A high-quality, homogenized, global, long-term (1993-2008) DORIS precipitable water data set for climate monitoring and model verification

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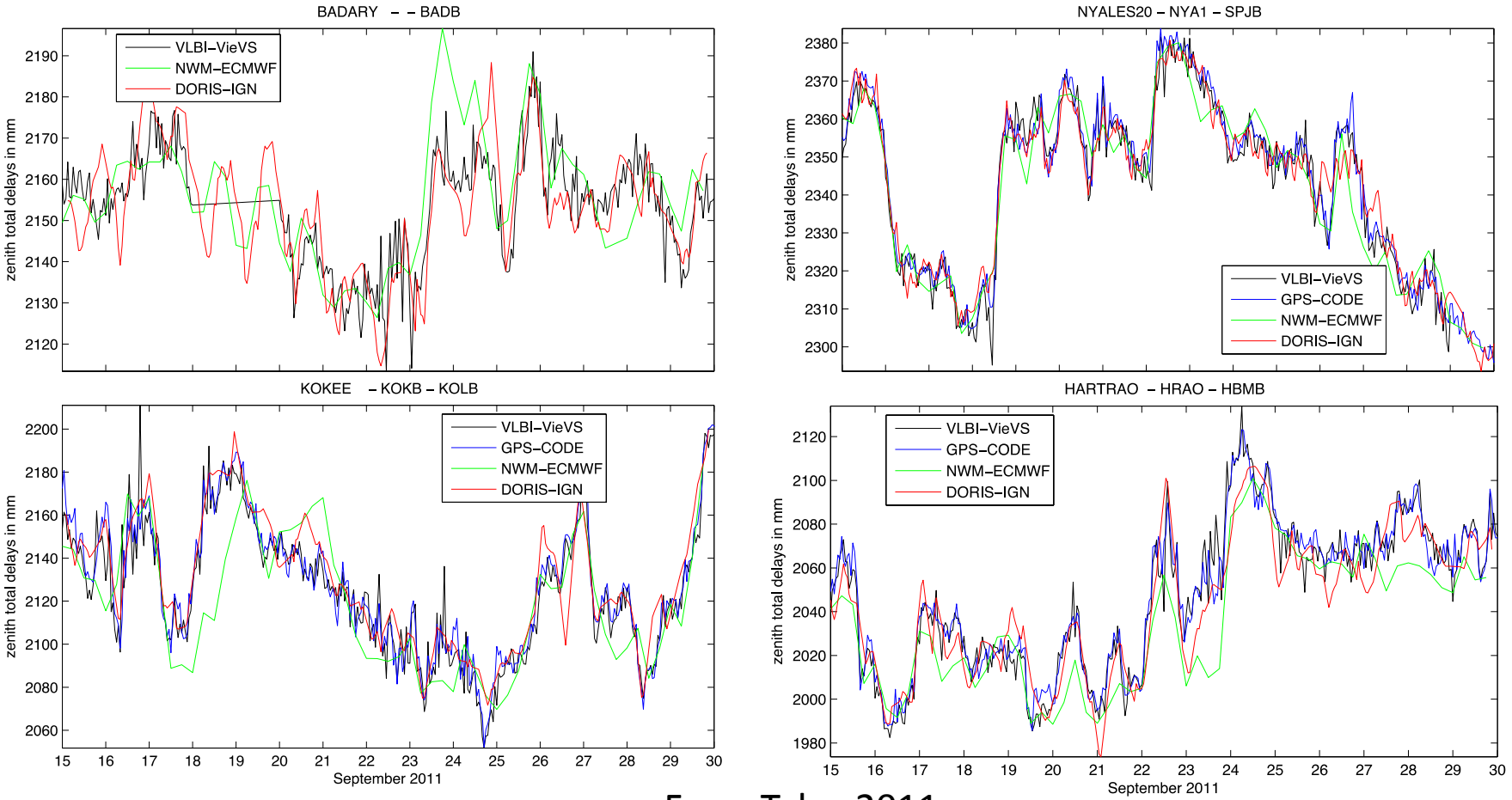
OUTLINE

- Summary of recent DORIS tropospheric results
  - Zenith tropospheric delays
  - Horizontal gradients
- New solution (using phase law)
- Conclusions

