

GSFC/NASA DORIS Contribution to ITRF2008

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Analysis strategy

- ENVISAT, SPOT2,
SPOT4, SPOT5, TOPEX
 - Jason-1 will be used only for 2002
- 2003-2007 (5 years)
- NASA software GEODYN version 0812
 - Version 0810 (nov08)*

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Summary of Force Models

- Gravity field : eigen-gl04s1 120x120 (*ggm02c*);
- Time variable gravity to 20x20 annual terms;
- Atmospheric gravity to 50x50 6 hours ECMWF (J.P. Boy) (*NCEP AGRA Petrov*);
- Macromodels (CNES); GSFC for SPOT2;
- UCL model used for ENVISAT;
- Albedo/thermal emission (Knocke and Ries, 1988);
- Ocean tides : GOT4.7 (*GOT00*);

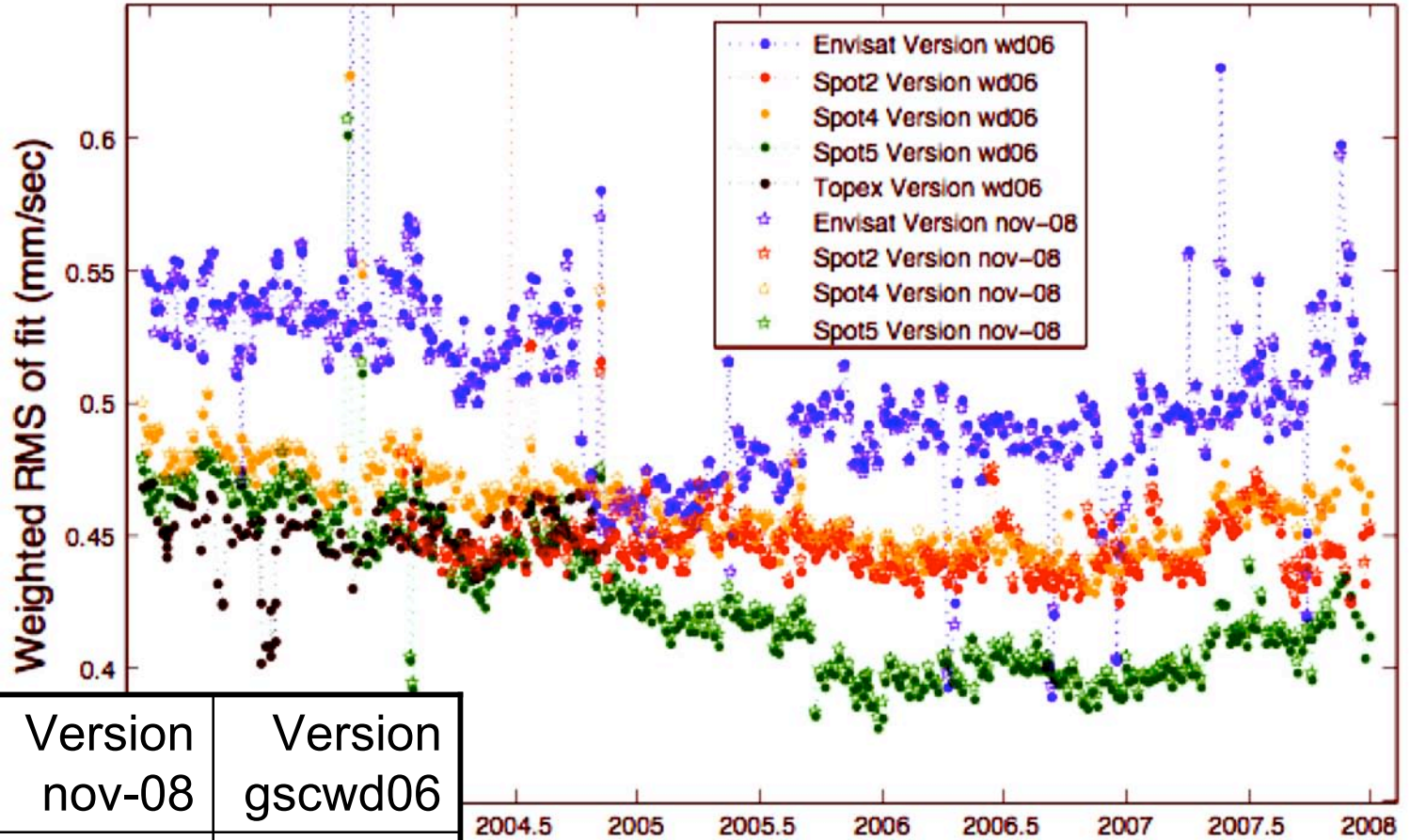


Measurements Models, Data and Parameterization

- 10 degrees elevation cutoff;
- Arc length :
 - 7 days +/- 6 hours (no maneuvers);
 - Shorter (with maneuvers).
- **A priori station positions : no eccentricity DPOD2005 (ITRF2005) + Center of Mass applied to the data;**
- Empirical accelerations : one per day along-track and cross-track.



