Macromodel and radiation pressure modeling with TP & Jason: Issues & Results

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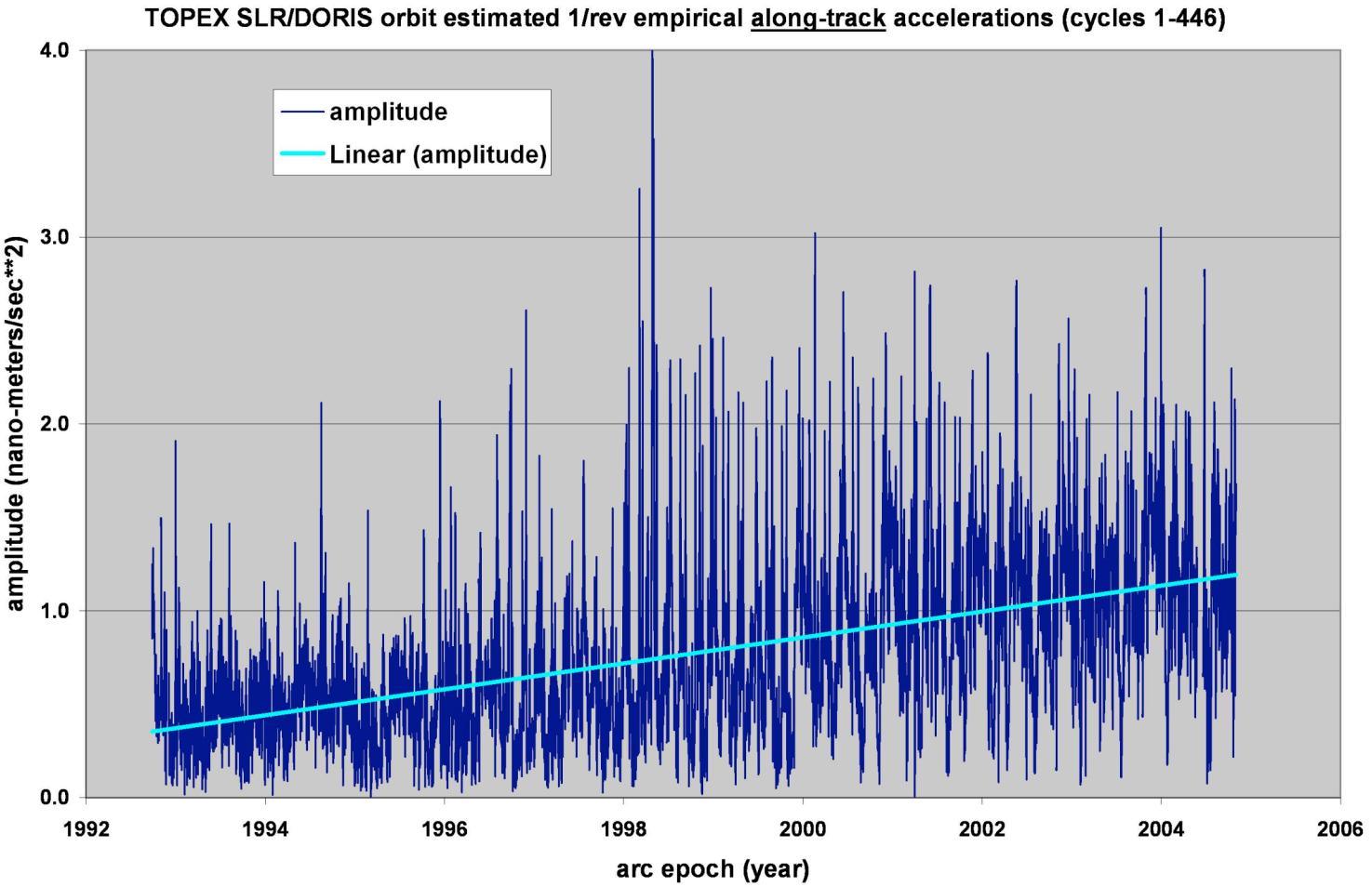
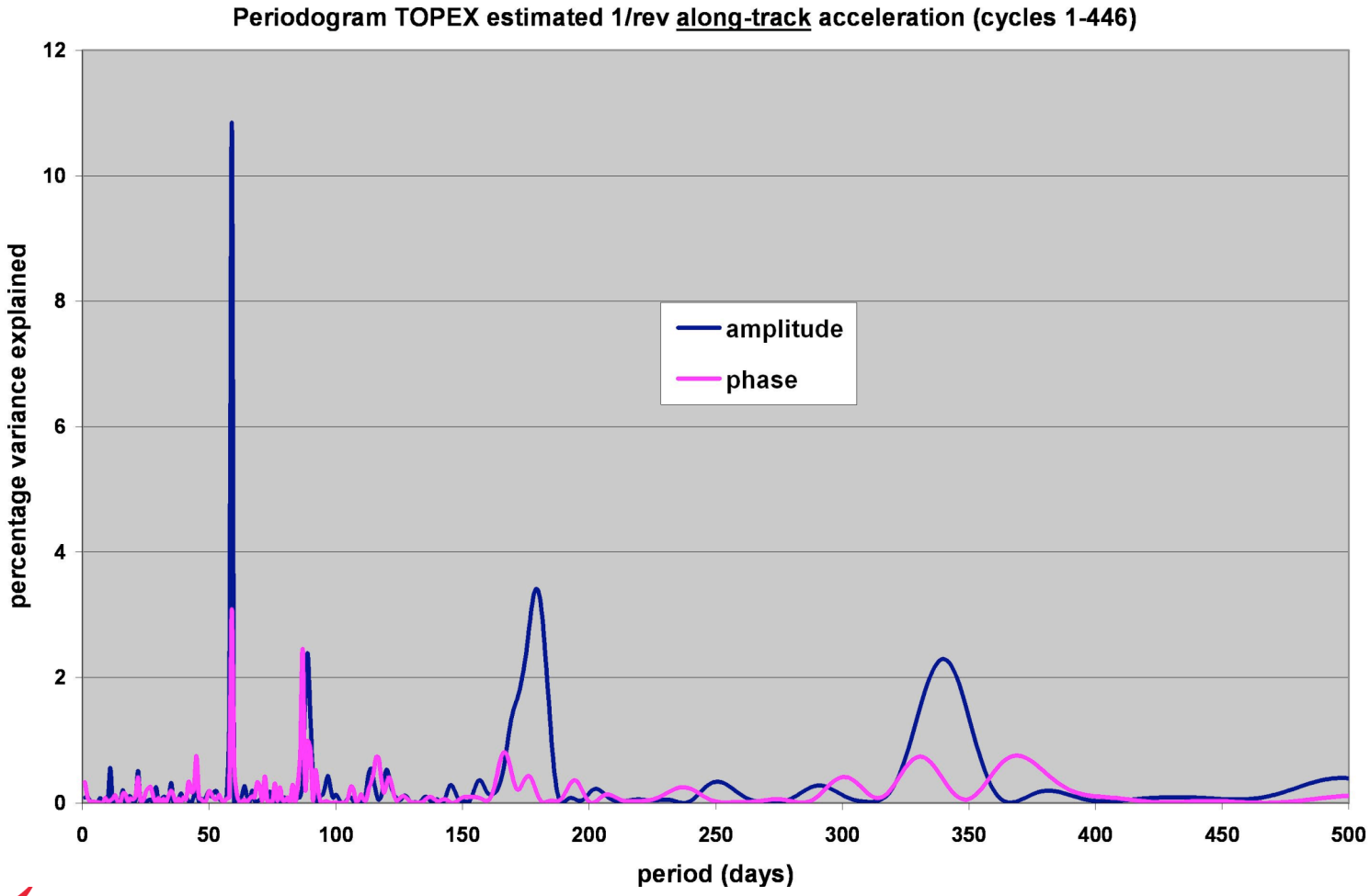