Recently published articles

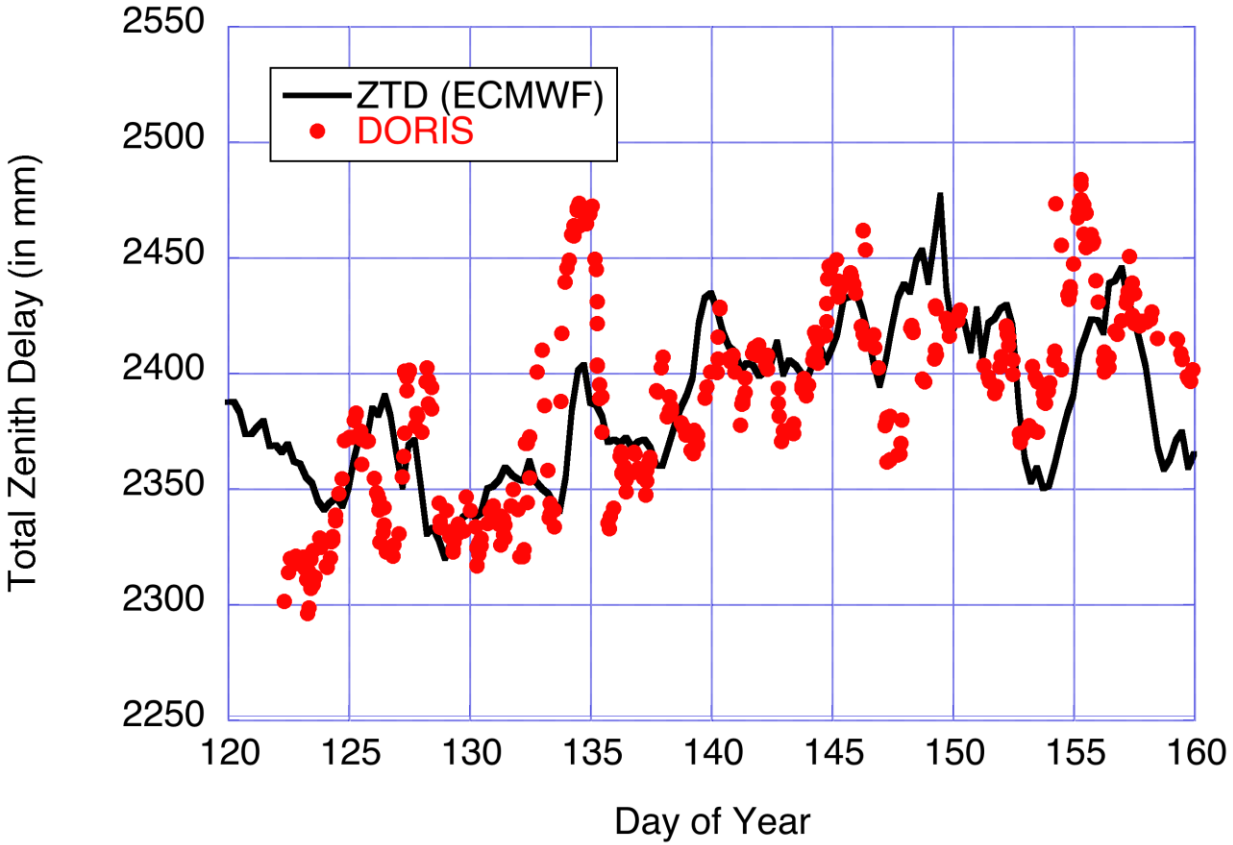
- Bock O., Willis P., Wang, J., Mears C. (2014), A high-quality, homogenized, global, long-term (1993-2008) DORIS precipitable water dataset for climate monitoring and model verification, Journal of Geophysical Research, Atmospheres, 119(12), 7209-7230, DOI: 10.1002/2013JD021124.
- Teke K., Nilsson T., Böhm J., Hobiger T., Steigenberger P., Garcia-Espada S., Haas R., Willis P. (2013), Troposphere delays from space geodetic techniques, water vapor radiometers, and numerical weather models over a series of continuous VLBI campaigns, Journal of Geodesy, 87(10-12), 981-1001, DOI: 10.1007/s00190-013-0662-z.
- Willis P., Mertikas S., Argus D.F., Bock O., (2013), DORIS and GPS monitoring at the Gavdos Calibration Site in Crete, Advances in Space Research, 51(8), 1438-1447, DOI: 10.1016/j.asr.2012.08.006.
- Willis P., Bar-Sever Y.E, Bock O. (2012), Estimating horizontal tropospheric gradients in DORIS data processing, Preliminary results, IAG Symposia Series, 136, 1013-1019, DOI: 10.1007/978-3-642-20338-1_127.

