Troposheric estimation using DORIS data

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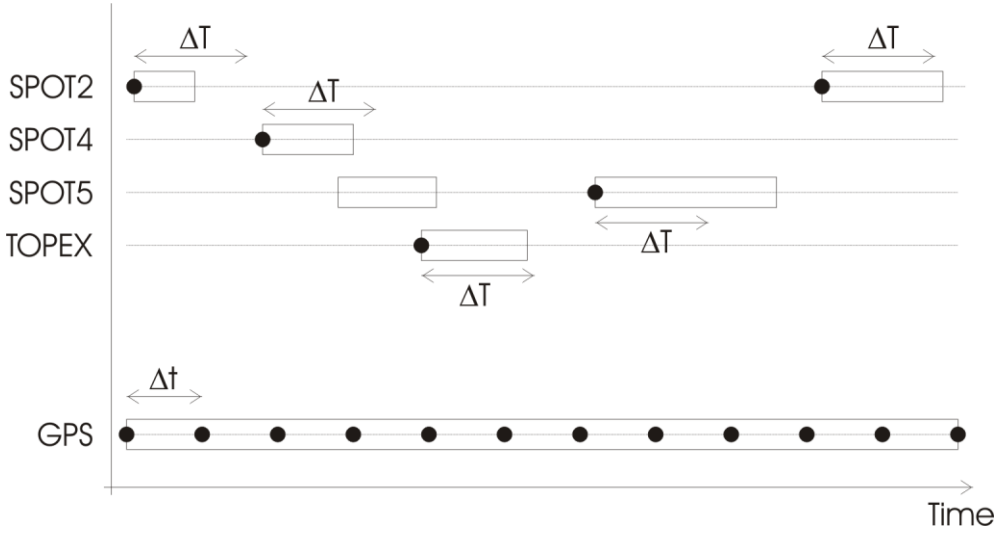
SUMMARY

- DORIS tropospheric estimation, where are we?
  - Current IGN strategy (ignwd08 for ITRF2008)
  - DORIS/GPS long term comparisons
  - DORIS/GPS/VLBI campaign (CONT08) comparisons
  - Estimating horizontal tropospheric gradients (comparisons + impact on station position)
- Post-ITRF2008 strategies

Current IGN analysis strategy

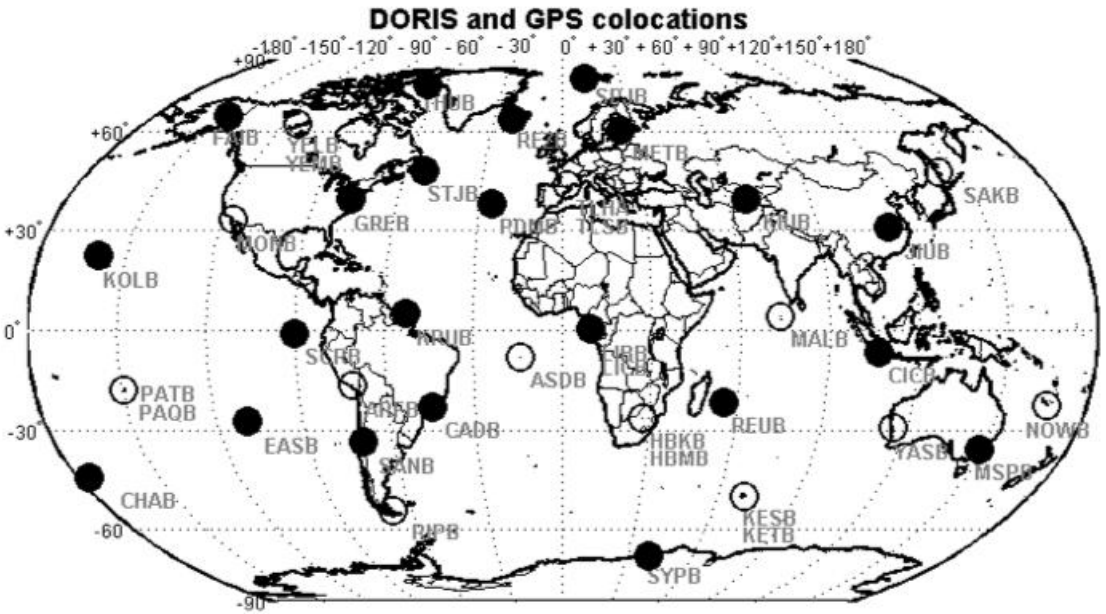
- A priori: function of height
- Mapping function: GMF --> VMF-1
- Parameter estimation:
  - Reset at start of pass
  - Only if time since last reset is larger than (20 minutes) --> not by pass but per station/time