DORIS ORBITS RMS OF FIT – GSFC solution



Median (mm/sec)	Version nov-08	Version gscwd06
Envisat	0.500	0.502
Spot-2	0.446	0.443
Spot-4	0.461	0.459
Spot-5	0.423	0.417
Topex		0.452

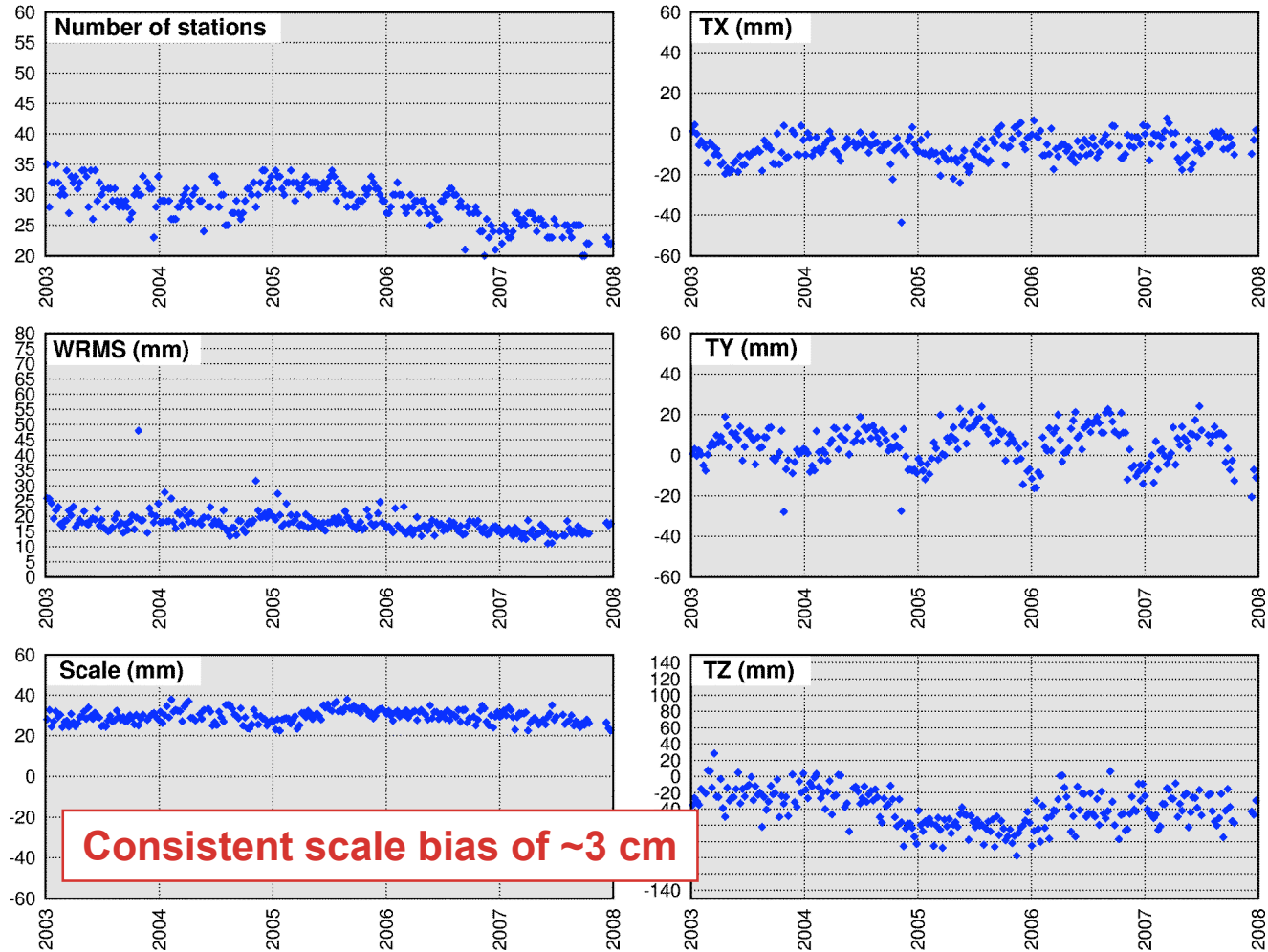
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Referencing results on gscwd06 (JJ Valette)