Exemple of DORIS ZTD results



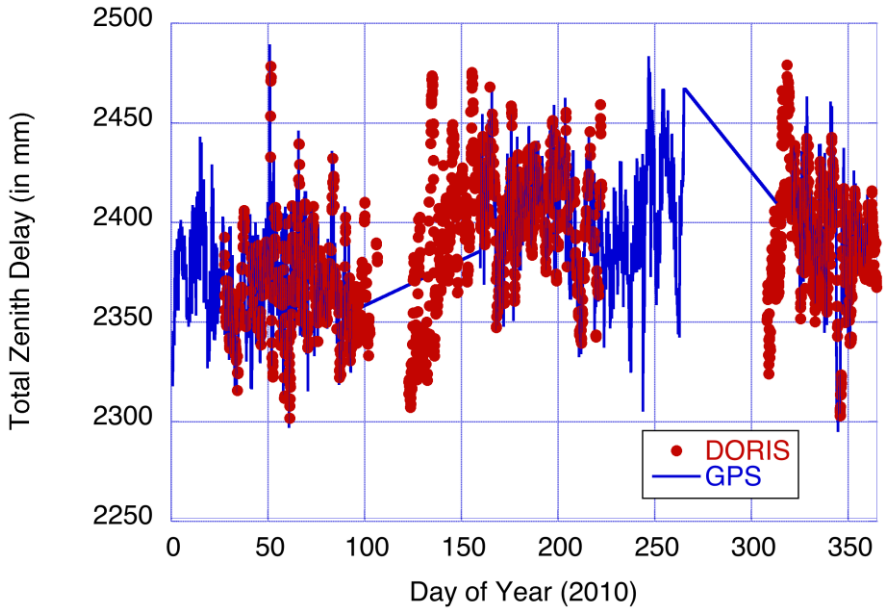
From Teke, 2011

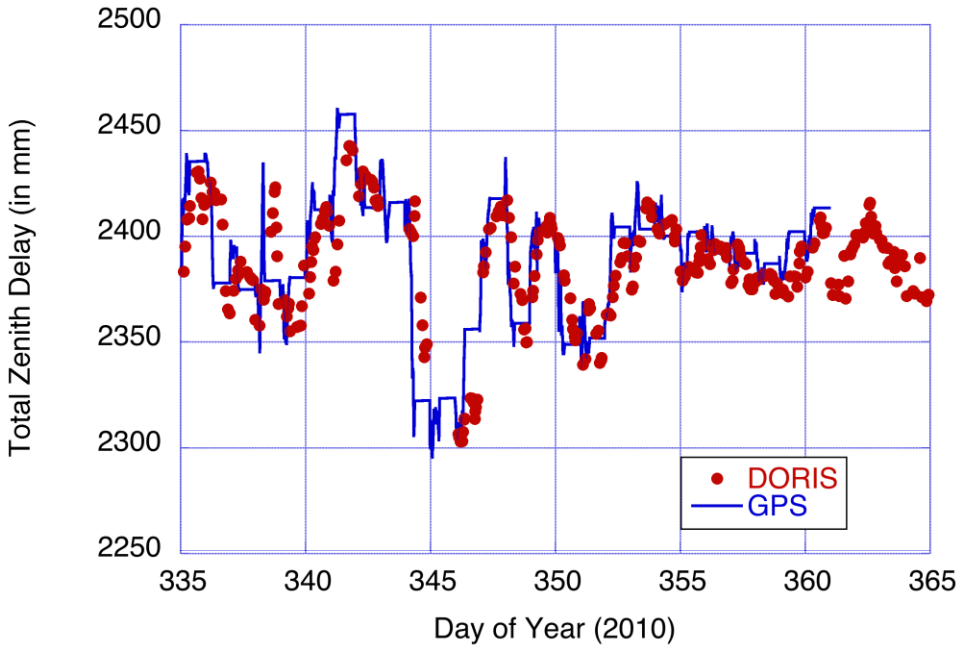
Exemple of DORIS ZTD results vs ECMWF (GAVDOS, Crete)