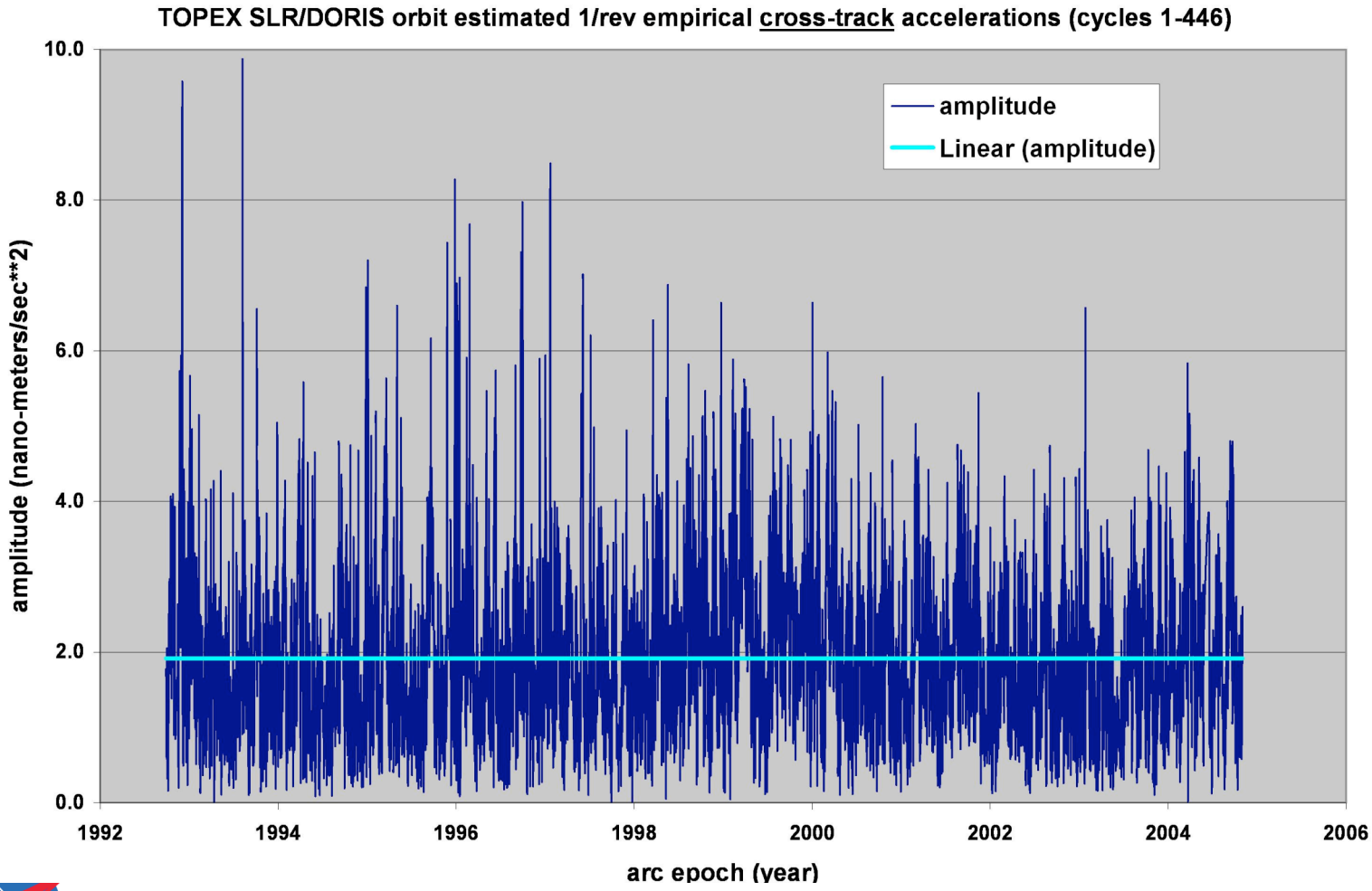
Residual signal evident in empirical accelerations for TOPEX