Per week comparison to ITRF2005

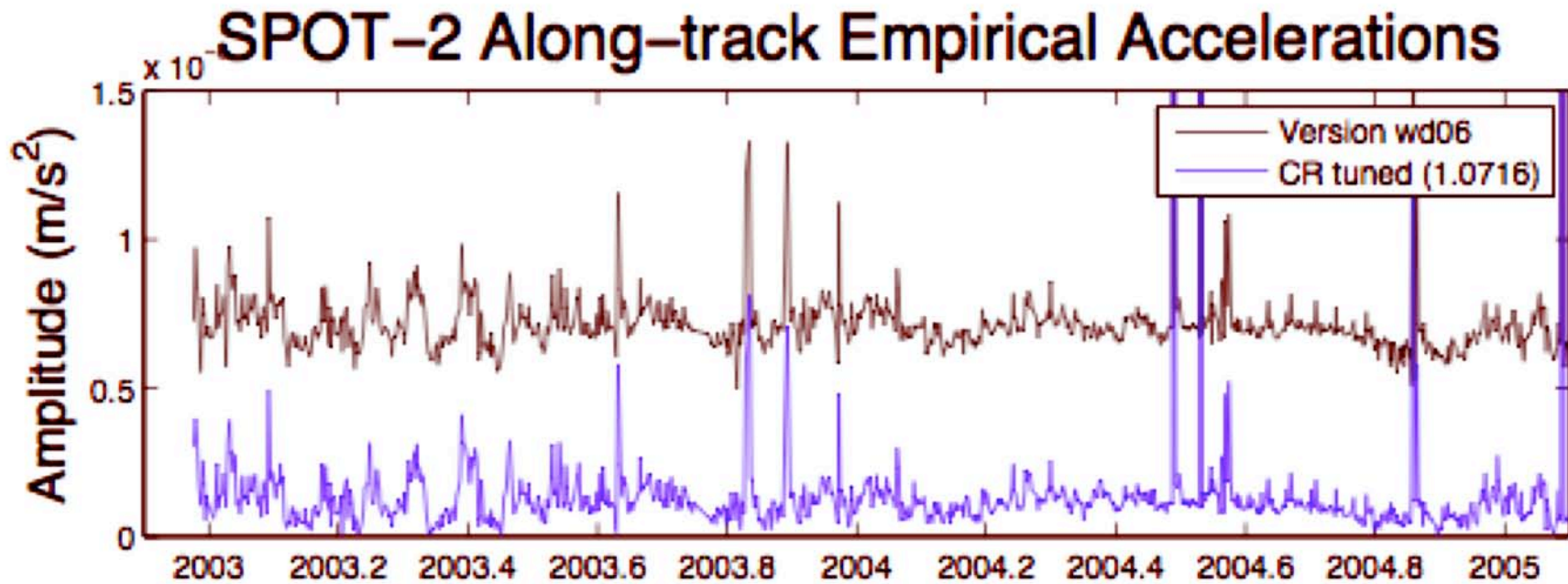
◆ gscwd06



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SPOT-2 : tuning of CR

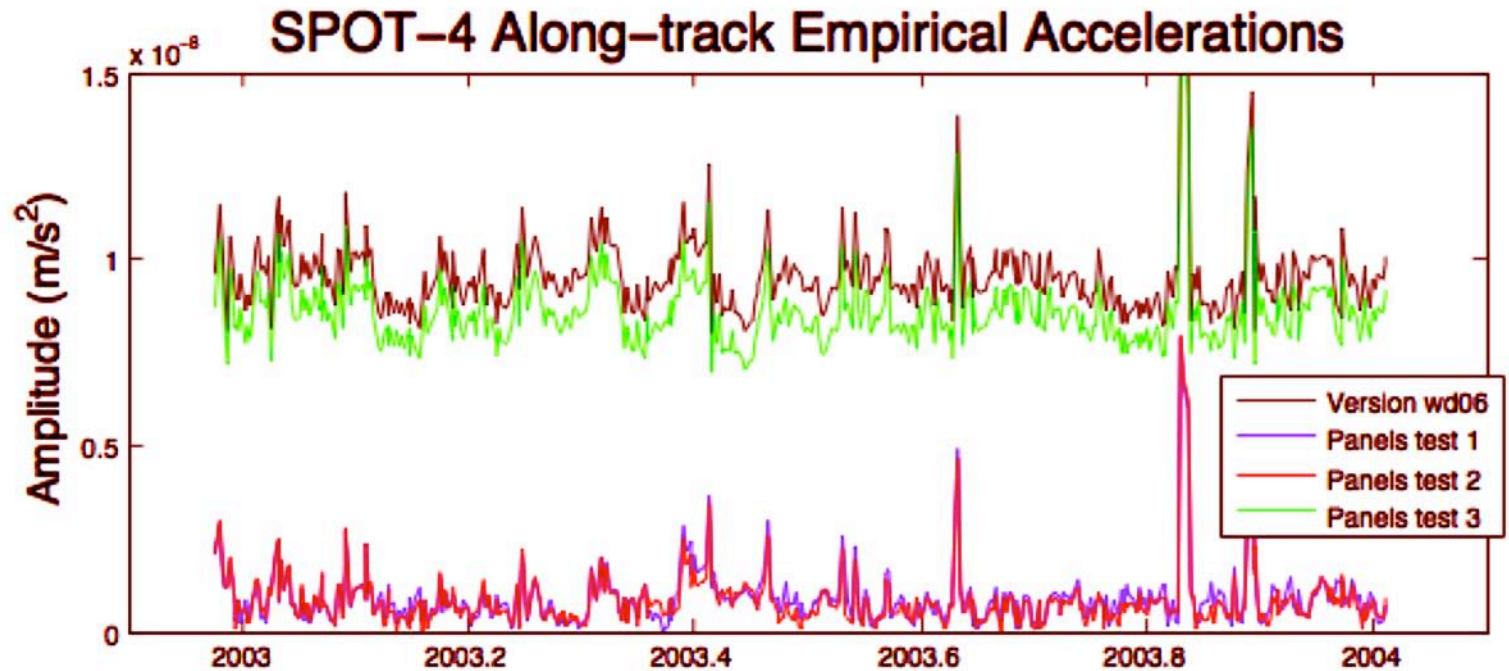


Amplitude (10^{-9} m/s^2)	Along-track	Cross-track
Version gscwd06	8.092	5.874
Cr value tuned (1.0716)	2.246	5.374

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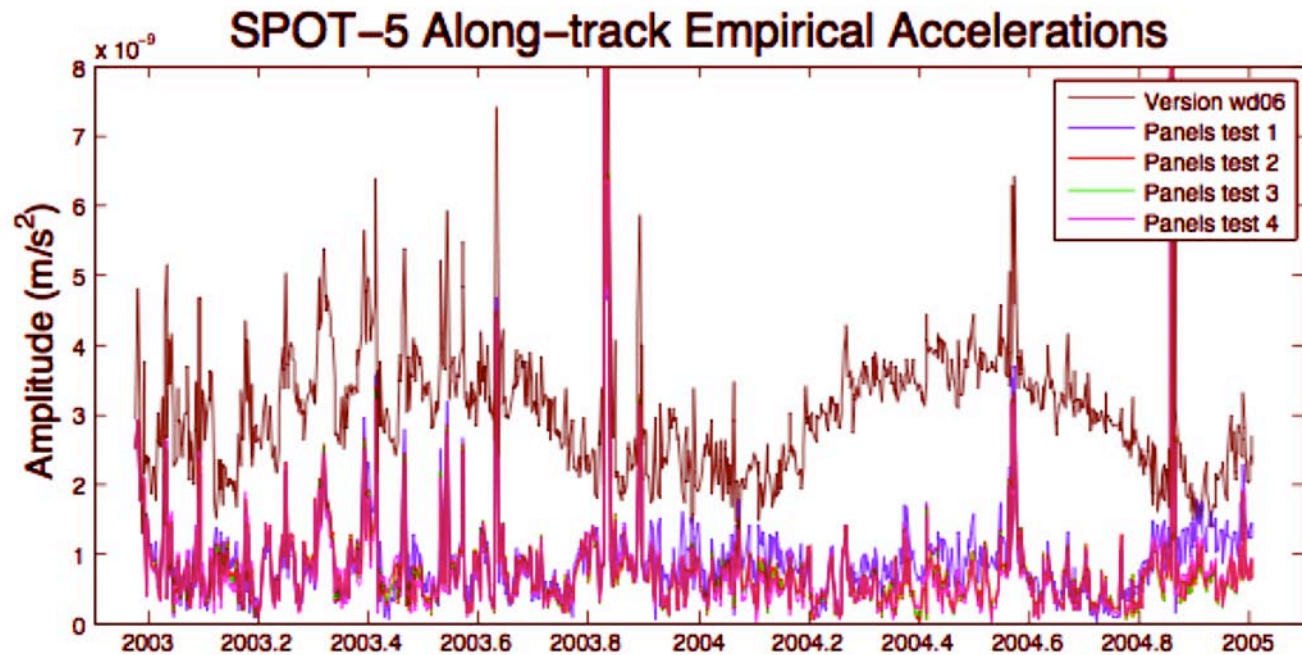


SPOT-4 : Panels adjustment tests



Amplitude (10^{-9} m/s^2)	Along-track	Cross-track
Version wd06	9.546	3.874
Panel test-1	0.933	4.396
Panel test-2	0.785	4.322
Panel test-3	8.497	3.841

SPOT-5 : Panels adjustment tests



Amplitude (10^{-9} m/s ²)	Along-track	Cross-track
Version gscwd06	3.034	2.859
Panel test 1	0.909	2.825
Panel test 2	0.755	2.946
Panel test 3	0.748	2.937
Panel test 4	0.737	2.934

TOPEX : Panels adjustment tests



Amplitude (10^{-9} m/s ²)	Along-track	Cross-track
Version wd06	1.253	3.892
Panel test-1	1.253	3.892
Panel test-2	1.197	3.891
Panel test-3	0.971	3.890
Panel test-4	1.233	3.891

