GSC Analysis Center Update

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IDS AWG Meeting

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SINEX Delivery Update

- 5 New DORIS stations beginning May 22, 2016
  JIWC PDOC SAPC KEVC MNAC

➔ (switch from DPOD2008v1.15 to DPOD2008v1.15-cls)

- wd28: 442 weekly files:
  July 13, 2008 to Sep 25, 2016 | Delivered Nov. 23, 2016
  Sept. 26, 2013 to Dec 26, 2016 | Delivered Mar 10 + 17, 2016

(wd28 = Jason2, Cryosat2, HY2A, Saral)

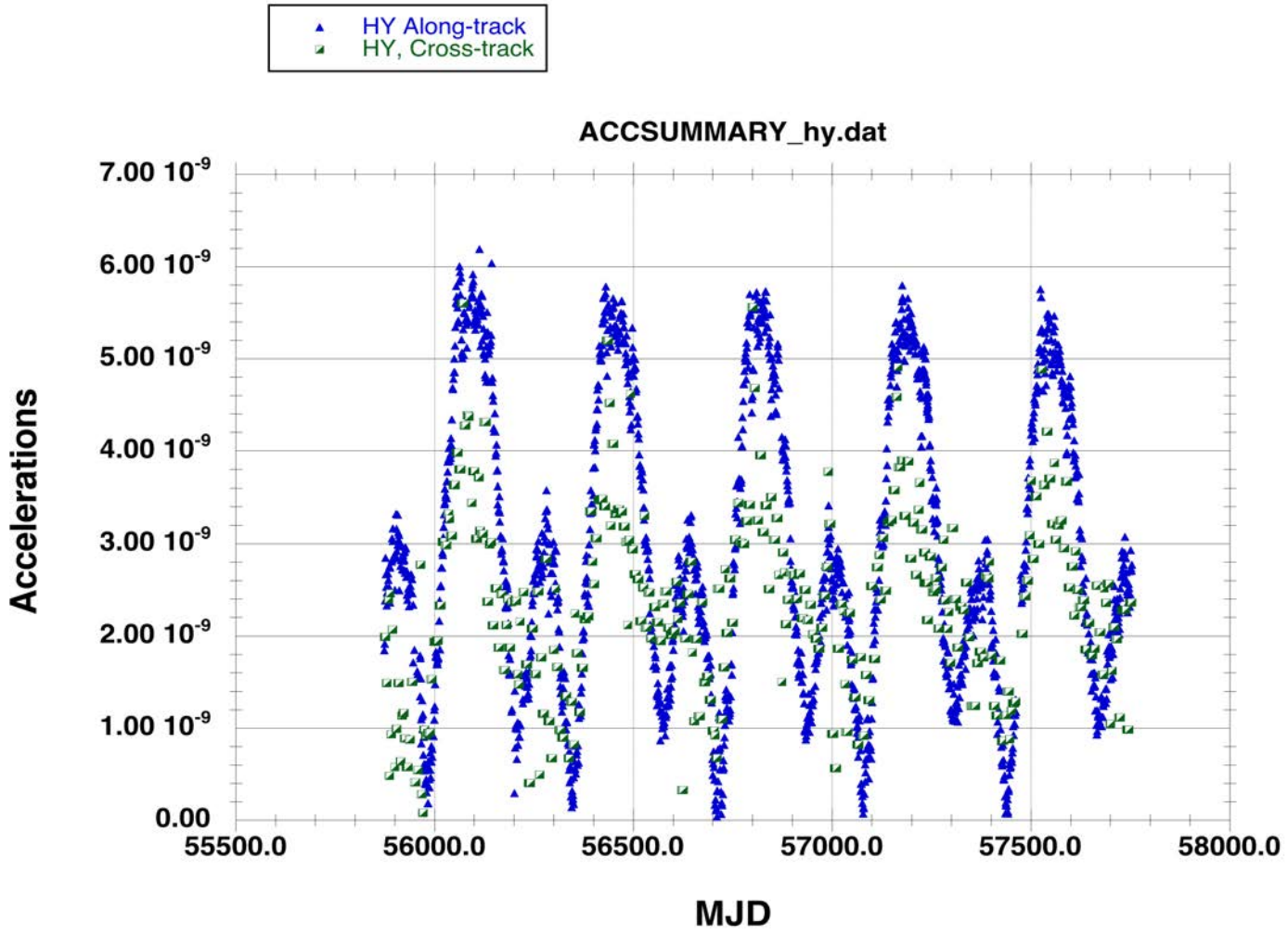
- Current operational series:
  wd28 = above satellites;

apply solar array quaternions on Jason-2. (**080713 to 161225**).

