

Systematic errors in DORIS Z-Geocenter time series

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SUMMARY

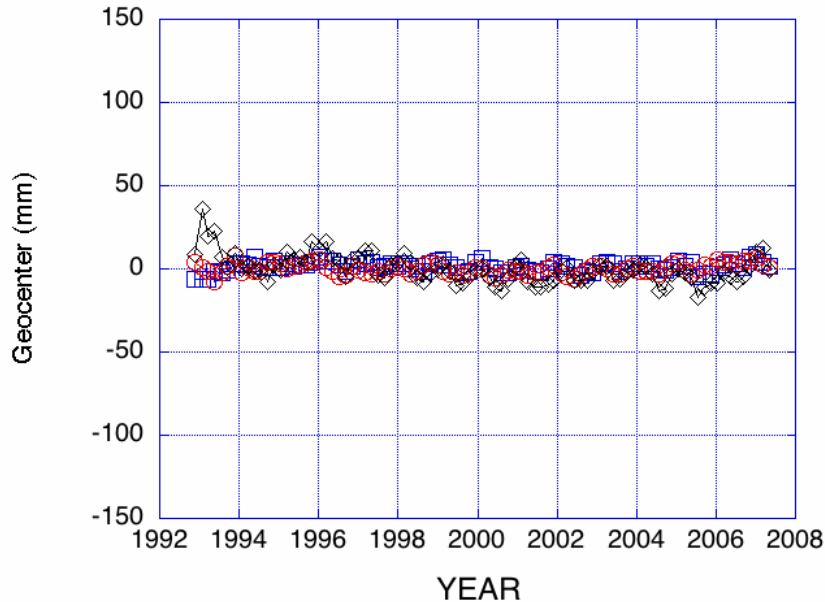
- Geocenter time series (SLR, GPS, DORIS)
- Detection of characteristic periods (periodogram)
- DORIS single satellite analysis
- Early results for TOPEX and TOPEX/SPOT2
- Future work and current problems
- Conclusions

SLR and DORIS-derived geocenter

60-days solution

—□— TX-Laser(mm)
—○— TY-Laser(mm)
—◇— TZ-Laser(mm)

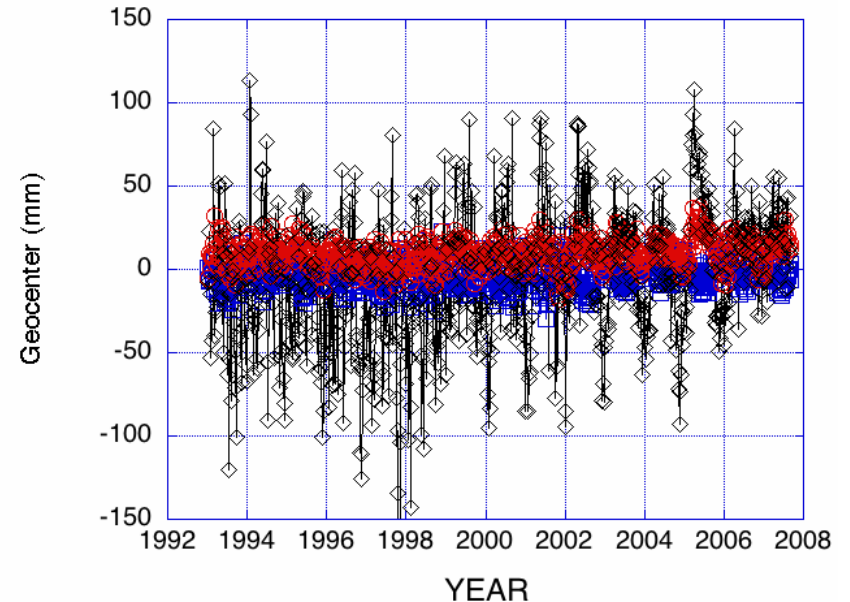
Solution Laser (J. Ries, U. Texas)



7-days solution

—□— TX-DORIS(mm)
—○— TY-DORIS(mm)
—◇— TZ-DORIS(mm)