From Willis et al., 2011

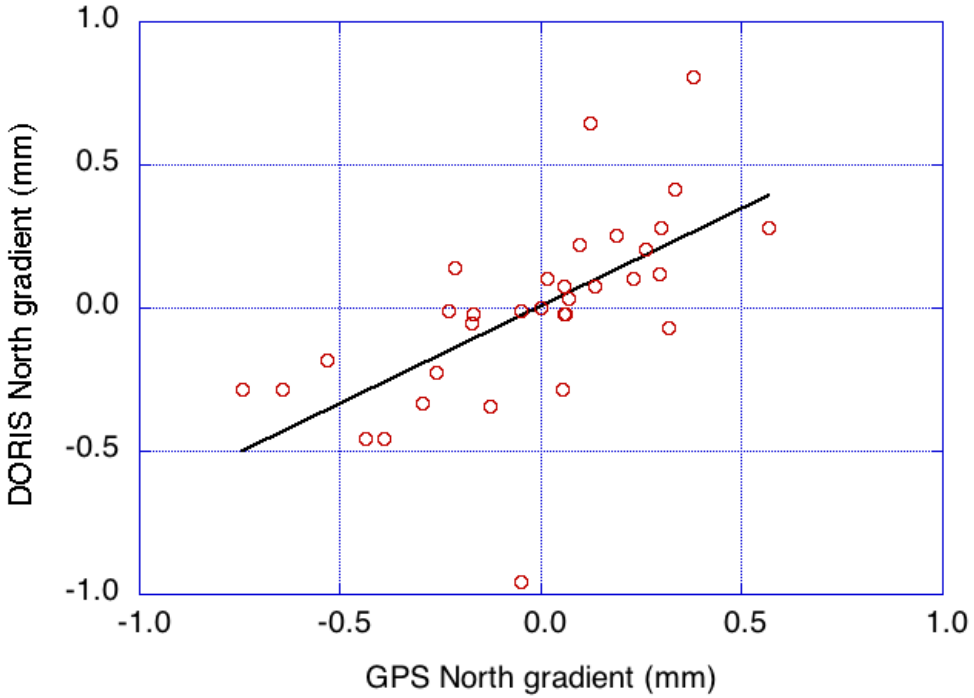
Example of DORIS/ZTD results wrt GPS (GAVDOS, Crete)