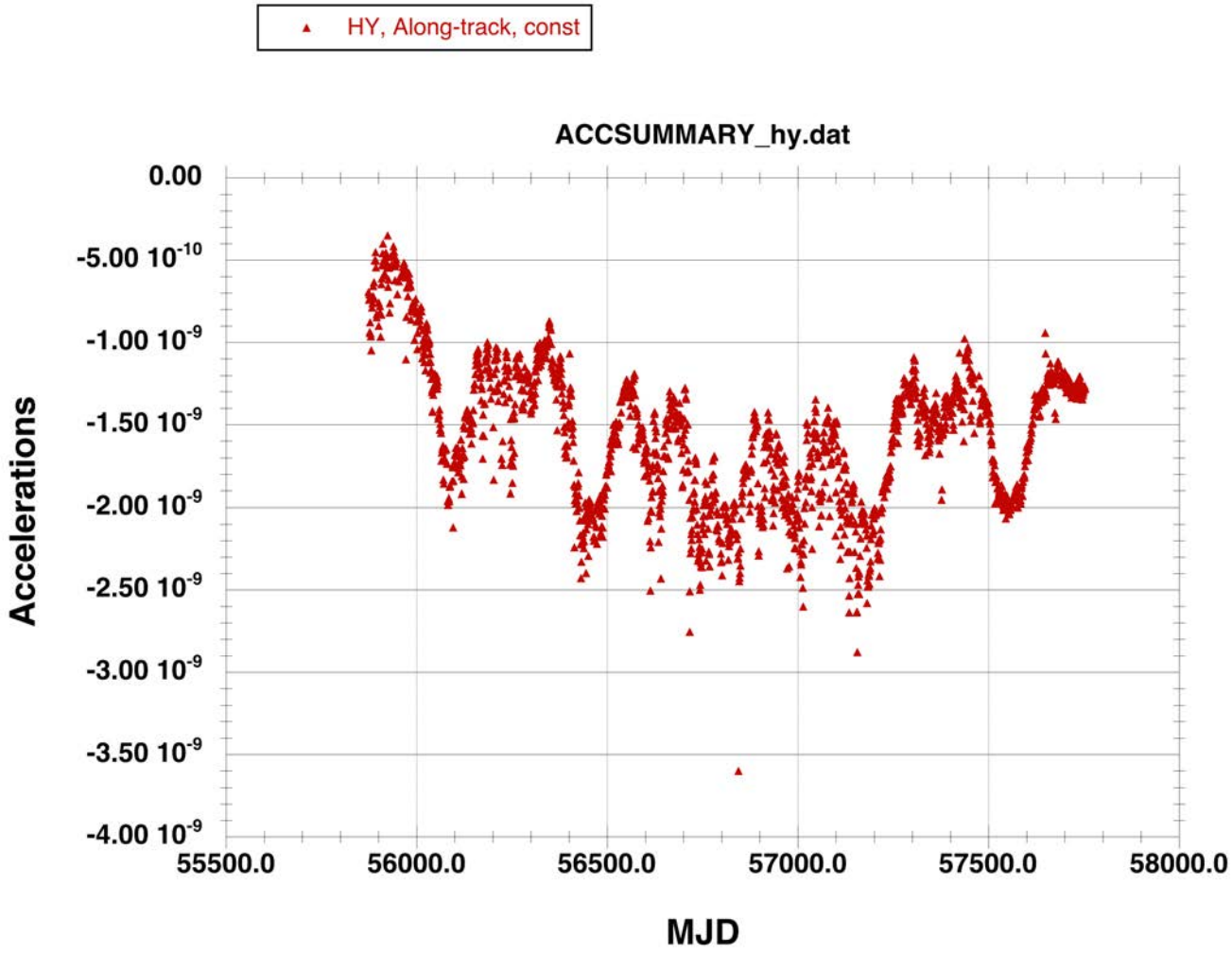
Satellite	Dates	RMS (mm/s)	n	Avg Obs/arc
Jason-2	07/13/2008 - 12/25/2016	0.3878	457	114612
Cryosat2	06/06/2010 - 12/25/2016	0.4095	429	51881
HY2A	11/11/2011 - 12/25/2016	0.4051	314	67810
SARAL	03/13/2013 - 12/25/2016	0.4142	236	62028
Envisat	07/13/2008 – 03/25/2012	0.4760¶	261	44593
SPOT-4	07/13/2008 – 06/09/2013	0.4512¶	289	30656
SPOT-5	07/13/2008 – 11/22/2015	0.4075	424	55528

¶ Edit multiplier of 6.0 used for these series instead of more standard value.

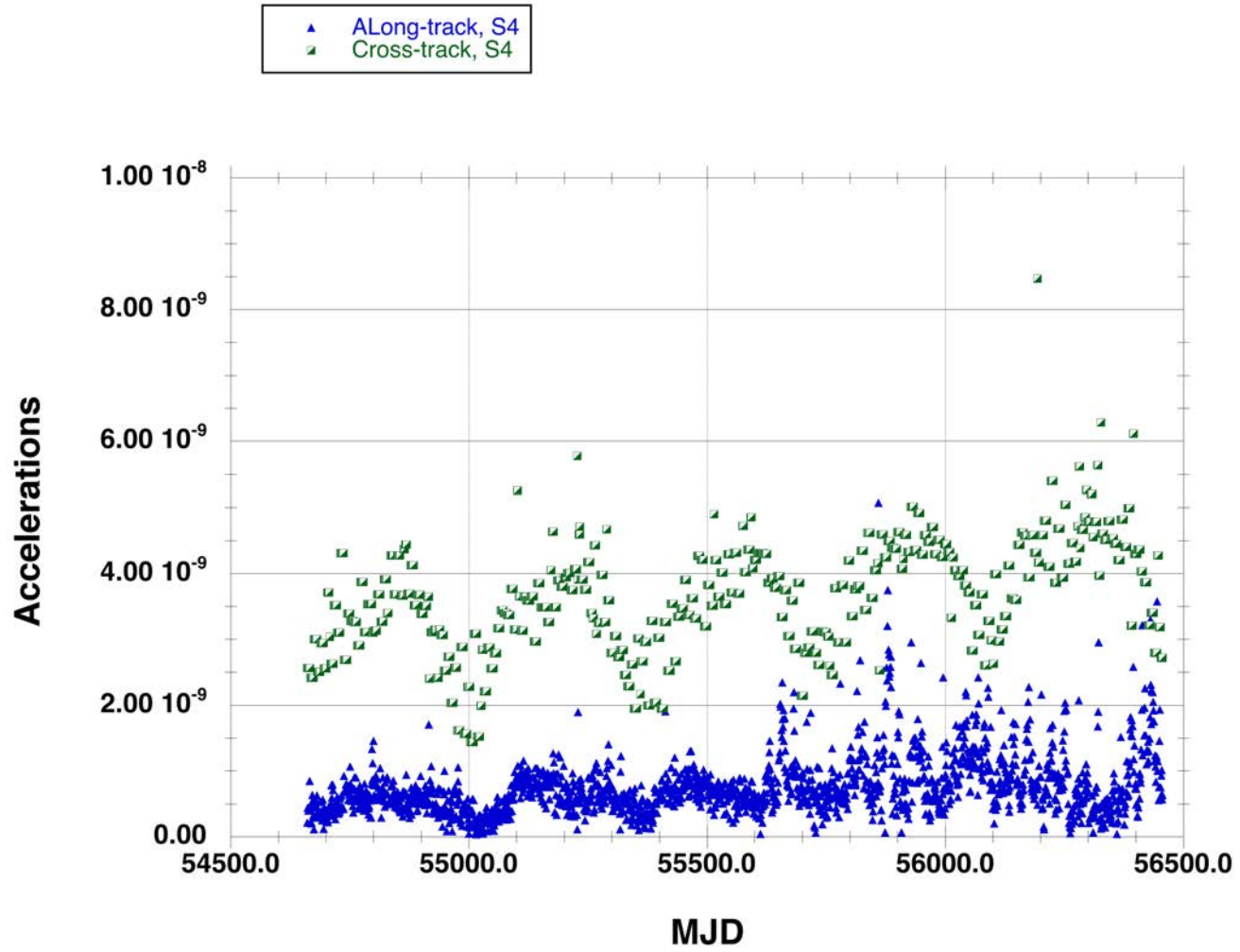
Satellite	Acceleration Along-track (nm/s^2)	Acceleration Cross-track (nm/s^2)	n
Jason-2	1.279	2.155	3001
Jason-2 (no SA quat)	1.400	2.288	3001
Cryosat-2	2.513	2.092	2375
HY2A	4.109	4.314	1809
Saral	1.534	1.458	1052
Envisat	1.763	1.064	1336
SPOT-4	0.758	3.624	1783
SPOT-5	2.855	1.193	2678