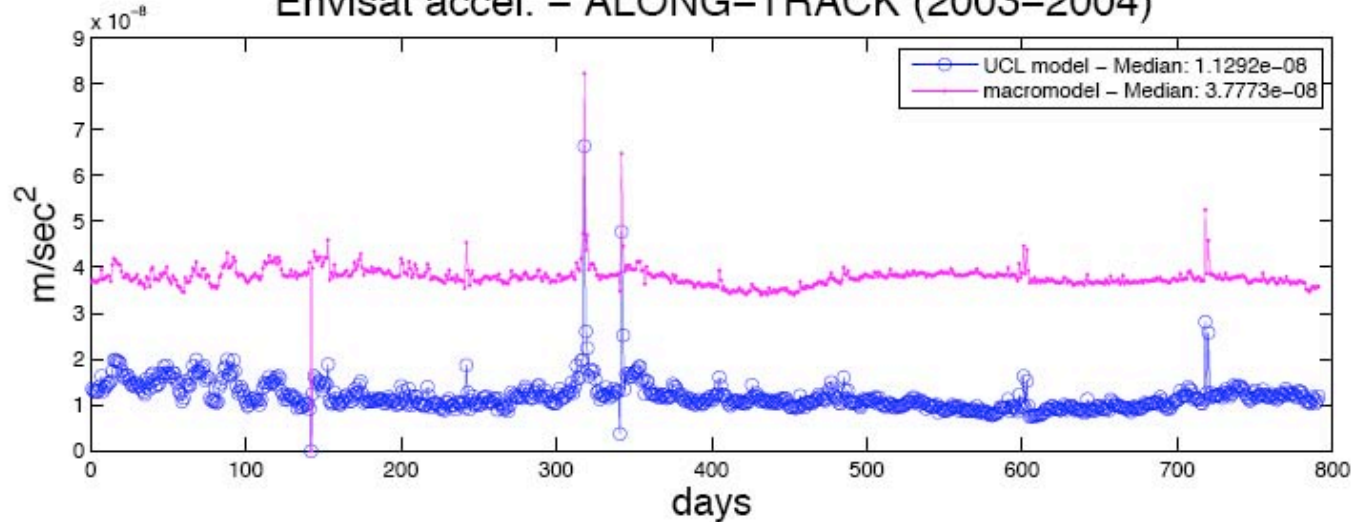
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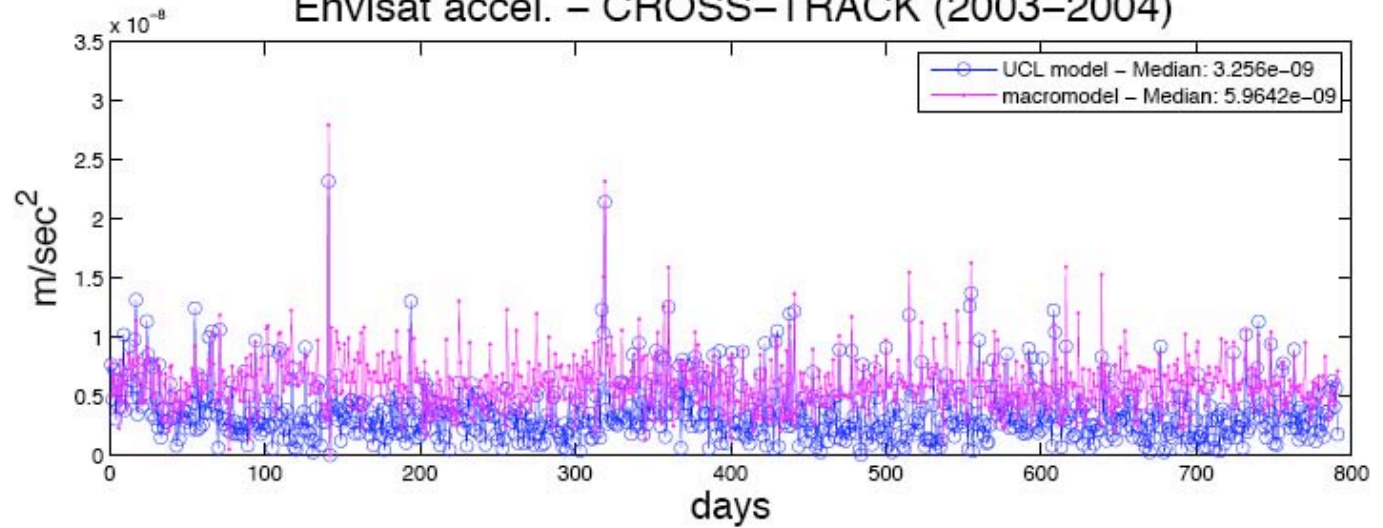


ENVISAT : Macromodel vs UCL

Envisat accel. – ALONG-TRACK (2003–2004)



Envisat accel. – CROSS-TRACK (2003–2004)