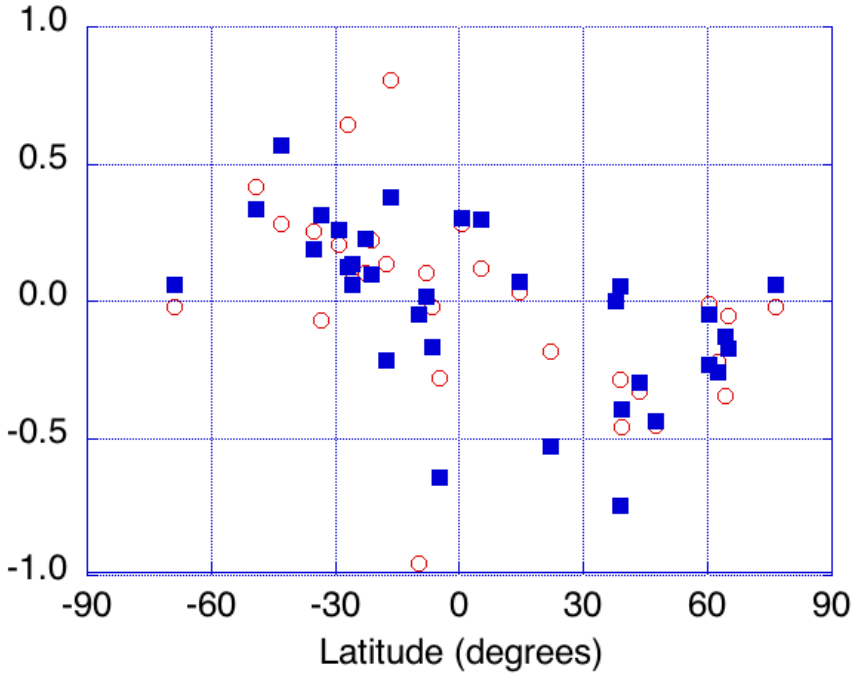




From Willis et al., 2013

DORIS horizontal gradients



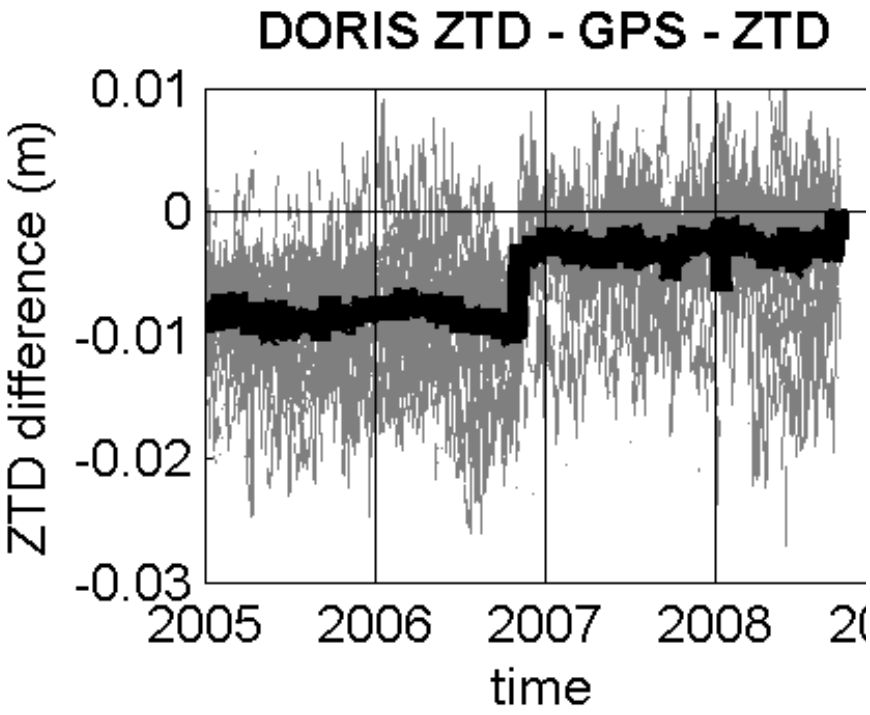


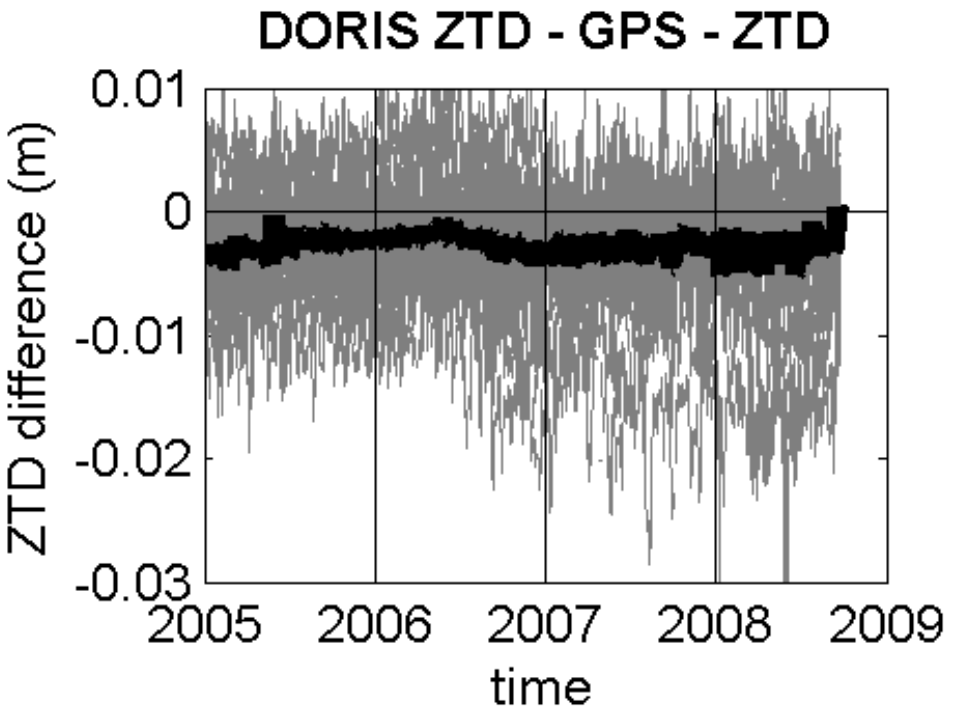