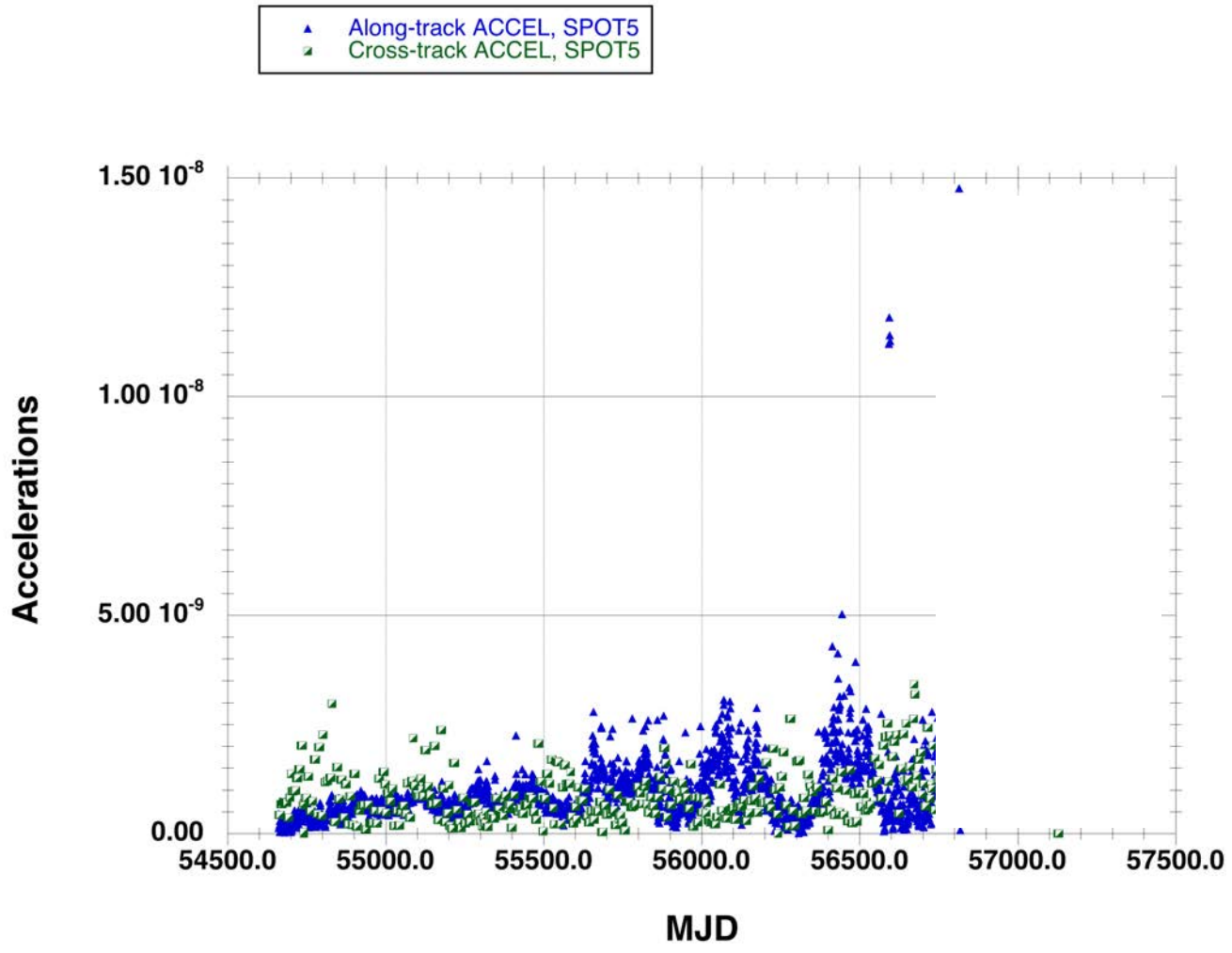
→Need to adjust Cr or SA specular reflectivity.