**Solution DORIS ign07wd01
(P. Willis, IGN/IPGP)**



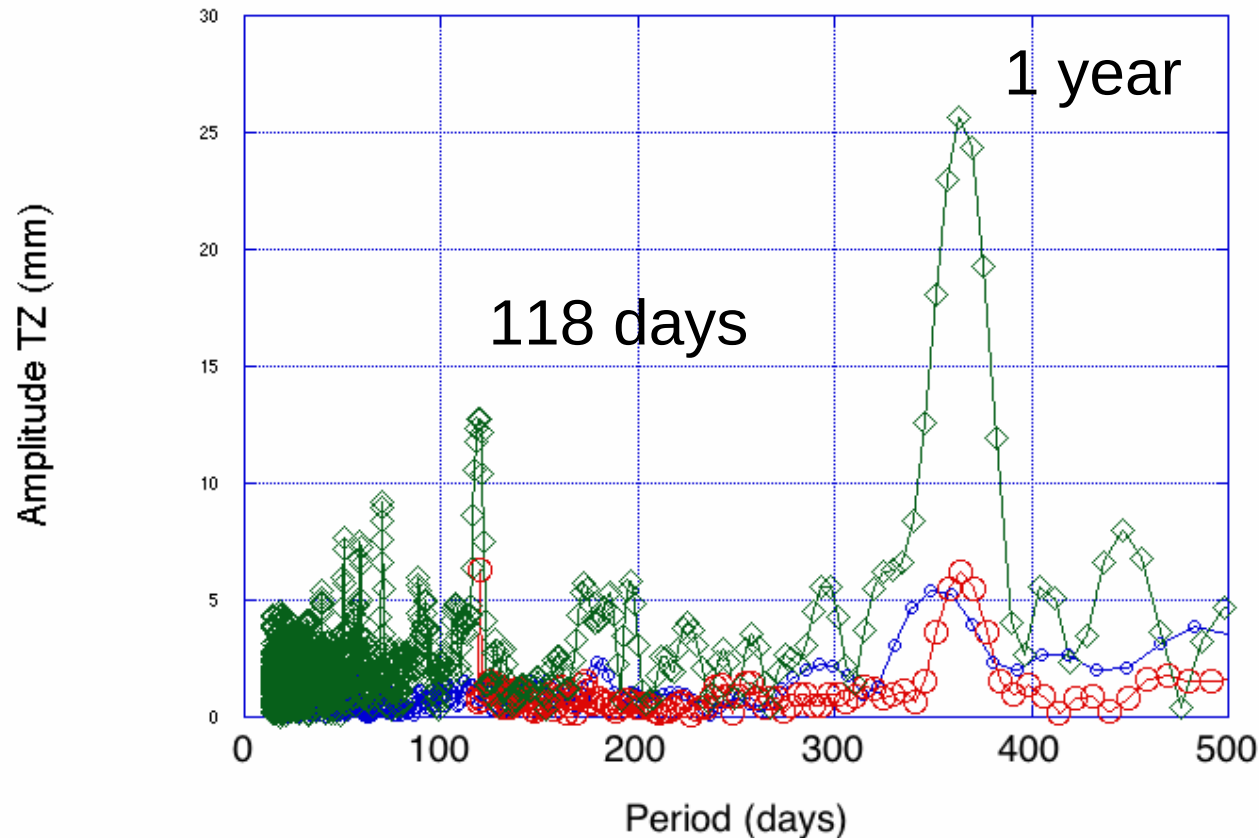
**DORIS IGN/JPL solution has large systematic biases
specially in Z**