From Willis et al., 2012

Using DORIS to calibrate GPS

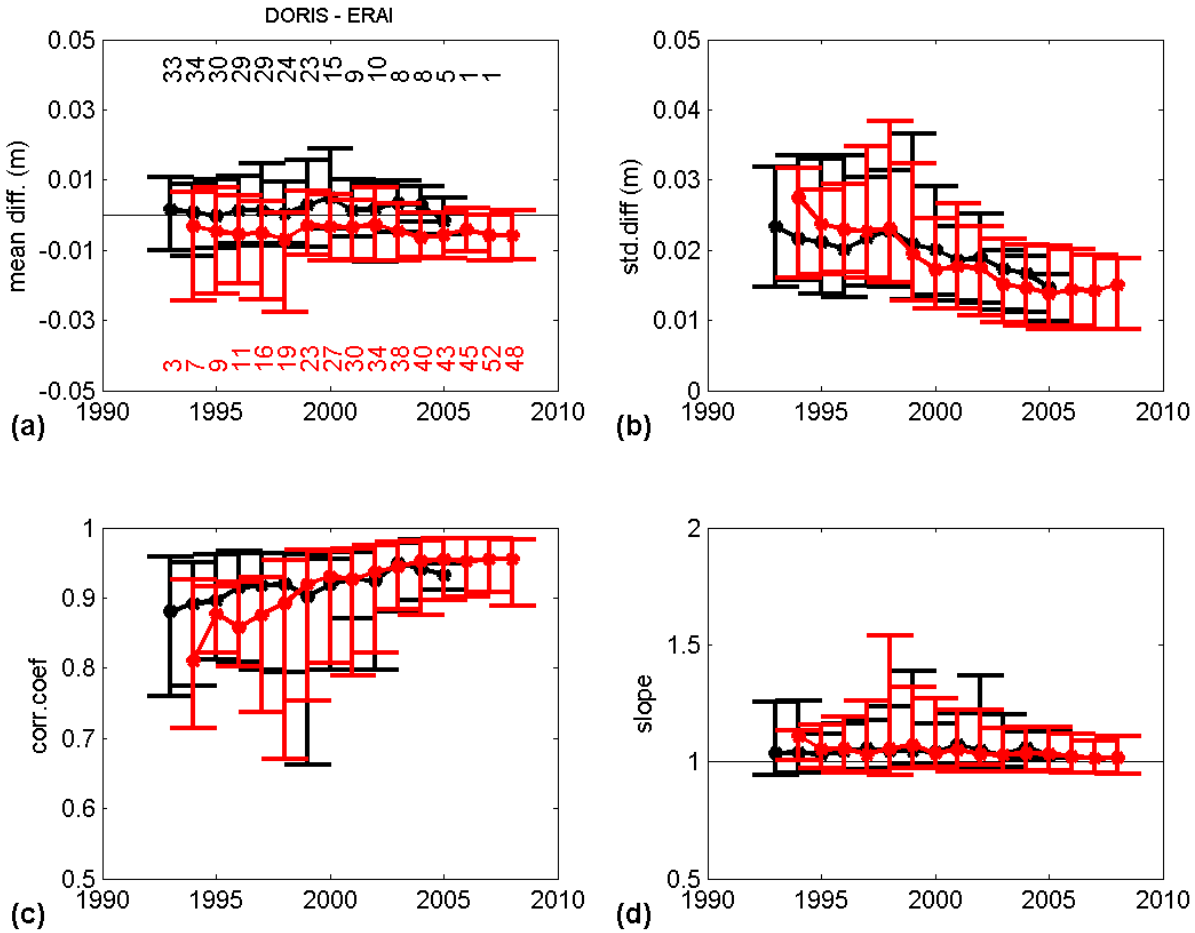
Temporal evolution
of DORIS – GPS bias
(IGS trop-new) 2005 - 2008