DORIS/GPS long-term comparisons

(from Bock et al., Adv. Space Res., submitted)

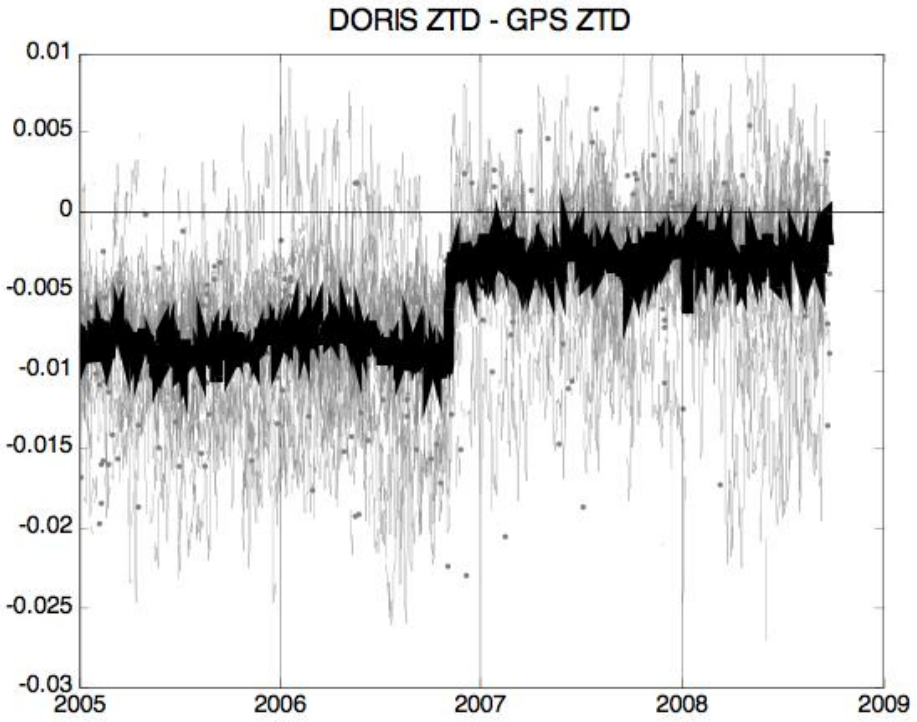
2005-2008 DORIS/IGN vs GPS/IGS



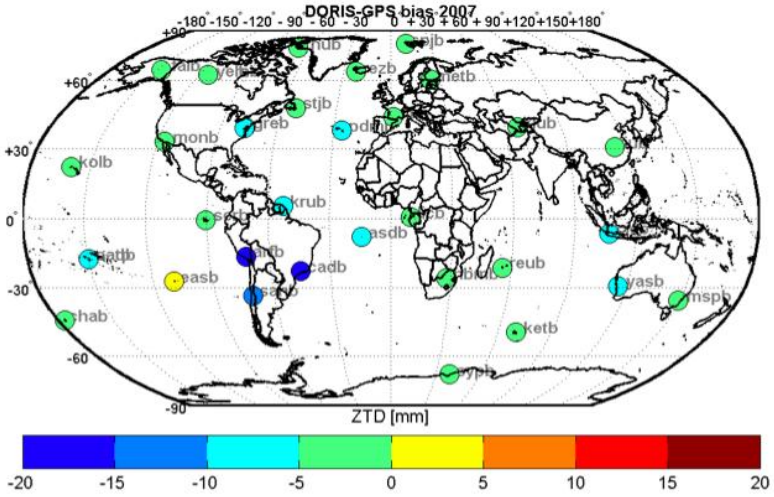
