GSC Analysis Center Report

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Modelling & Processing Summary

0. SPOT-2, SPOT-4, SPOT-5, Envisat.

- (Mostly) Same standards as wd10 series (1993-2009.0). (EIGEN-GL04S1, Niell mapping function+GPT+ Hopfield, GOT4.7; cd/2hr for the Spots+Envisat with light constraint; DPOD2005; 10° elevation cutoff; ~7-day arcs, except for maneuvers; opr adjusted along+cross-track/day).

1. Macromodels and Cr's as defined in Le Bail et al. (2010) (UCL Model applied for Envisat).

2. For SPOT-2: Due to sparser tracking, cd/4-hrs in 2009; Obviously no SPOT-2 data after July 14, 2009.

Nonconservative Force Modelling

(really …. Radiation Pres. Modelling)

SPOT-2: GSFC Macromodel + Cr=1.07

SPOT-4: ~CNES Macromodel +

adj. SA spec. refl. Front (σ=0.10 to 0.34)

adj. Y+ spec. refl. (σ=0.54 to 0.21).

SPOT-5: ~CNES Macromodel +

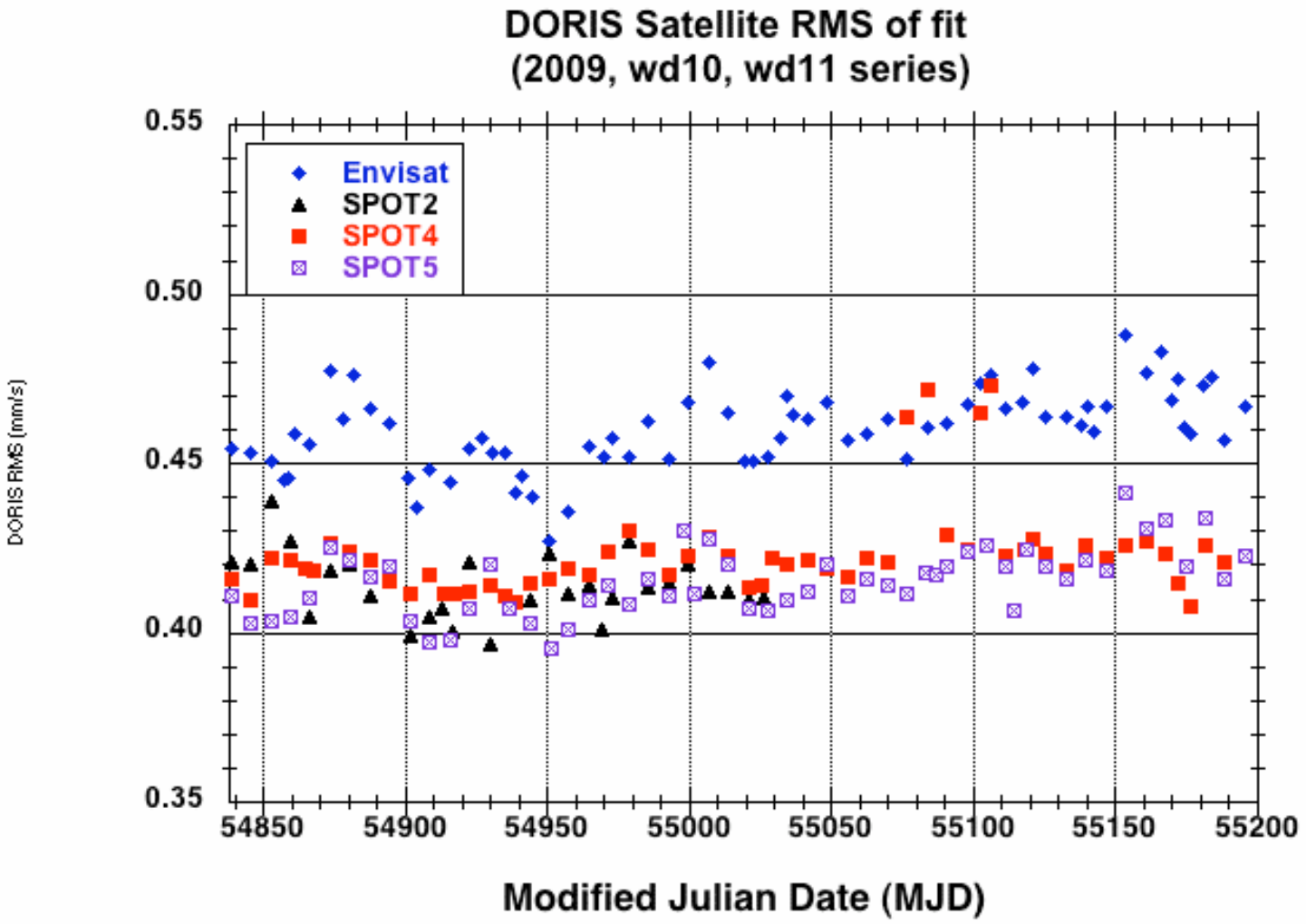
adj. SA spec. refl. Front (σ=0.10 to 0.168)

adj. Y- spec. refl. (σ=0.457 to 0.673).

adj. X+ spec. refl. (σ=0.346 to 0.526).