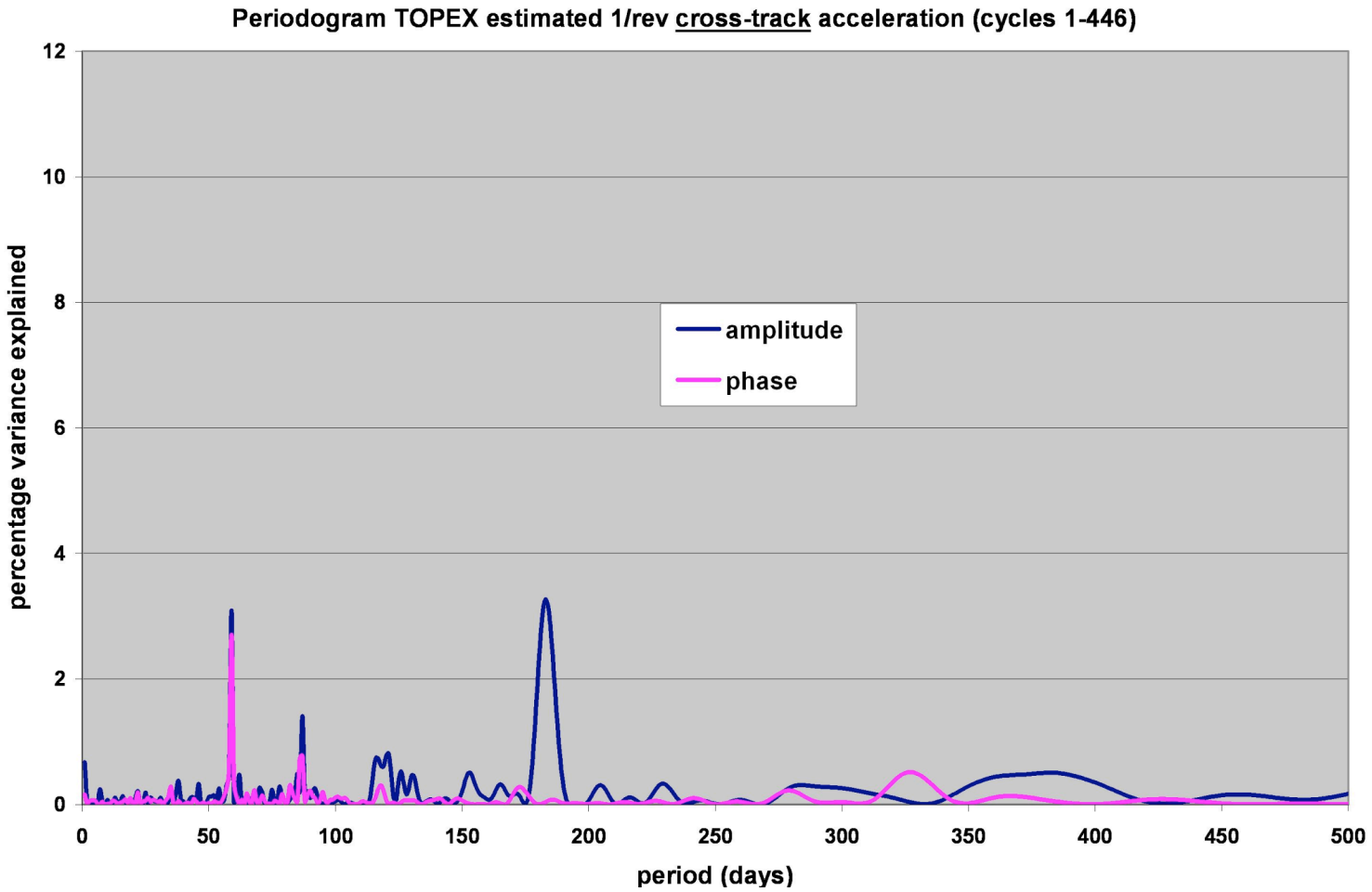
Residual signal at distinct frequencies



In contrast to along-track, no evidence of linear trend in cross-track accels.



Similar frequencies appear in cross-track accels, but with less amplitude.



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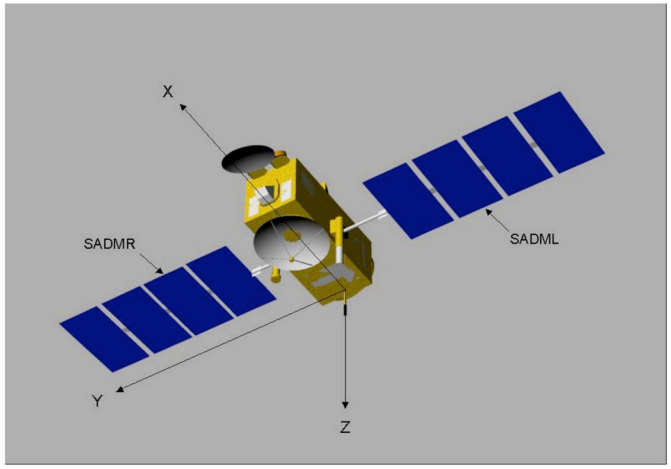
Jason solar radiation pressure modeling is evaluated using the CNES 8-panel macromodel and the University College London (UCL) models

The UCL model is the more sophisticated, where the radiation flux is simulated using a pixel array, and the spacecraft structure is represented as a set of interlocking geometric primitives.