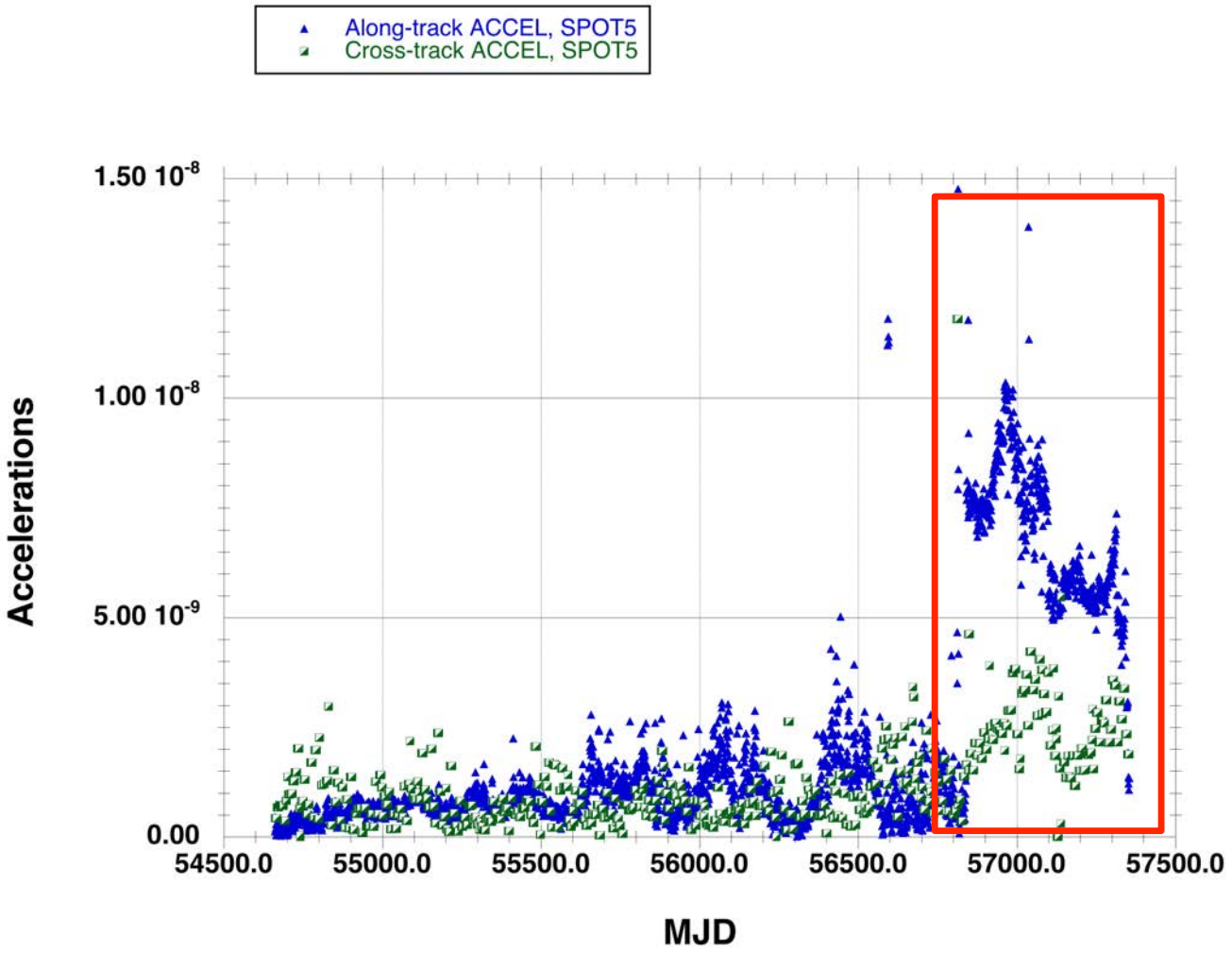
The only DORIS satellite that consistently requires adjustment of an along-track constant accel;



Cross-track accels. are always higher by 2-3X.
Annual signal. No model for thermal emission.



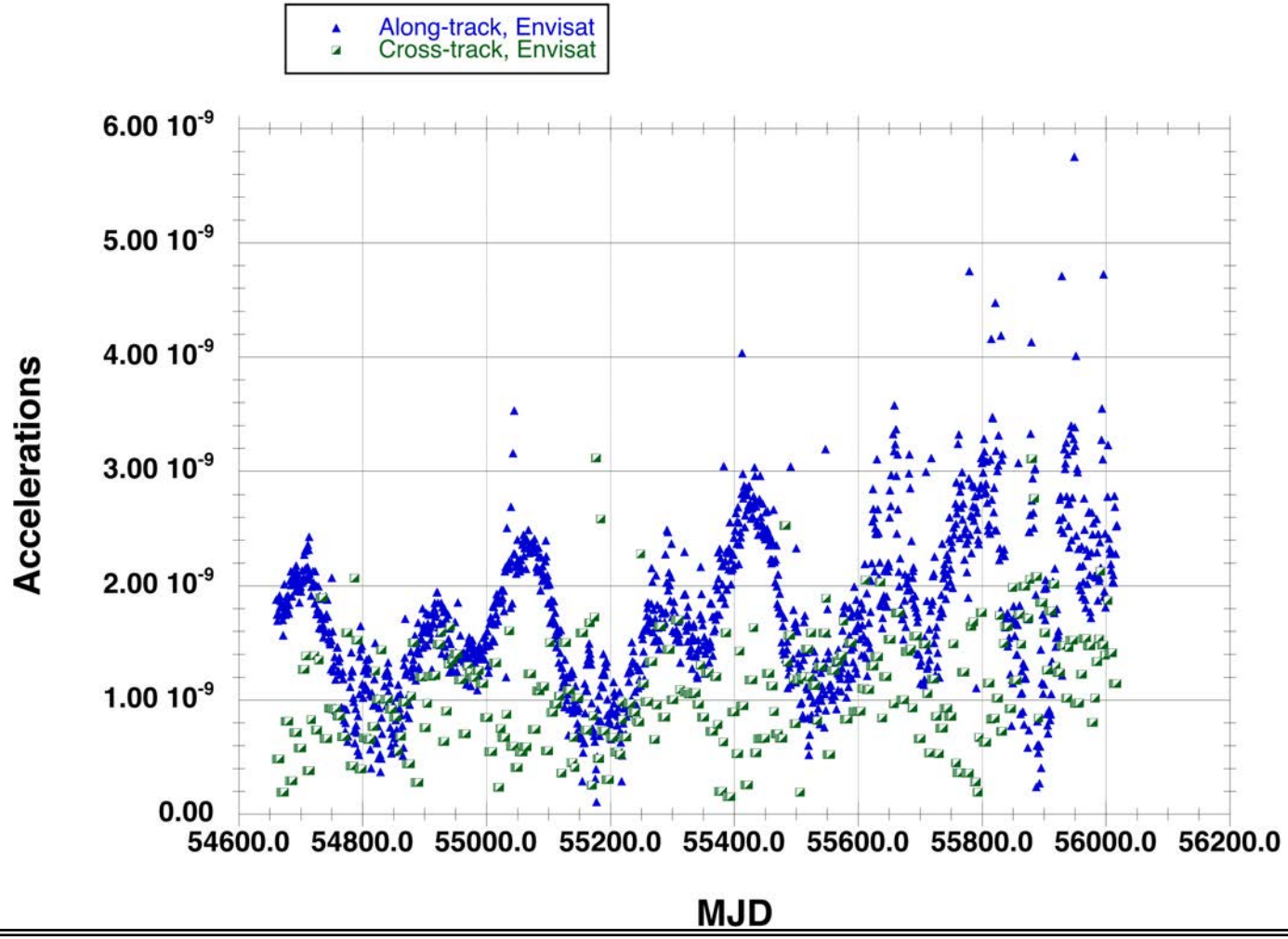
SPOT-4 behavior a puzzle, because macromodel on SPOT-5 does not produce higher Cross-track accels (when solar array pitch bias properly modeled)