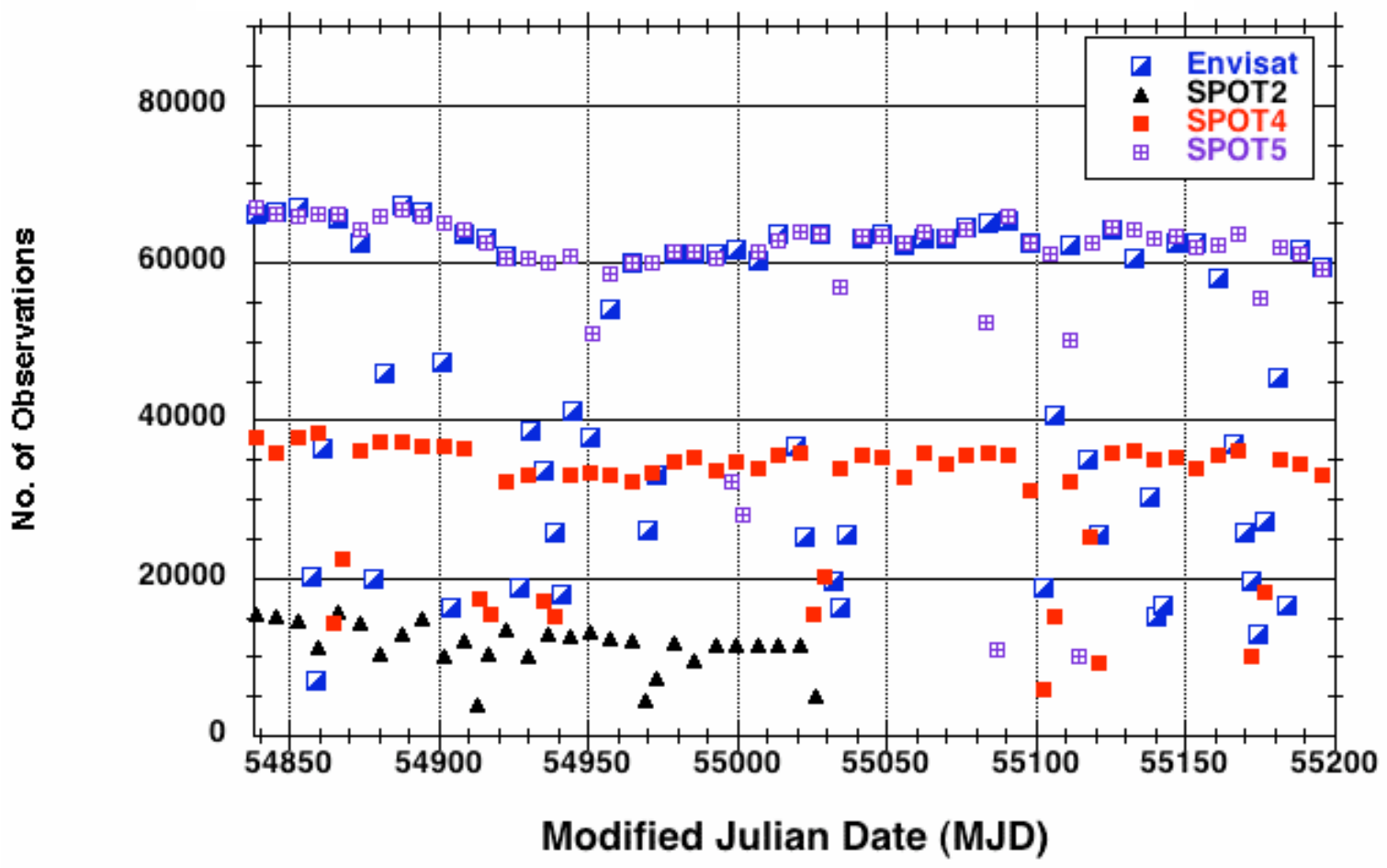
Cr with new macromodel adjusted to 0.82 after Jan 27, 2008

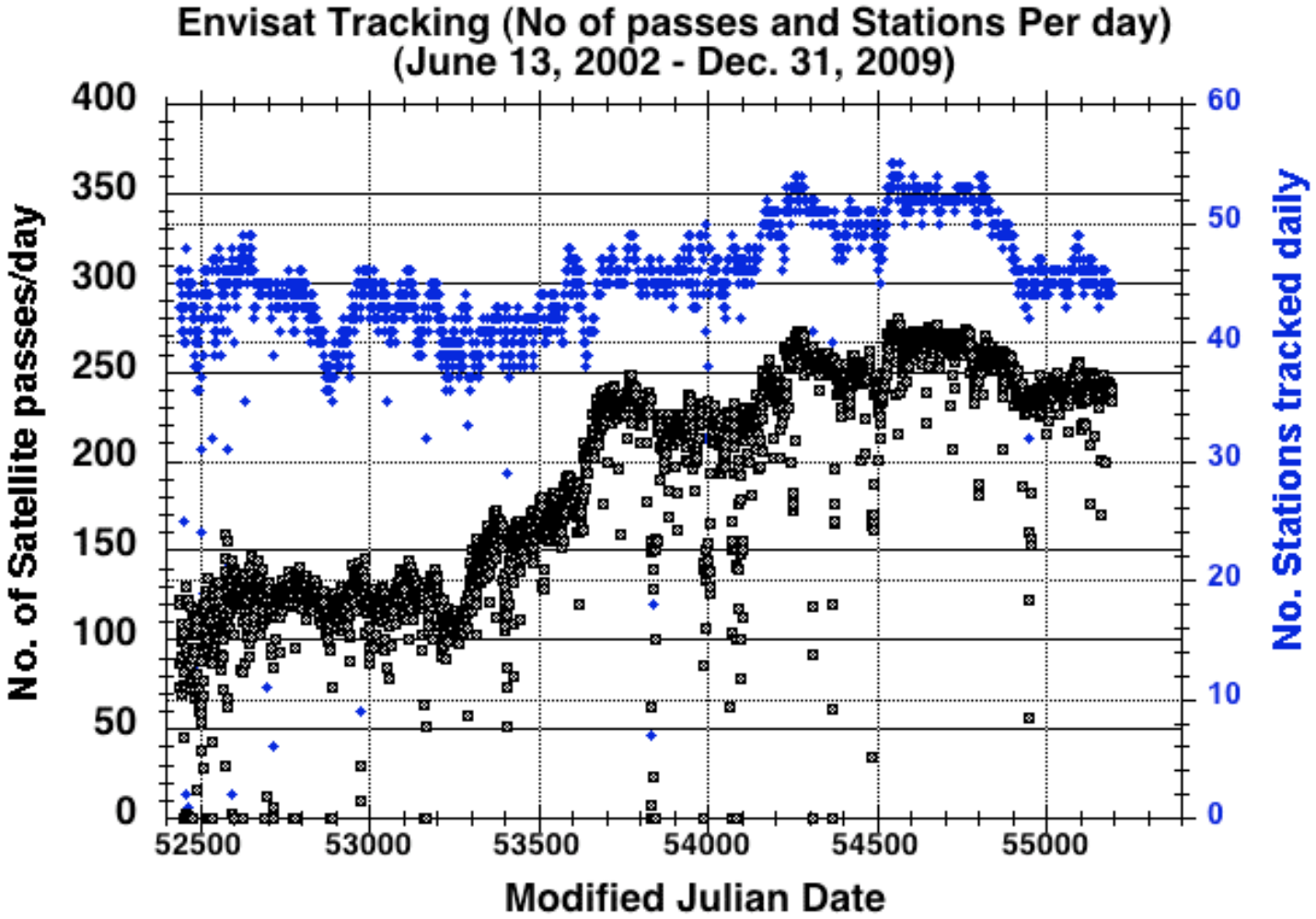
Envisat: UCL model (Cr = 1).