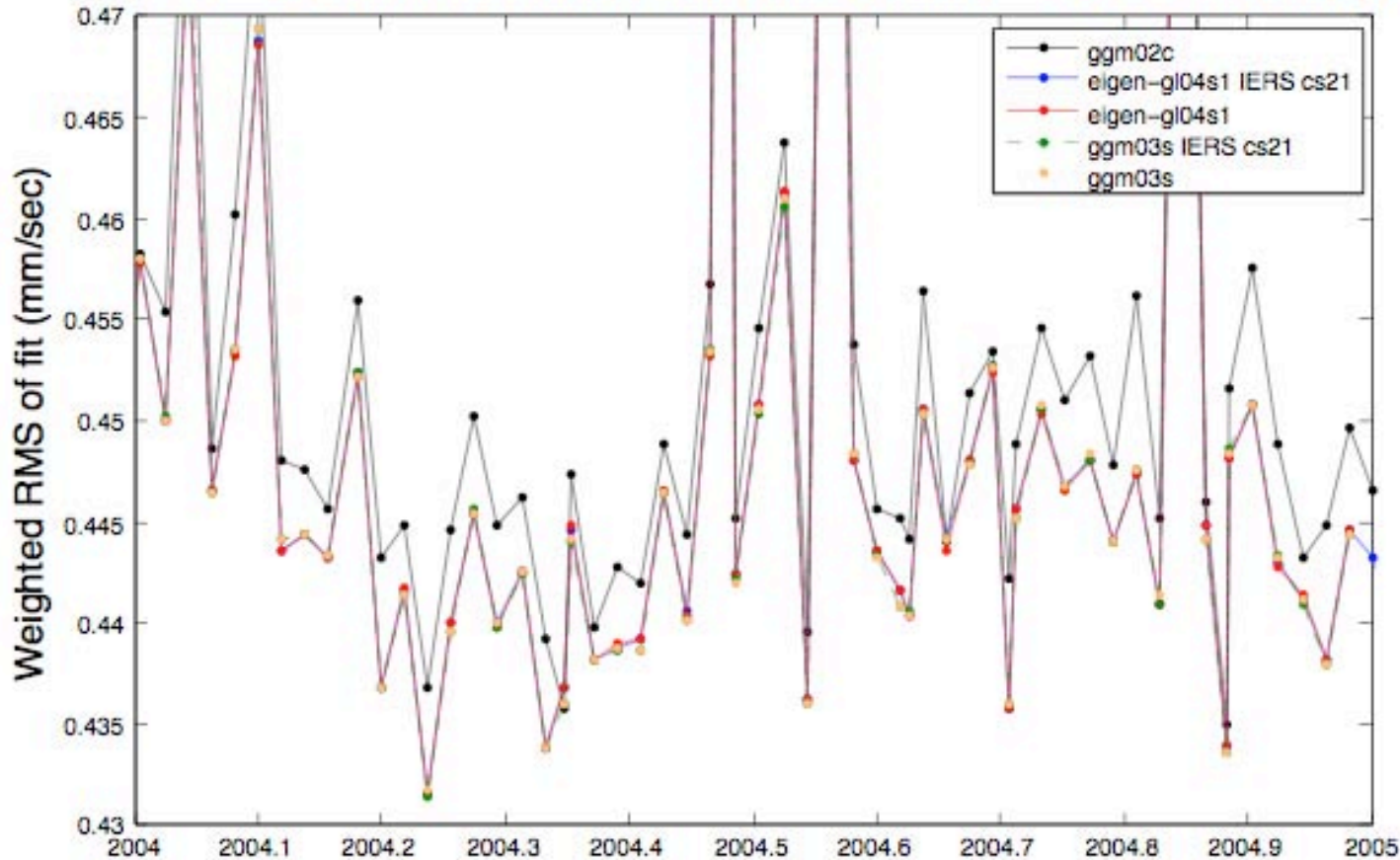


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Gravity models

SPOT-2 DORIS ORBITS RMS OF FIT – GSFC solution

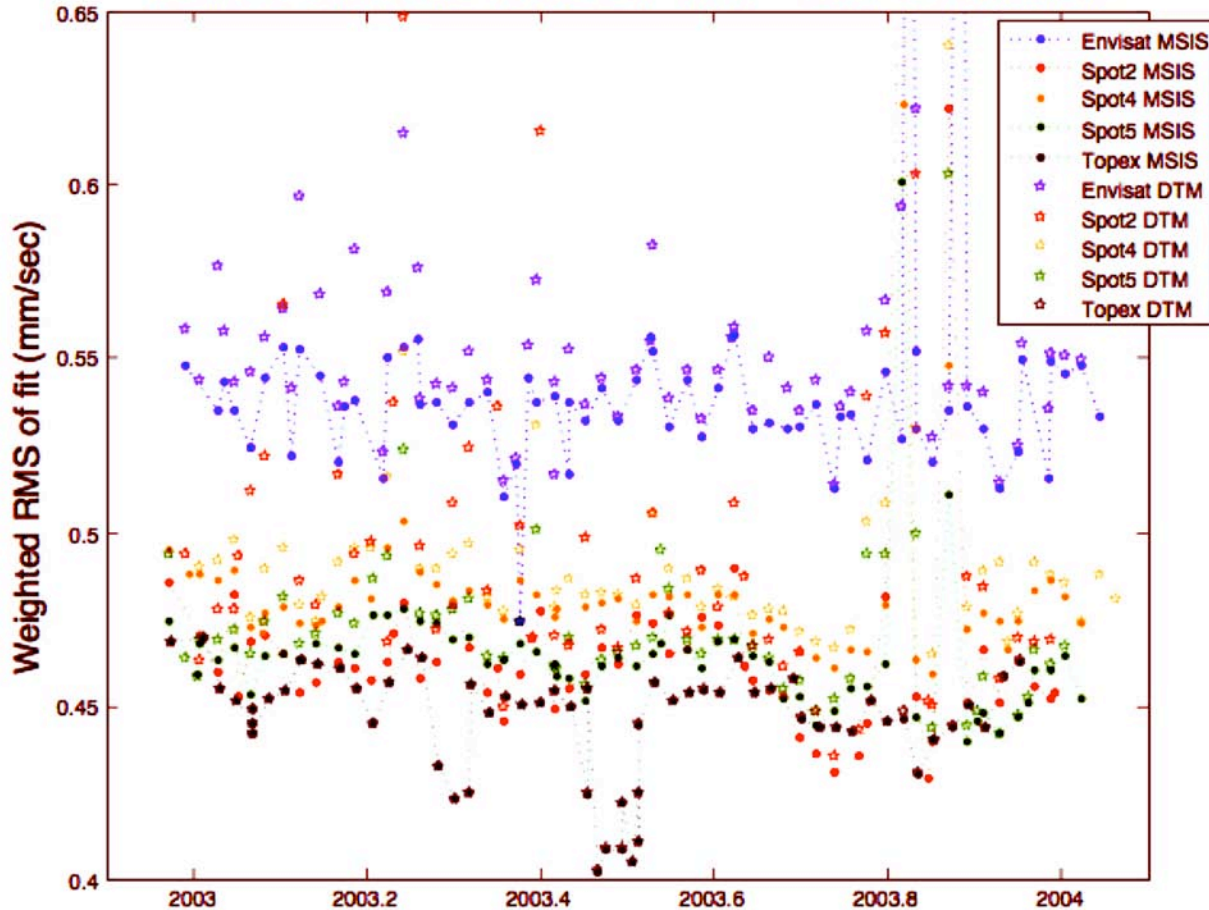


ggm02c	eigen-gl04s1 IERS cs21	eigen-gl04s1	ggm03s IERS cs21	ggm03s
0.448	0.445	0.445	0.445	0.445



Empirical DRAG model MSIS86 vs DTM94

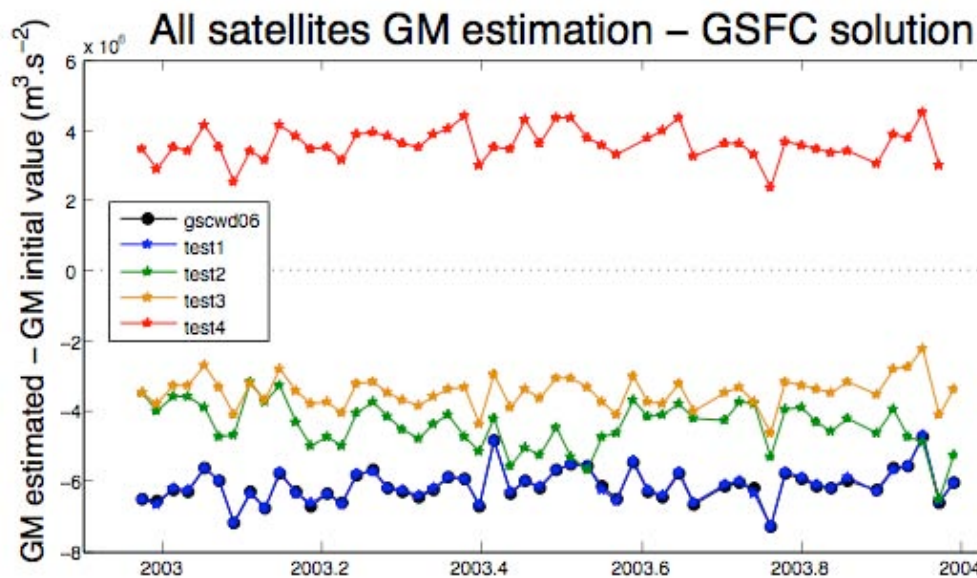
DORIS ORBITS RMS OF FIT – GSFC solution



RMS mm/sec	MSIS86	DTM94
ENV	0.547	0.576
SP2	0.466	0.527
SP4	0.481	0.496
SP5	0.461	0.472
TOP	0.447	0.447

Troposphere modeling

GM estimated - a priori GM ($3.986004415 \cdot 10^{14}$)					
	Meteo. data	Trop. model	SCA*	Mapping function	10^5
gscwd06	DORIS	Hopfield	Wet+dry	Chao	-67
test1 (wd08)	GPT	Hopfield	Wet+dry	Chao	-63
test2	GPT	Hopfield	Wet+dry	CFA2.2	-44
test3	GPT	Hopfield	Wet only	CFA2.2	-34
test4 (wd09)	GPT	GPS	Wet+dry	Neill	+33