After ~July 1, 2014, Error in application of SPOT5 solar array pitch bias → Will reprocess and resubmit these arcs.

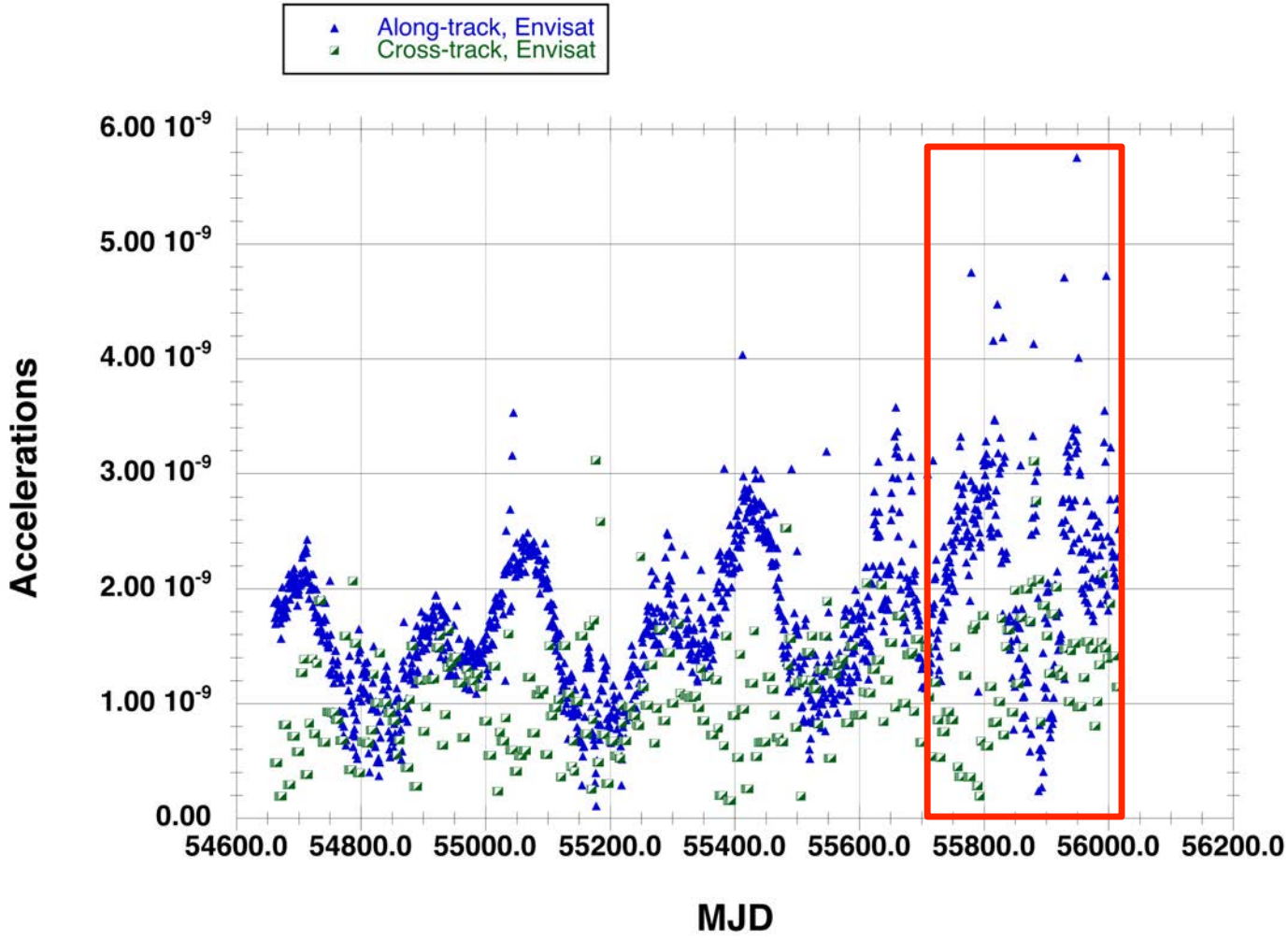
Nonconservative Force modeling for Envisat in gscwd28

(1) UCL Model for Envisat (SRP + Thermal reradiation). Sibthorpe, 2006
(2) Albedo: Knocke et al. (1988).
(3) Drag: MSIS86, cd per 2hrs with, exponential decay sensitivity and time correlation of 2 hrs.
(4) Macromodel: 10 plates (Box + solar array + SAR) used for Albedo and Drag.
(5) OPR/day along-track.
(6) OPR/arc, cross-track.