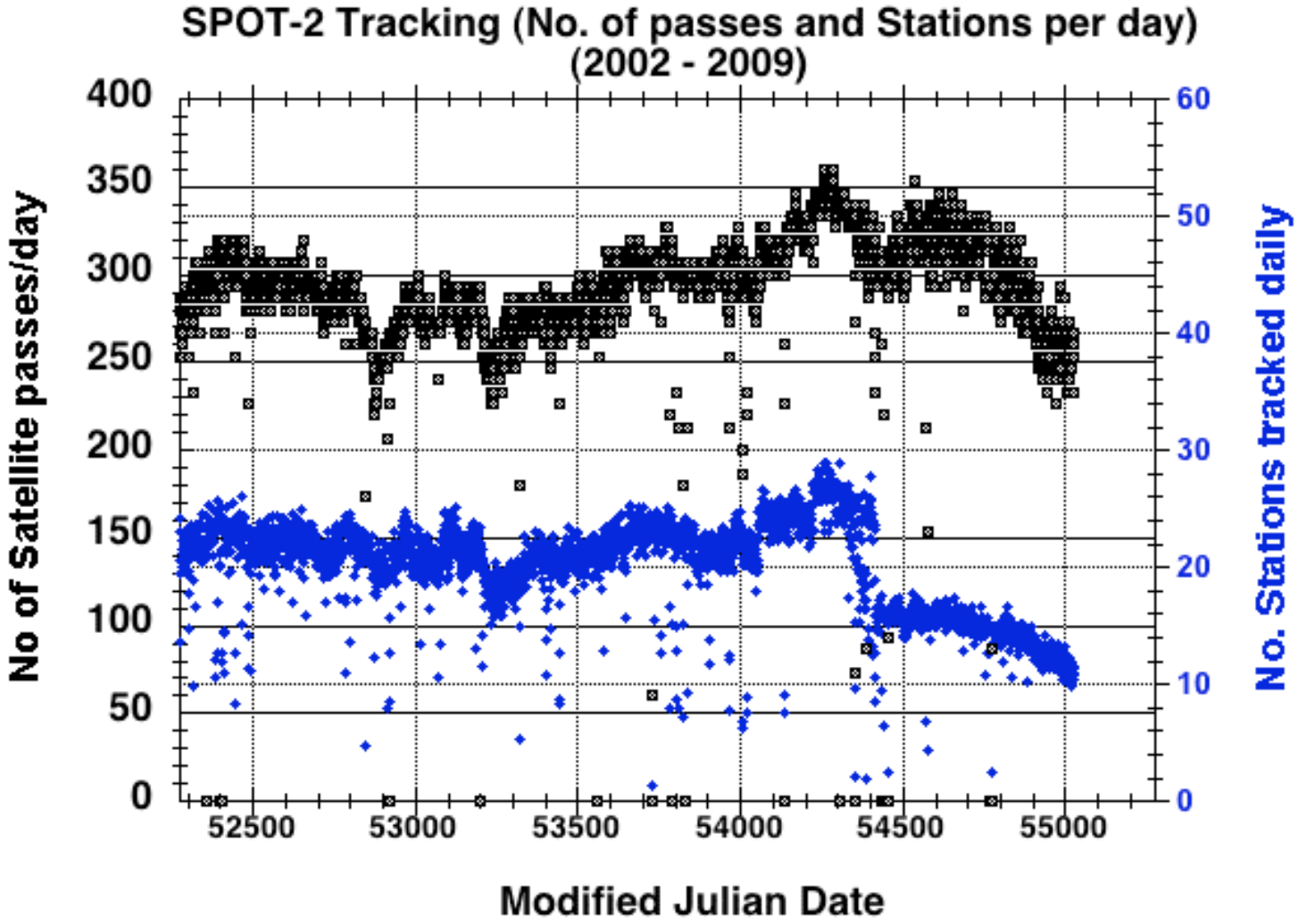

DORIS Satellite RMS of fit
(2009, wd10, wd11 series)
Envisat
SPOT2
SPOT4
SPOT5
DORIS RMS (mm/s)
0.55
0.50
0.45
0.40
0.35
54850
54900
54950
55000
55050
55100
55150
55200
Modified Julian Date (MJD)