GPS : 352 days = draconitic period

See, Urschl et al., Adv. Space Res., 2007



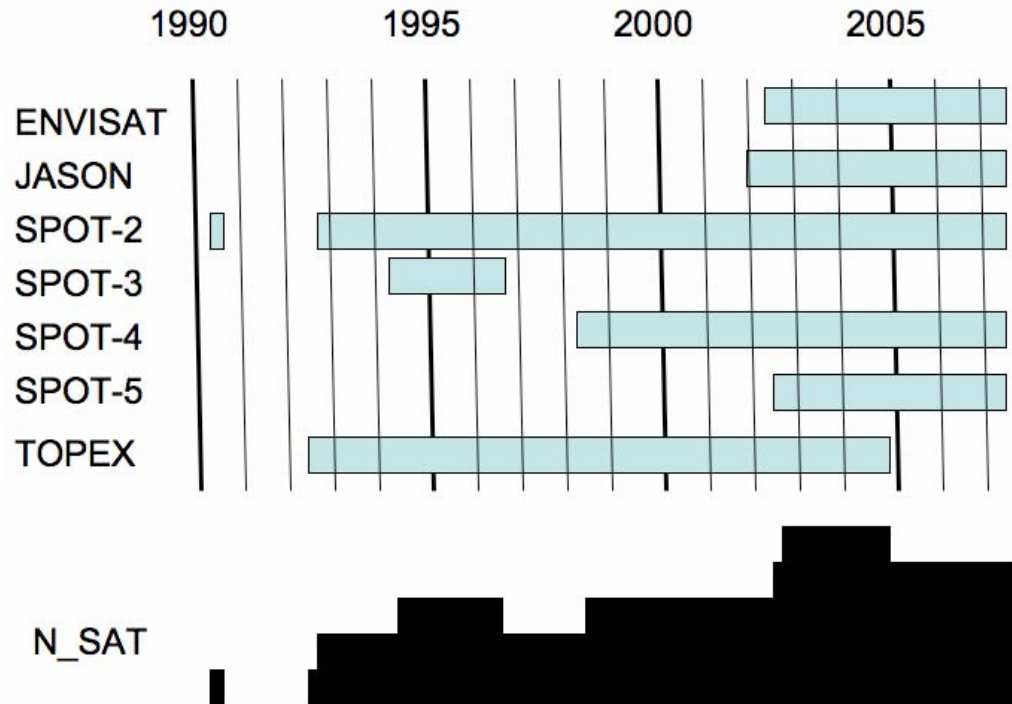
Geocentre



GPS = IDS solution, courtesy of Remi Ferland

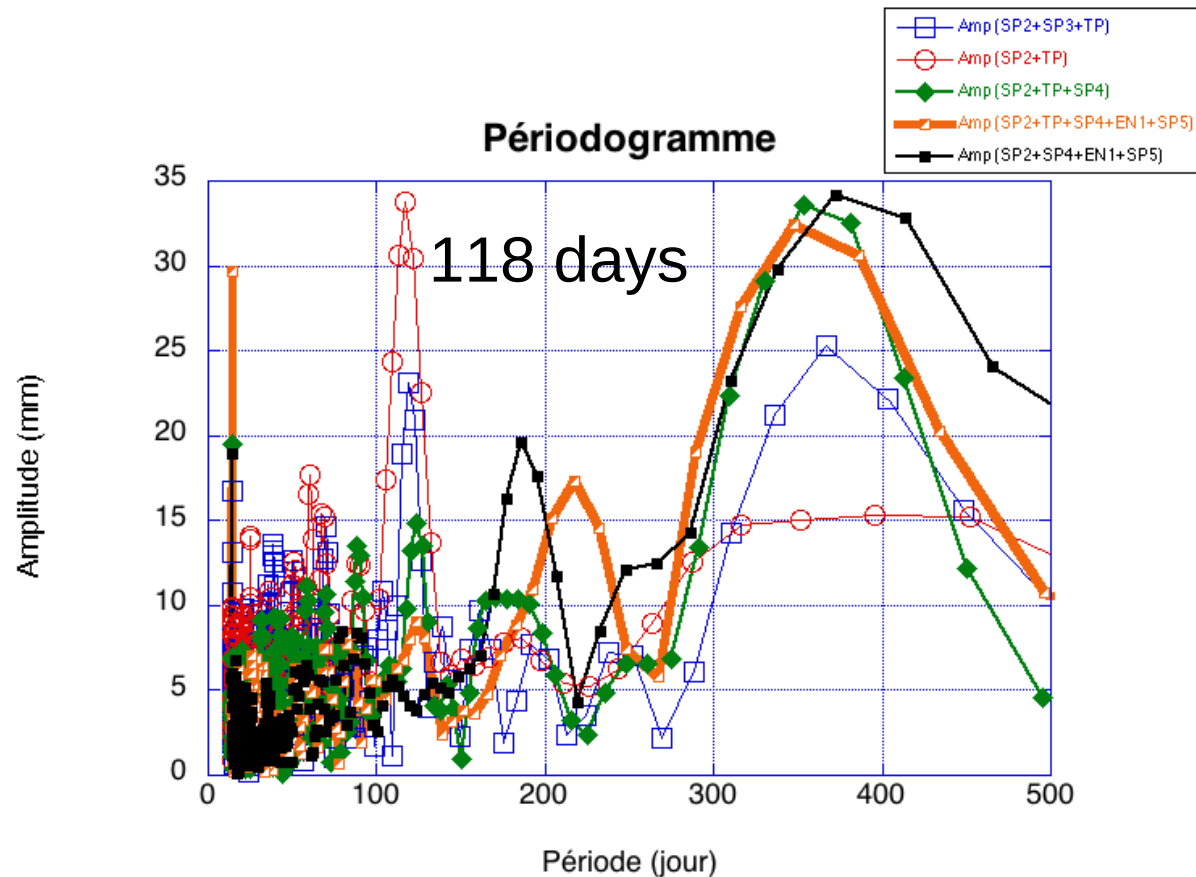
Laser = Texas solution, courtesy of John Ries