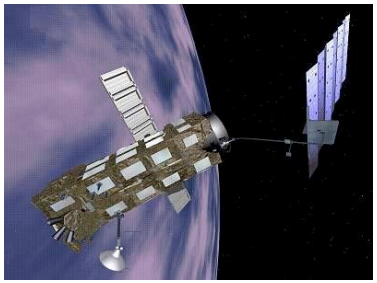


Cross-track accels. are quite good; Due to background model being UCL model? Along-track has semi-annual signal − drag density error? or error in modeling orientation of macromodel for drag?

B



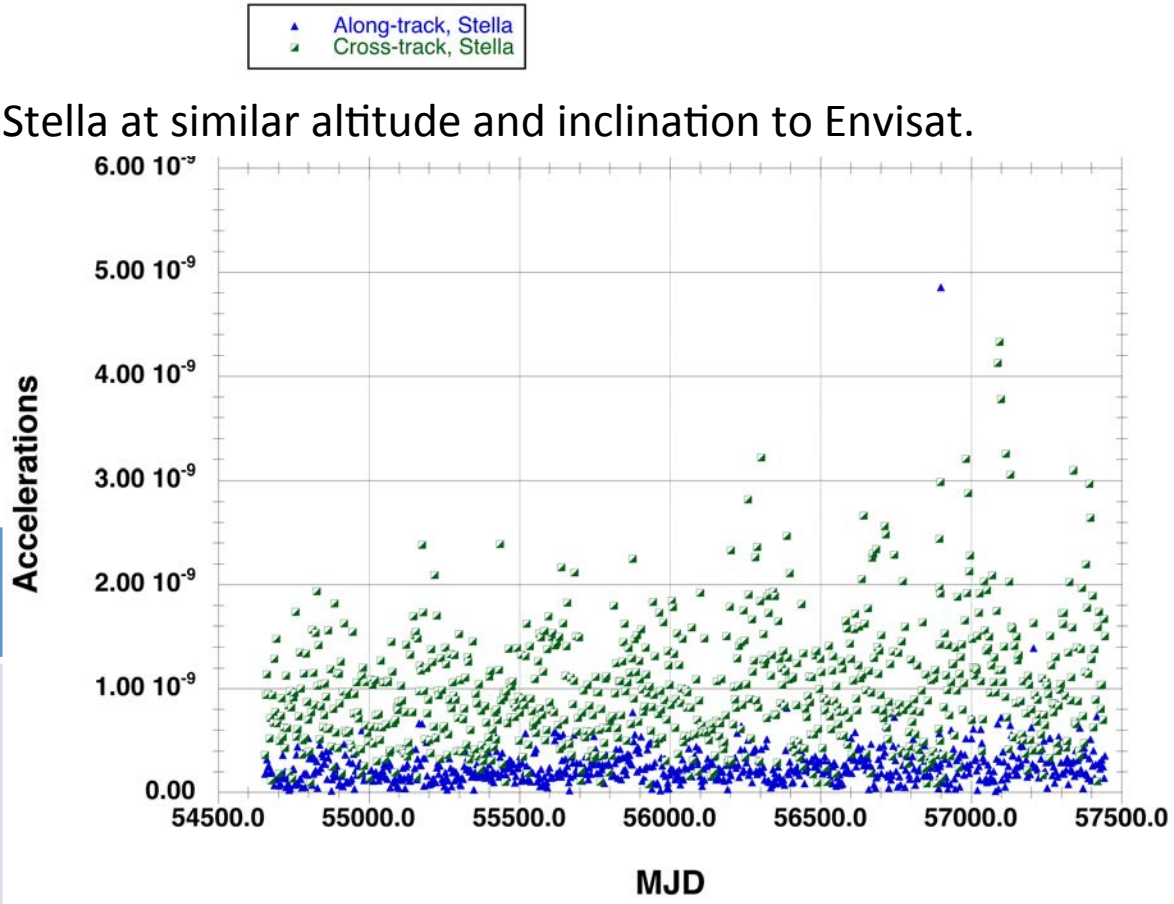
Behavior more irregular at end of mission, due to non-nominal orbit behavior?



Sat.	Area (m^2)	Mass (kg)	A/m
Envisat	~71 (SA); ~13 (SAR) 9x2 (bus)	~8000	0.0089 (SA) 0.0016 (SAR)
Stella¶	0.0452	48	0.00094