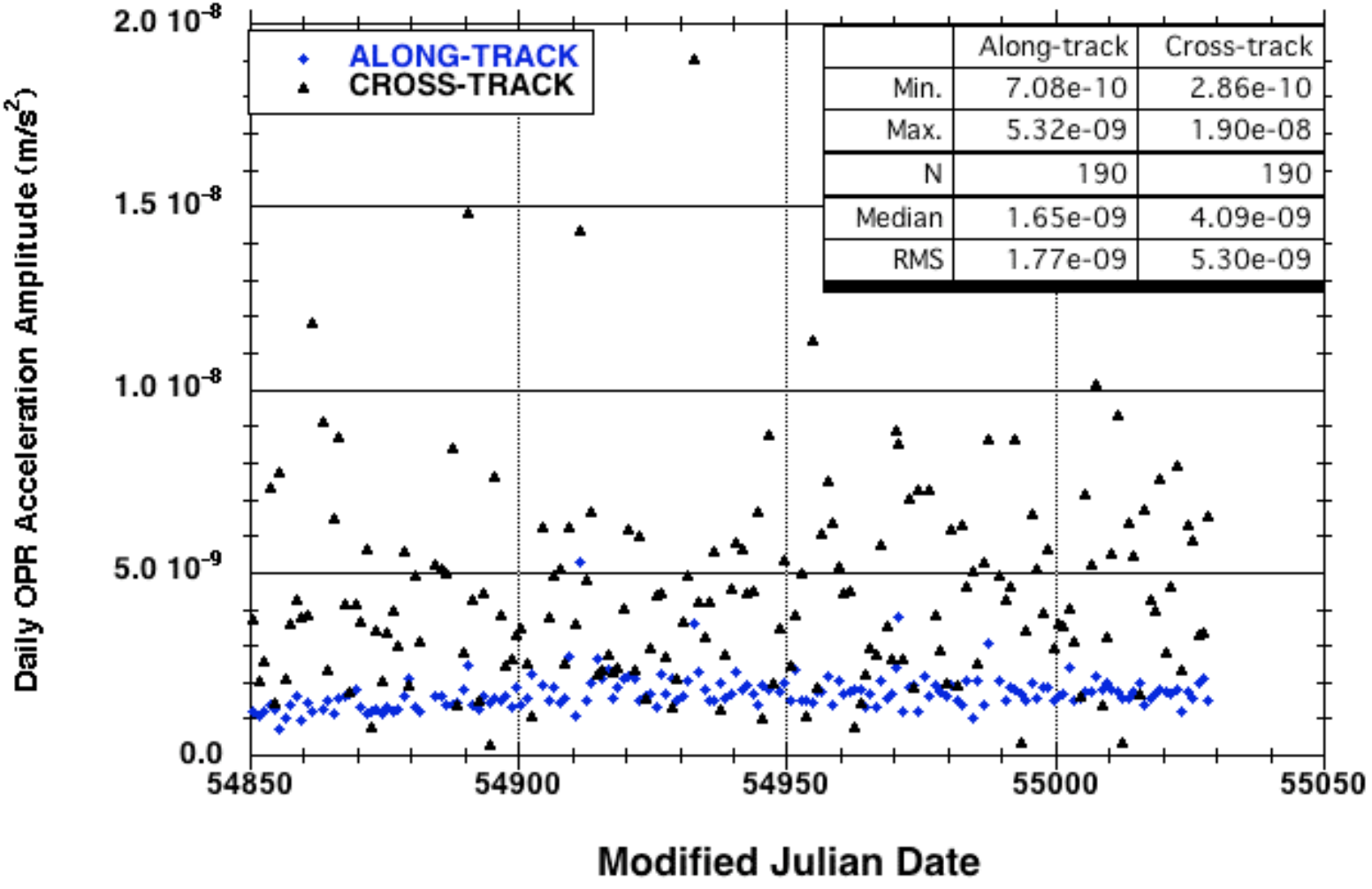
Number of Observations per DORIS Satellite Data Arc

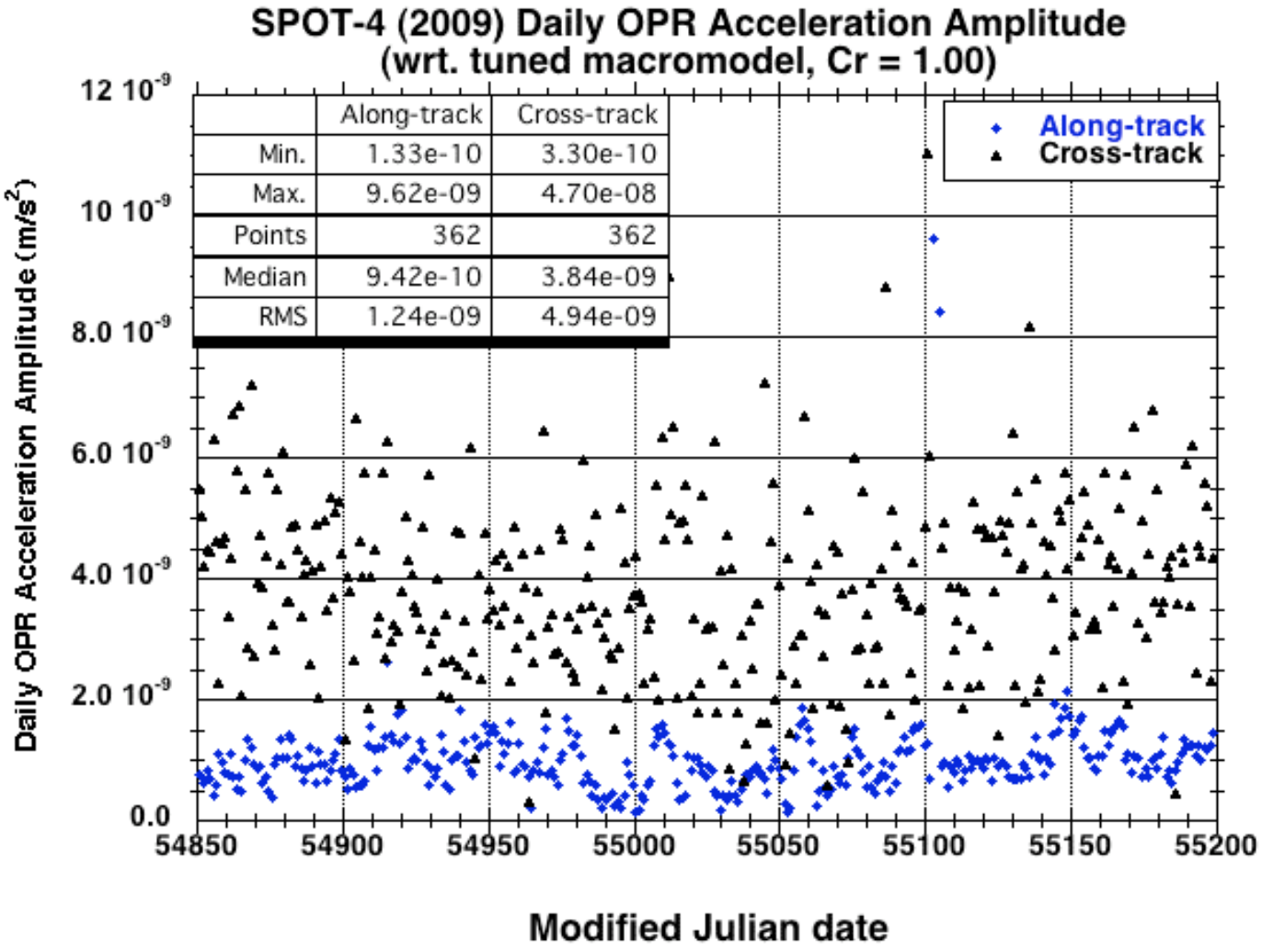
(2009, wd10, wd11 series)