Preliminary tests with SLR/DORIS orbits show marginal improvement in the SLR RMS residuals using UCL

SLR residuals (cm) summary SLR/DORIS cycles 1-120		
test	mean	rms
Macro-model	0.050	1.408
UCL Version1	0.108	1.400

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CNES Macromodel is constructed using 8 flat plates, each representing an average area and reflectivity properties obtained from CNES pre-launch specs

(http://calval.jason.oceanobs.com/html/calval_plan/pod/modele_jason.html)

Jason visible								
surfaces	**X+**	**X-**	**Y+**	**Y-**	**Z+**	**Z-**	**SA+**	**SA-**
area (m)	1.65	1.65	3.0	3.0	3.1	3.1	9.8	9.8
specular reflectivity	0.425	0.408	0.334	0.274	0.236	0.298	0.344	0.004
diffuse reflectivity	0.178	0.186	0.342	0.369	0.382	0.336	0.006	0.298

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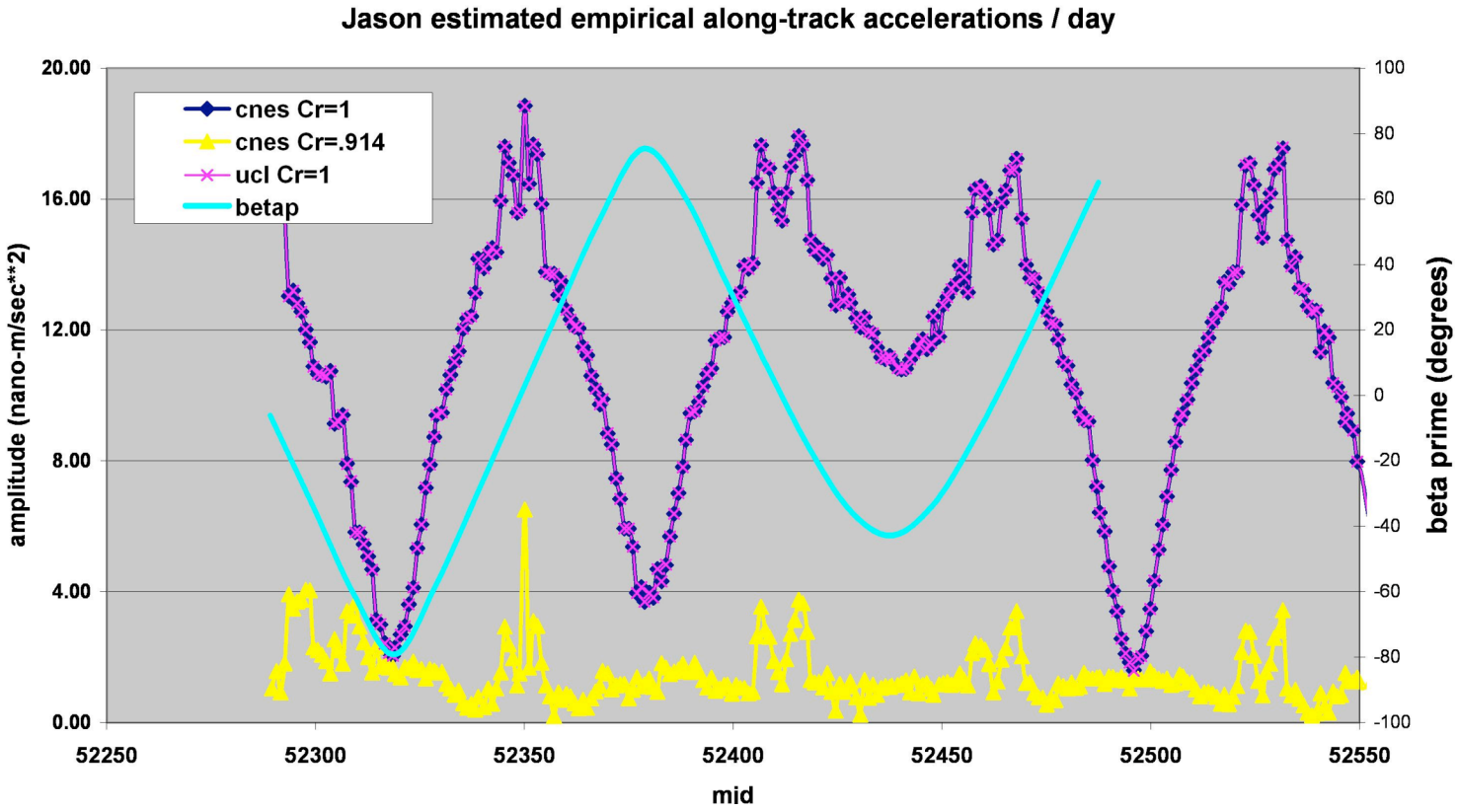
Jason CNES Macromodel improvement with tuning C_R