Update with IGS/repro1
and trop_new





Using long-term DORIS results

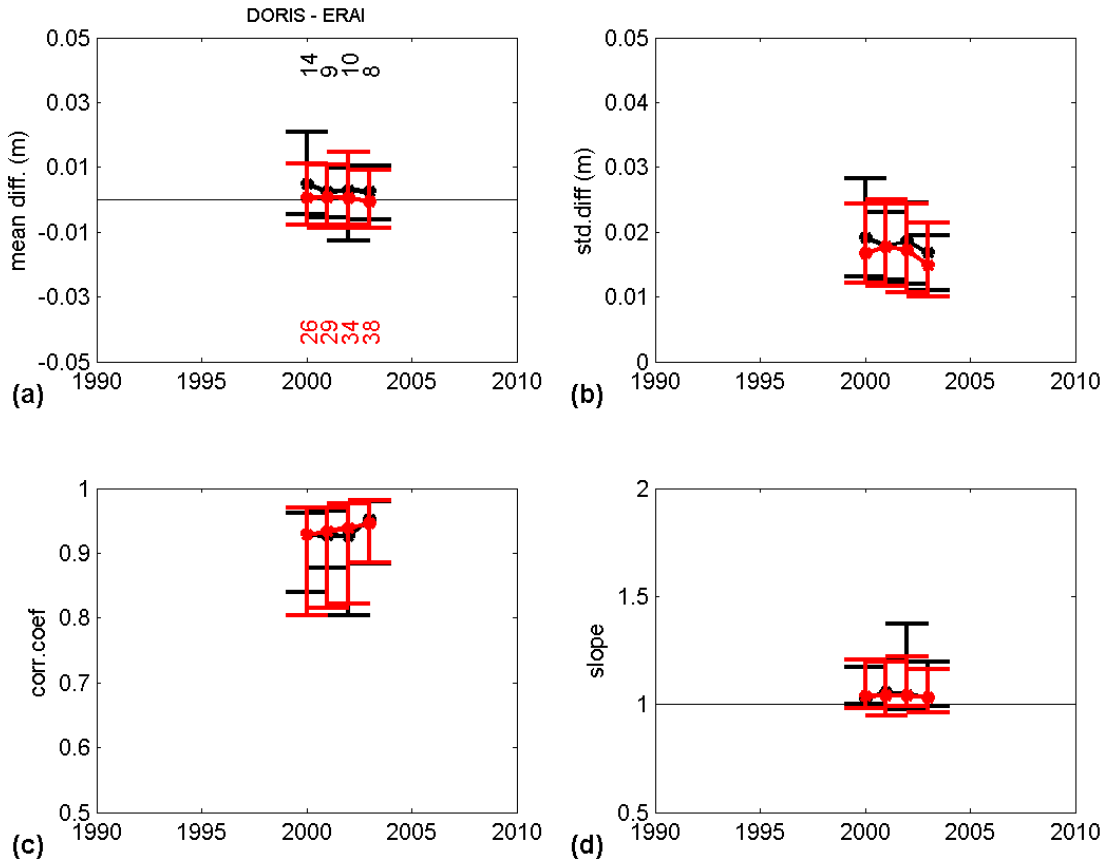


Alcatel = black

Starec = red

From Bock et al., 2014

Using long-term DORIS results (new solution)



Alcatel = black

Starec = red

Comparison ERA-Interim (2000-2004)

solution	Std dev (mm)	Mean (mm)
Alcatel - old	2.90	18.6
Starec - old	-3.9	17.6
Alcatel - new	2.73	18.1
Starec - new	0.5	17.4

CONCLUSIONS

- Long-term DORIS tropospheric results (1993-2008) available as electronic supplement of Bock et al., 2014.
- New reprocessing ongoing using latest options (phase law)
- First results show better results and also better consistency between Alcatel and Starec results (200-2004)