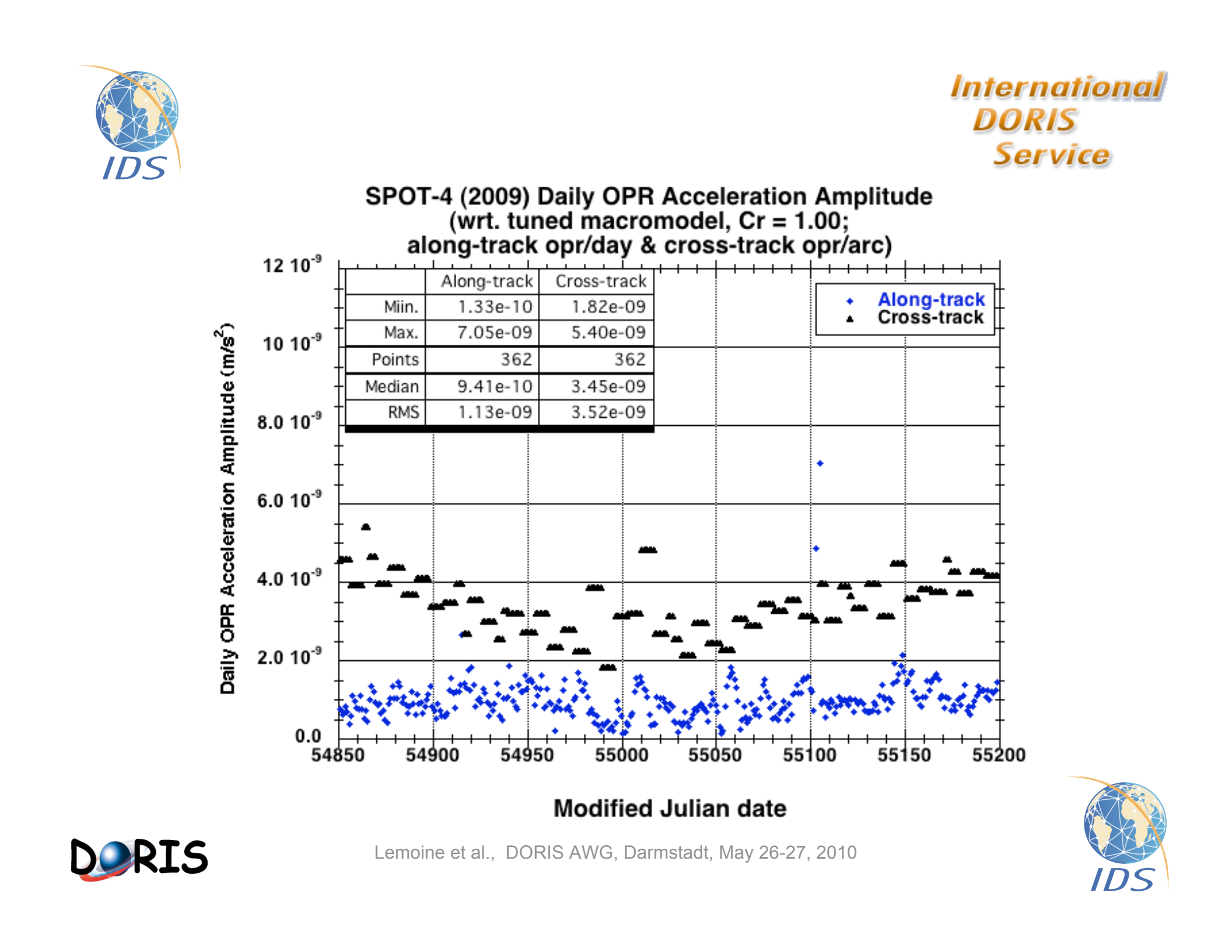


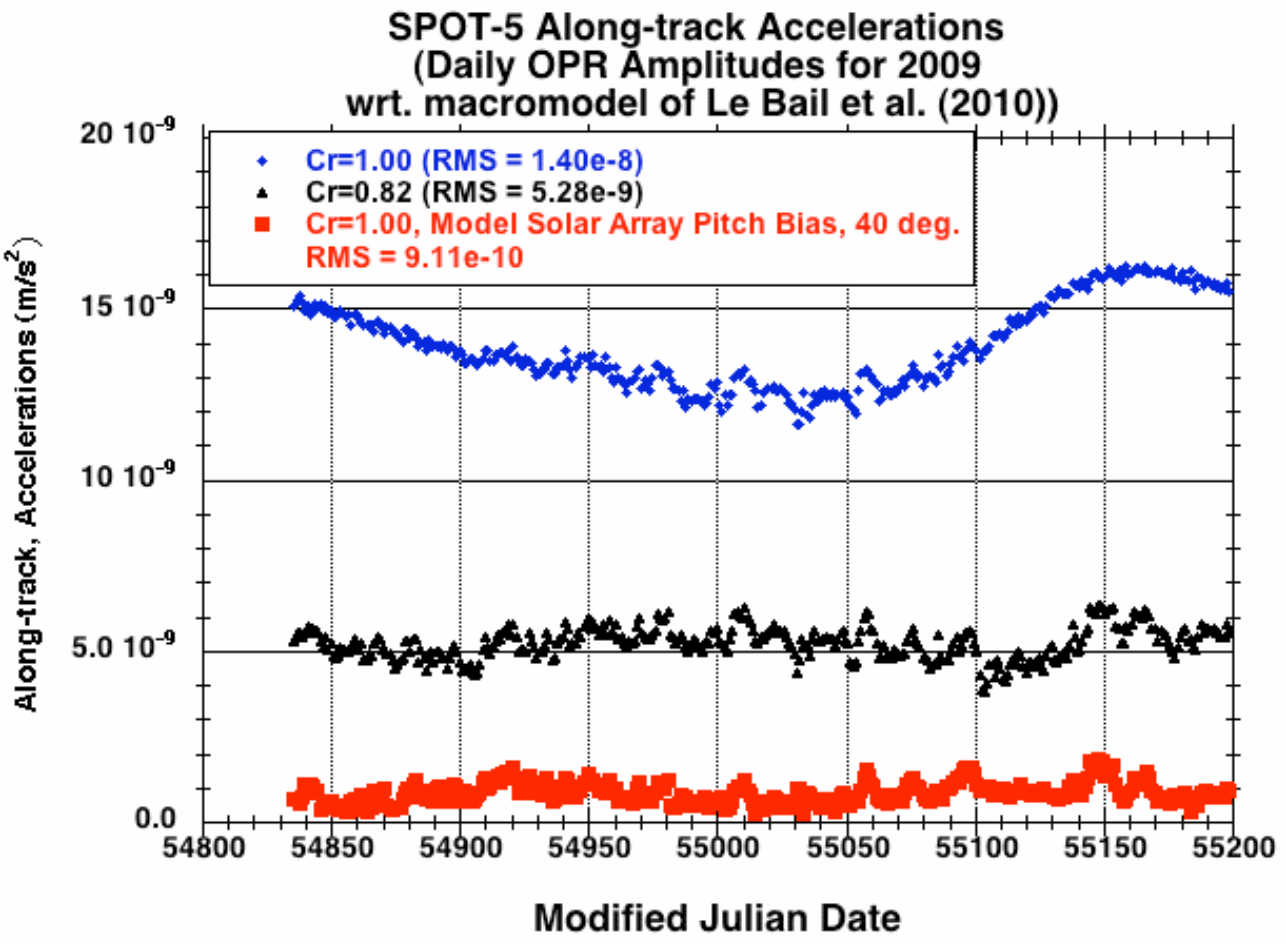

Envisat Tracking (No of passes and Stations Per day)
(June 13, 2002 - Dec. 31, 2009)
No. of Satellite passes/day
No. Stations tracked daily
Modified Julian Date
0
50
100
150
200
250
300
350
400
0
10
20
30
40
50
60
52500
53000
53500
54000
54500
55000


SPOT-2 Tracking (No. of passes and Stations per day)
(2002 - 2009)
No of Satellite passes/day
No. Stations tracked daily
Modified Julian Date
400
350
300
250
200
150
100
50
0
60
50
40
30
20
10
0
52500
53000
53500
54000
54500
55000