DORIS = IGN/JPL solution

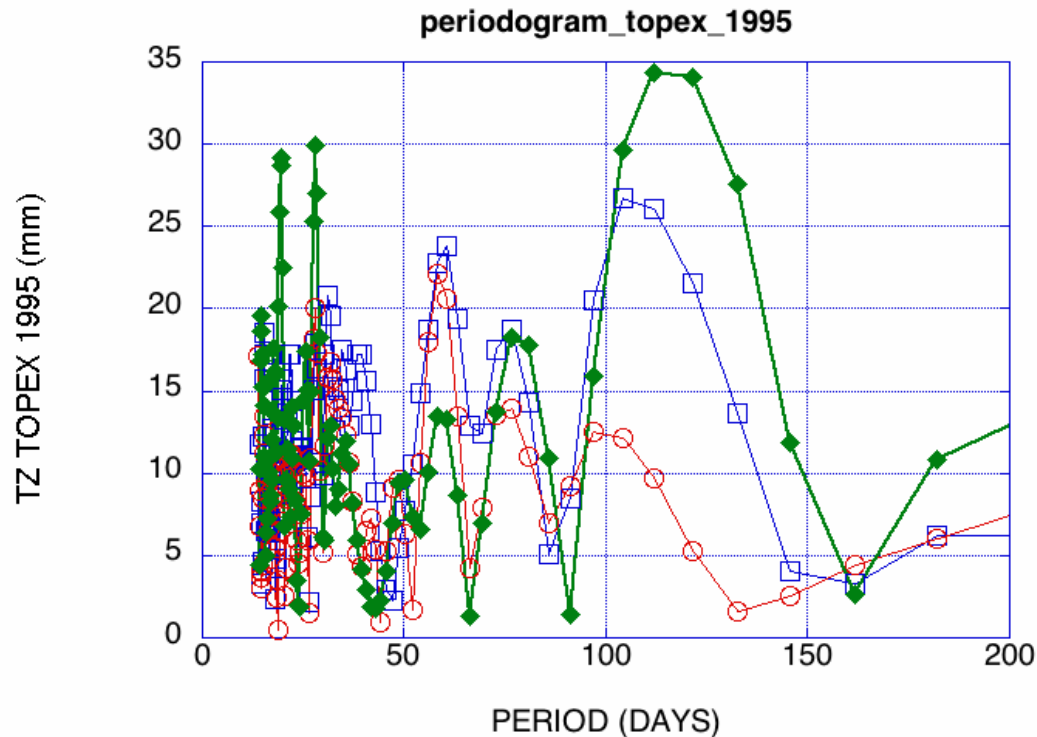
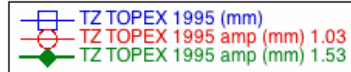


DORIS time series is not homogeneous
See [Willis et al., CR Geoscience, 2007](#)

Look at periods for which the DORIS time
IS really homogeneous
(periods with same satellites)



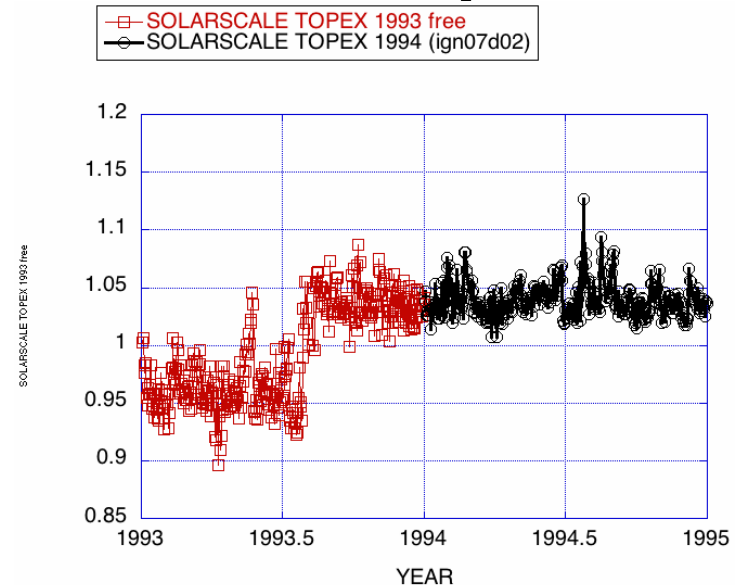
Recompute DORIS single-satellite solution