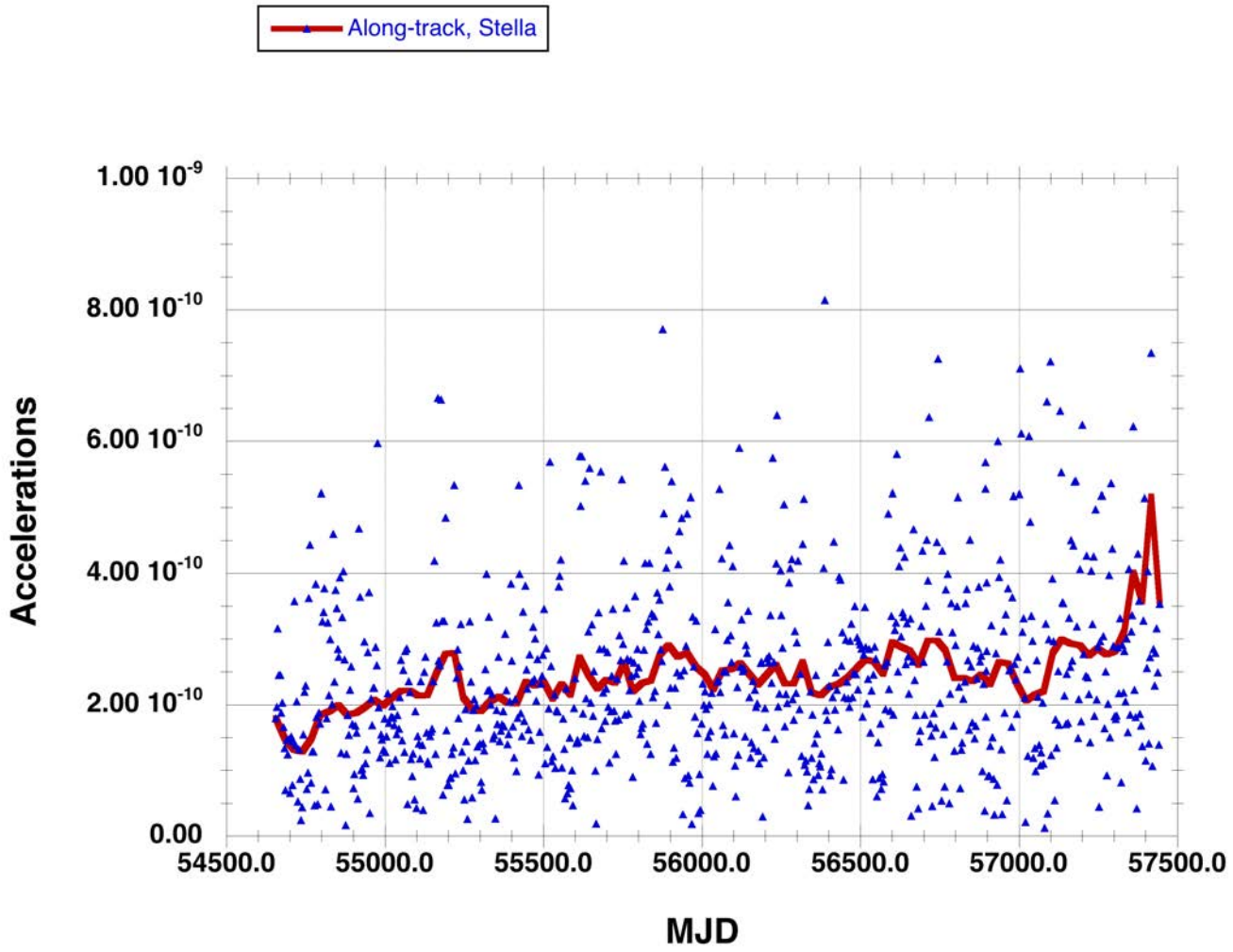
¶ 24 cm diameter; ~19 gm/cm^3

Stella at similar altitude and inclination to Envisat.



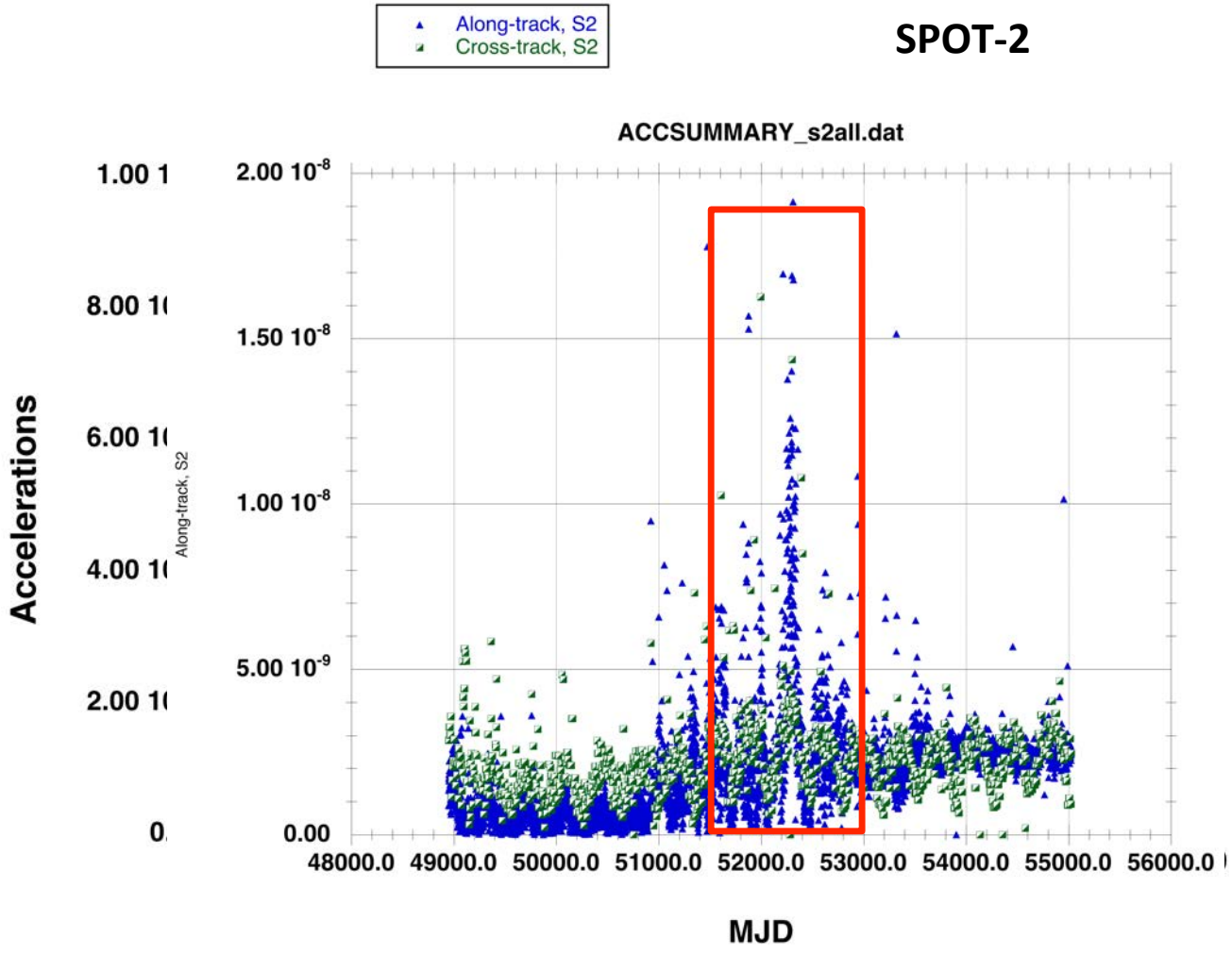
No obvious signals in OPR's (2X per 7-day arc); Other background modeling the same as for Envisat.