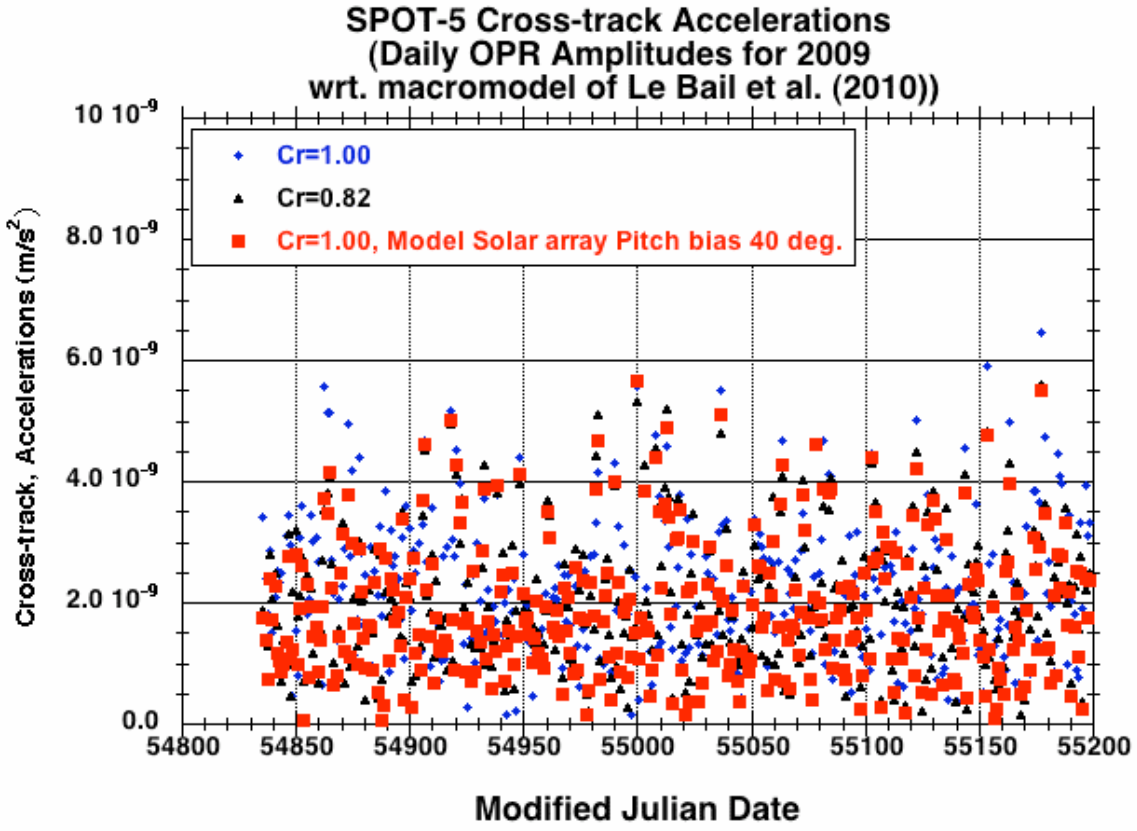

SPOT-2 (2009) Daily OPR Acceleration Amplitudes
(wrt. GSFC macromodel & Cr=1.0716)
ALONG-TRACK
CROSS-TRACK
Along-track Cross-track
Min. 7.08e-10 2.86e-10
Max. 5.32e-09 1.90e-08
N 190 190
Median 1.65e-09 4.09e-09
RMS 1.77e-09 5.30e-09
Daily OPR Acceleration Amplitude (m/s²)
2.0 10⁻⁸
1.5 10⁻⁸
1.0 10⁻⁸
5.0 10⁻⁹
0.0
54850
54900
54950
55000
55050
Modified Julian Date


SPOT-4 (2009) Daily OPR Acceleration Amplitude
(wrt. tuned macromodel, Cr = 1.00)
Along-track
Cross-track
Min. 1.33e-10 3.30e-10
Max. 9.62e-09 4.70e-08
Points 362 362
Median 9.42e-10 3.84e-09
RMS 1.24e-09 4.94e-09
Daily OPR Acceleration Amplitude (m/s²)
12 10⁻⁹
10 10⁻⁹
8.0 10⁻⁹
6.0 10⁻⁹
4.0 10⁻⁹