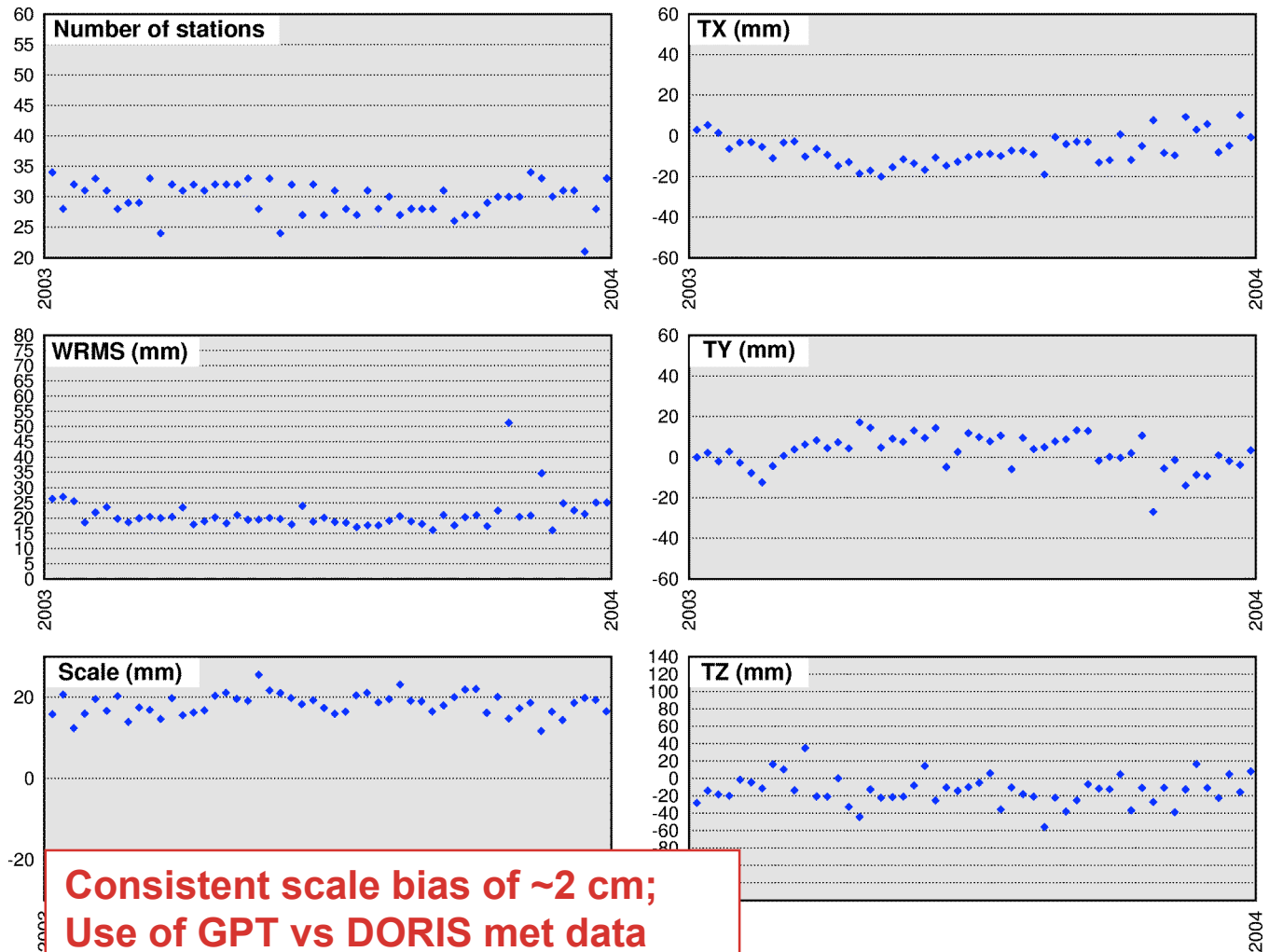
(test4)	envisat	+14
(test4)	spot2	+40
(test4)	spot4	+22
(test4)	spot5	+18
(test4)	topex	+14

*SCA : Scale Factor Adjustment

JJV Analysis: Results of wd08 + wd09?

Per week comparison to ITRF2005

gcwd08



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Conclusion

- We have tested TOPEX-dorisonly orbits (STEP3 processing) with std0809 SLR/DORIS orbits (1993-1997); The agreements are quite good - a few cm generally in the radial direction.
- We are ready to proceed with reprocessing, with all the model updates, (macromodels & troposphere and other minor details), once the latest SINEX series (wd09) has been validated.

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Test on the gravity fields - overlaps

OVERL – envisat – along track