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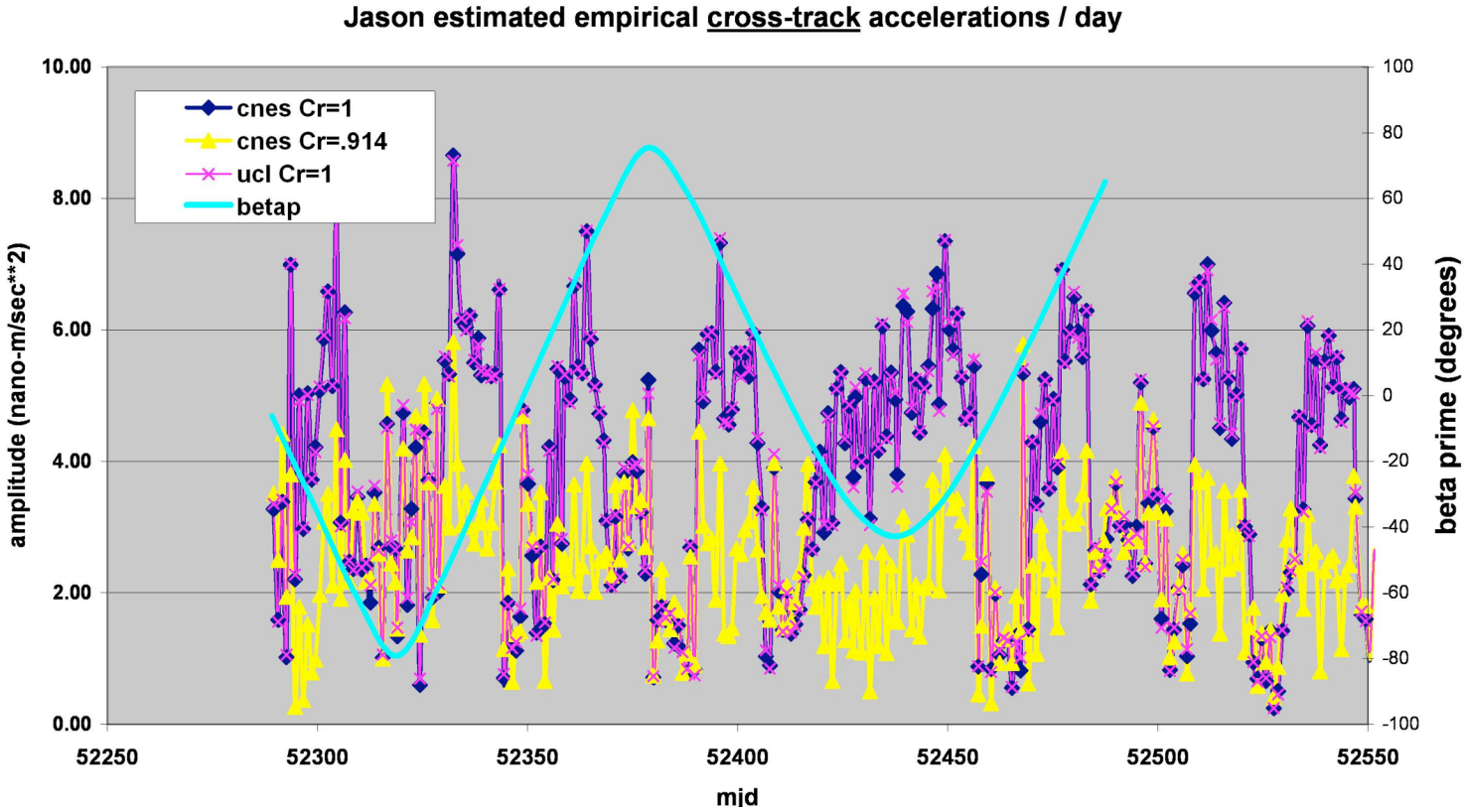
Jason CNES Macromodel improvement with tuning C_R



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Other Notes

1. UCL Jason-1 Model #2 Available. Preliminary tests indicate is better than model #1 (Test in GEODYN & Gypsy?)
2. UCL ENVISAT Model is available -- Macromodel is too simplistic for this schoolbus-sized s/c. (Test in GEODYN & Gypsy?)
3. Are there alternate models for the SPOT satellites? Should we compare magnitude of accelerations from different centers? Should we try a macromodel tuning?