2.0 10⁻⁹
0.0
54850
54900
54950
55000
55050
55100
55150
55200
Modified Julian date


SPOT-4 (2009) Daily OPR Acceleration Amplitude
(wrt. tuned macromodel, Cr = 1.00;
along-track opr/day & cross-track opr/arc)
Along-track
Cross-track
Miin. 1.33e-10 1.82e-09
Max. 7.05e-09 5.40e-09
Points 362 362
Median 9.41e-10 3.45e-09
RMS 1.13e-09 3.52e-09
Daily OPR Acceleration Amplitude (m/s²)
12 10⁻⁹
10 10⁻⁹
8.0 10⁻⁹
6.0 10⁻⁹
4.0 10⁻⁹
2.0 10⁻⁹
0.0
54850
54900
54950
55000
55050
55100
55150
55200
Modified Julian date

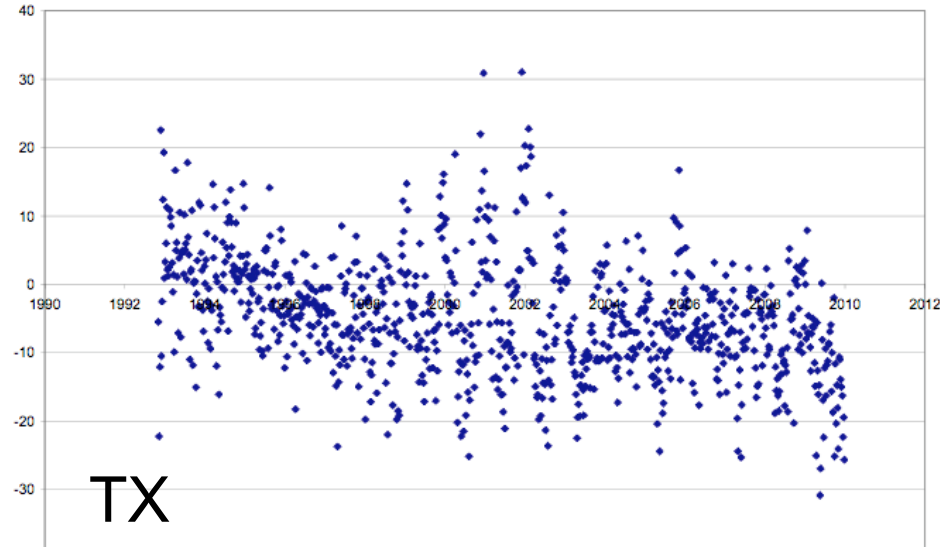


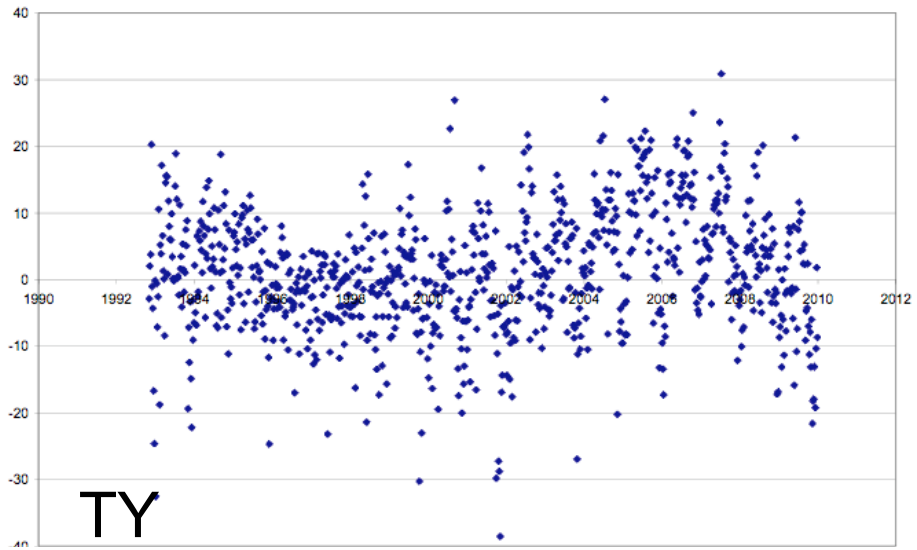
Series (n=362)	Median	RMS
	(nm/s²)	
Cr=1	13.6	14.0
Cr=0.82	5.29	5.28
Cr=1 + SA Pitch bias, 40 deg	0.84	0.91