Correlation between TZ and empirical parameters,
See also [Willis et al., J Geod, 2006](#)

FUTURE WORK (and current problems)

- Estimate all DORIS satellite coefficients for SRP
- Fix coeff and verify station positions,...
- Try constrained approach



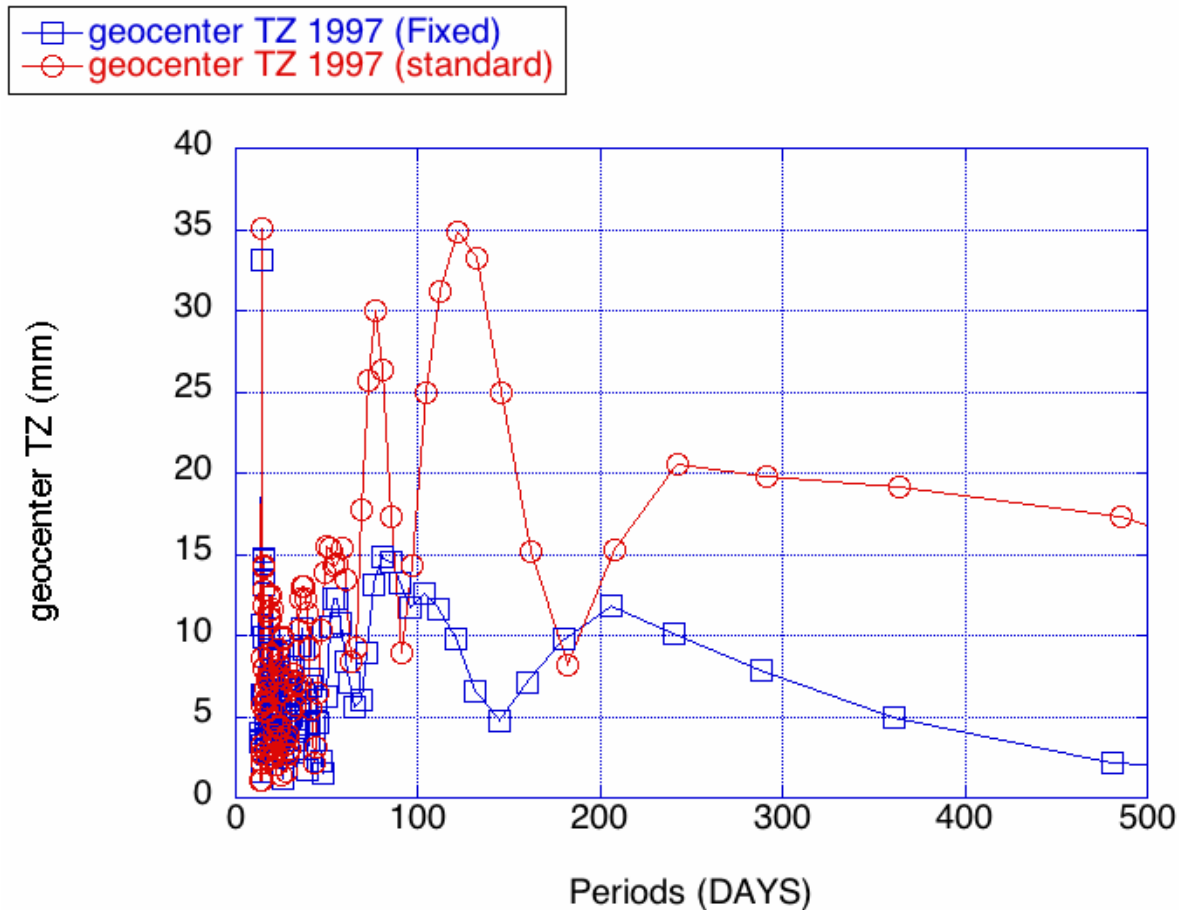
Discontinuity?

= change in satellite receiver mode

See a similar problem in ENVISAT

In Willis et al., Adv. Space Res., 2007

Recomputing old data (1997)



CONCLUSIONS

- Large systematic errors exist in the DORIS IGN/JPL Z-geocenter time-series
- Fixing solar pressure coefficient provides better results
- Millions of residuals can be used to detect causes of mismodelling (eg. Solar pressure estimation in DORIS IGN/JPL)
see also [Doornbos&Willis, Acta Astronaut., 2007](#)
- It could be use to use individual solutions as well for ITRF combination (biases would be easier to identify)