Jason-2 (J2). This enables to quantify the very good performances of the Jason-2 orbits both in Near Real Time (IGDR) and Delayed time (GDR)

IGDR   GDR

Geographic variability

Envisat monomoission crossover statistics over 22 J2 cycles

Average Crossovers ENEN IGDR

Average of the cyclic average per 4°x4° box smoothed 11x11 boxes

-3cm   3cm

Crossovers Standard deviation ENEN IGDR

Standard deviation of the cyclic average per 4°x4° box smoothed 11x11 boxes

0cm   3cm

ORB POE – MOE EN

Envisat POE-MOE average over 22 cycles:
The difference is milimetric

Average Crossovers ENEN GDR

-3cm   3cm

Geographic Biases
- Local Asc/Dsc bias
- Same geographic patterns in IGDR and GDR

Crossovers Standard deviation ENEN GDR

0cm   3cm

Variability
-Week variance gain in GDR
-Mean Std:
←1.4cm/1.3cm→

Jason-2 monomoission crossover statistics over 22 J2 cycles

Average Crossovers J2J2 IGDR

Average of the cyclic average per 4°x4° box smoothed 11x11 boxes

-3cm   3cm

Crossovers Standard deviation J2J2 IGDR

Standard deviation of the cyclic average per 4°x4° box smoothed 11x11 boxes

0cm   3cm

ORB POE – MOE J2

Jason-2 POE-MOE average over 22 cycles:
Small geographical difference

Average Crossovers J2J2 GDR

-3cm   3cm

Geographic Biases
- Reduction of the 3.8 mm bias between Asc/Dsc in IGDR for GDR (POE)
- No geographical effect of GDR/IGDR

Crossovers Standard deviation J2J2 GDR

0cm   3cm

Variability
-Temporal stability improved in GDR
-Mean Std:
←1.6cm/1.2cm→

Jason-1 monomoission crossover statistics over 22 J2 cycles

Average Crossovers J1J1 IGDR

Average of the cyclic average per 4°x4° box smoothed 11x11 boxes

-3cm   3cm

Crossovers Standard deviation J1J1 IGDR

Standard deviation of the cyclic average per 4°x4° box smoothed 11x11 boxes

0cm   3cm

Improvement over a 3-cycle average of the SAA introduction in the MOE (on 5th April 2009)

ORB POE – MOE J1

ORB POE – MOE J1

Jason-1 POE-MOE average over 3 cycles:before (top) and after (bottom) the SAA evolution on MOE:
Centimetric geographical differences are now much reduced

Average Crossovers J1J1 GDR

-3cm   3cm

Geographic Biases
- Reduction of the geographical effect of GDR/IGDR due to the difference POE-MOE

Crossovers Standard deviation J1J1 GDR

0cm   3cm

Variability
-Temporal stability improved in GDR
-Mean Std:
←1.9cm/1.4cm→

Temporal variability

Monitoring of the statistics of Ascending/Descending differences of the Sea Surface Height at crossovers.
Cross-overs are averaged over 4°x4° boxes and with a selection on :
- Bathymetry > 1000m
- 50°S<Lat<50°N
- Oceanic variability <20cm²

Average per J2 cycle of the average per boxe

Standard deviation per J2 cycle of the average per boxe

ssion results : SSH difference at crossovers, averaged per box (4 x4) (Lat<50, Bathy>1000

J2J2	Mean = -0.7758	StdDev = 0.7229
ENEN	Mean = -0.4587	StdDev = 0.5441
J1J1	Mean = -0.1701	StdDev = 1.344

Var·cion results : SSH difference at crossovers, averaged per box (4 x4) (Lat<50, Bathy>1000

J2J2	Mean = -0.4207	StdDev = 0.414
ENEN	Mean = -0.5683	StdDev = 0.4948
J1J1	Mean = -0.4376	StdDev = 0.35

ission results : SSH difference at crossovers, averaged per box (4 x4) (Lat<50, Bathy>100

J2J2	Mean = 4.436	StdDev = 0.2391
ENEN	Mean = 4.7	StdDev = 0.2526
J1J1	Mean = 4.647	StdDev = 0.3206

Var·on results : SSH difference at crossovers, averaged per box (4 x4) (Lat<50, Bathy>100

J2J2	Mean = 4.232	StdDev = 0.1827
ENEN	Mean = 4.536	StdDev = 0.2426
J1J1	Mean = 4.176	StdDev = 0.1551

Further information on the missions comparison can be seen on A.Ollivier et al., Y.Faugere et al. and S.Philipps et al.Presentations and posters.

To conclude

In GDR (with POE), the time variability is:
- Very much decreased for J1
- Slighly decreased for J2
- Almost unchaged for EN
compared to the IGDR (MOE) which is consistent with the plots here-above

In GDR (with POE), the performances are:
- Decreased by cm for J1 (same level as J2)
- Slighly decreased for J2
- Almost unchanged for EN

Globally the quality of the orbits are finally very good and similar.

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OSTST meeting

Seattle, June 2009

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