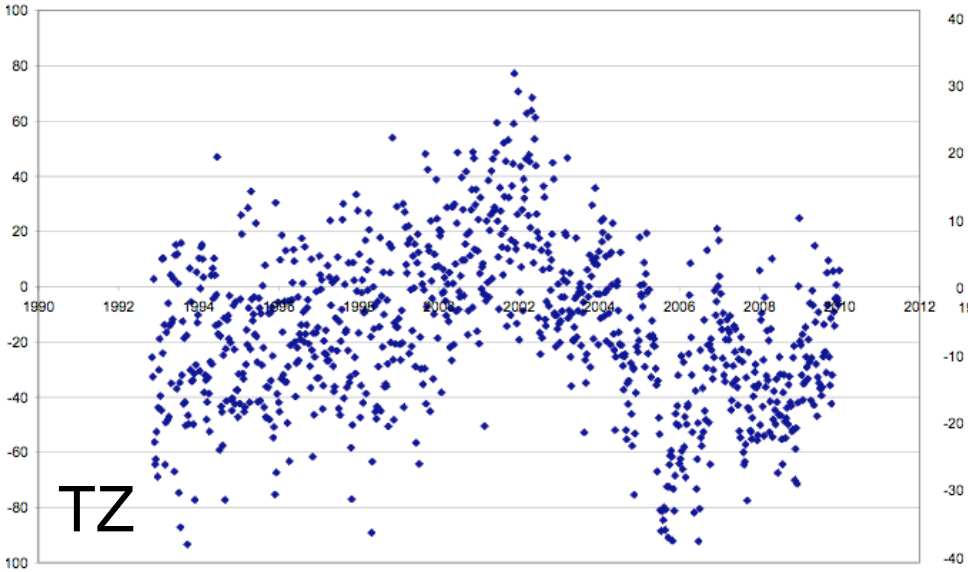


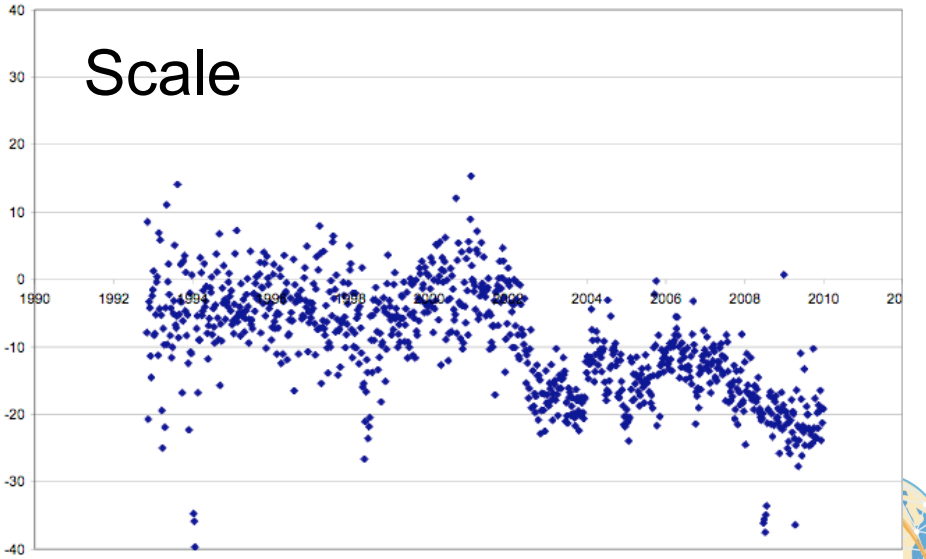
Series (n=362)	Median	RMS
	(nm/s²)	
Cr=1	2.17	2.58
Cr=0.82	2.02	2.30
Cr=1 + SA Pitch bias, 40 deg	1.70	2.18

Geocenter & Scale parameters for gscwd10 SINEX series (including 2009)









Preliminary SLR & DORIS EOP Comparisons

1. Develop Normal equations for SLR data Using GEODYN for 2008-2009.
2. SLR processing uses Lageos1, Lageos2, Starlette, Stella.
3. A single combined technique-specific normal equation is created for EOP's.
4. We have taken care to apply the same models to process both sets of data (e.g. pole tide, ocean loading with GOT4.7, Tidal EOP & COM).
5. Only EOP adjusted so as to compare results and intercompare the GEODYN processing of the two space geodetic techniques. A priori coordinates are in DPOD2005 (DORIS) & LPOD2005 for SLR.
6. The results are compared with IERSC04; All GEODYN solutions are daily values at 12:00 UT.
7. Look at the period July 13, 2008 to Dec. 30, 2009.
8. For the DORIS solutions, look at the DORIS-satellite solutions with & without Jason-2

EOP Modelling/Verification Tests, 2008-2009 (differences GEODYN - IERSC04)

Series	npts	Edit (mas)	RMS EOPx (mas)	Avg EOPx (mas)	RMS EOPy (mas)	Avg EOPy (mas)
SLR-4satellite	484	1	0.276	-0.120	0.263	-0.013
	484	1	0.249	----	0.263	----
SLR-4satellite	423	0.5	0.222	-0.093	0.206	-0.007
	423	0.5	0.202	----	0.206	----
DORIS-no Jason2	480	1	0.338	0.072	0.328	-0.055
	480	1	0.330	-----	0.323	----
DORIS-with Jason2	484	1	0.247	-0.019	0.269	0.026
	484	1	0.246	----	0.268	----
DORIS-with Jason2	435	0.5	0.221	-0.010	0.215	0.016
	435	0.5	0.220	----	0.215	----