D

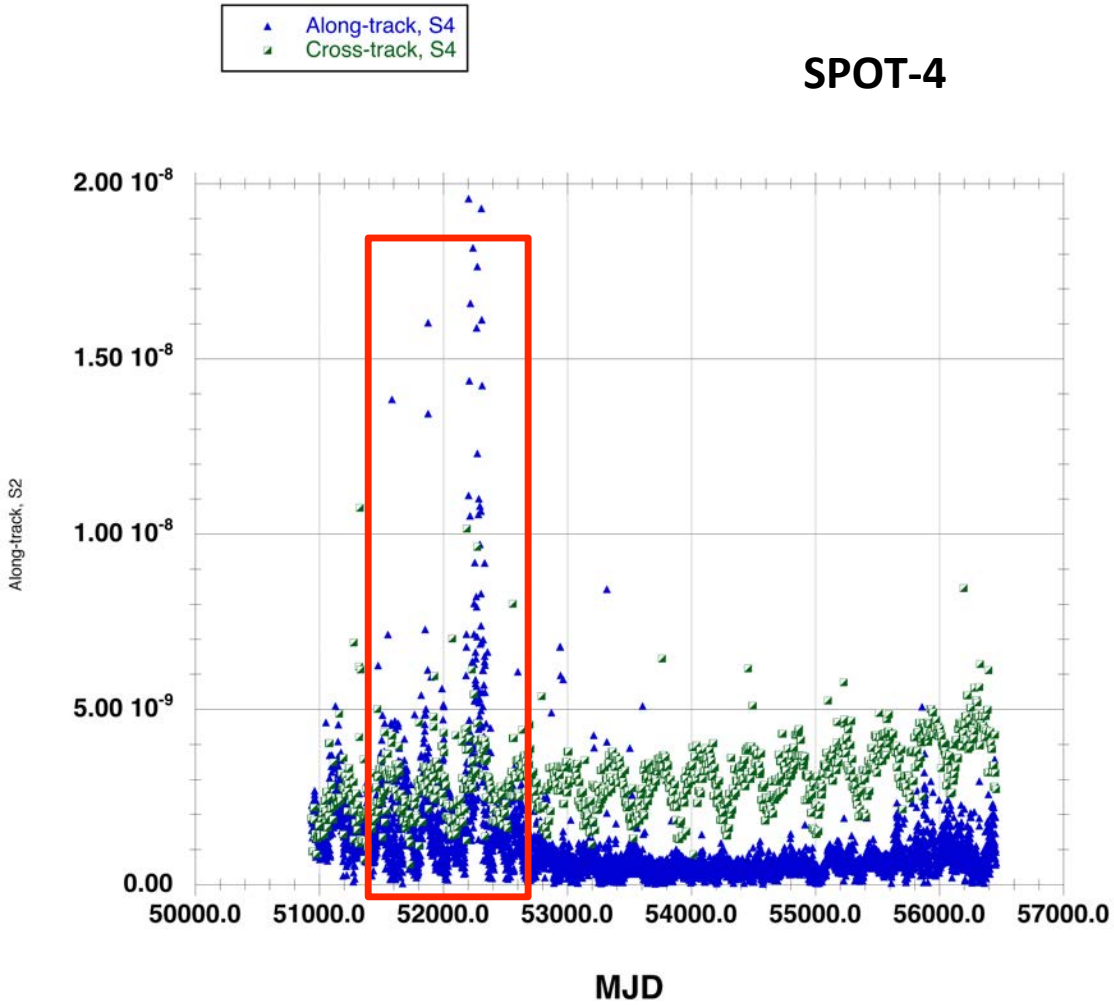


Zoom: Still No obvious signals in OPR's (2X per 7-day arc); Even with smoothing. Conclude that Envisat semi-annual signal is a problem with orientation of s/c (cross-sectional area) for drag being improperly modeled.

SPOT-2



Atmospheric drag mismodeling (improper orientation or macromodel?; atmospheric density?) is a limiting error source for SPOT2-4 satellites around solar maximum.



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Updates of models for New SINEX Series

	gscwd28	New series; Models Considered
Stations	DPOD2008	DPOD2014
Data	Inherited edits from previous processing.	DPOD2014 a priori edits; otherwise remove all other edits.
Gravity (static)	GOCO2S	GOCO5C or ITSG-GRACE2016
Gravity (TVG)	GRACE (annuals) + 5x5 (SLR/DORIS)	Derived from ITSG-GRACE2016 monthly solutions + adjust (3x3)?
Ocean Tides	GOT4p8	GOT4p10 +
Troposphere	GMF/GPT	VMF1
Geocenter	No	Yes. (Ries, 2013?)
Atmosphere Loading	No	Maybe?
Atmosphere gravity	ECMWF-6hr (JPBoy)	Try to be consistent with GRACE background? ECMWF+TUGO?
HY2A	Prelim macro.	Retune
SPOT-4	Tuned. Le Bail et al. (2010)	Retune with new (wd26) parameterization
ENVISAT	no quaternions	quaternions or better macromodel?
Albedo/IR	Knocke et al. 1988	Derived from CERES data.