GPS/DORIS tropo

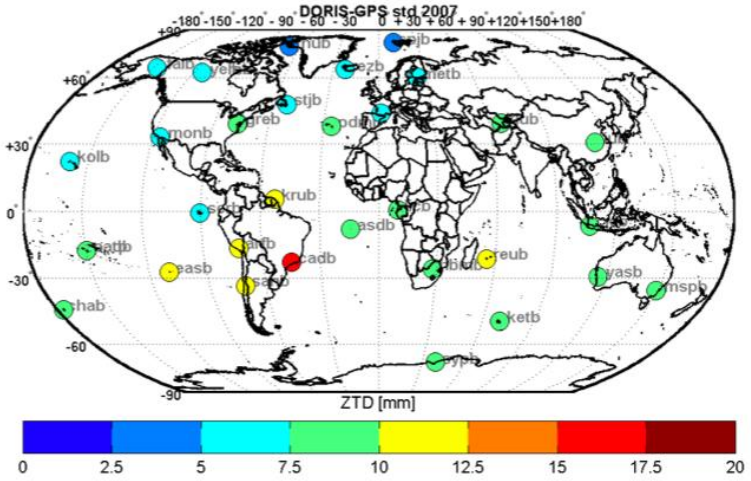
GPS discontininuity

5 novembre 2006 = 5 mm



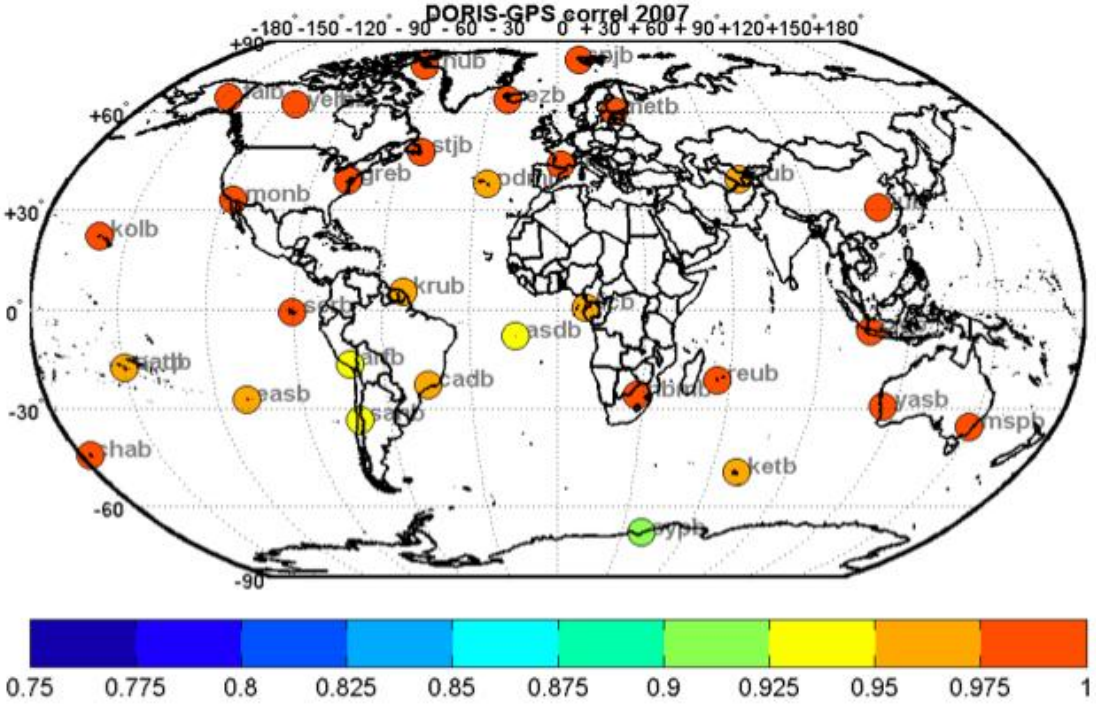
Global comparisons
(bias / standard deviations)





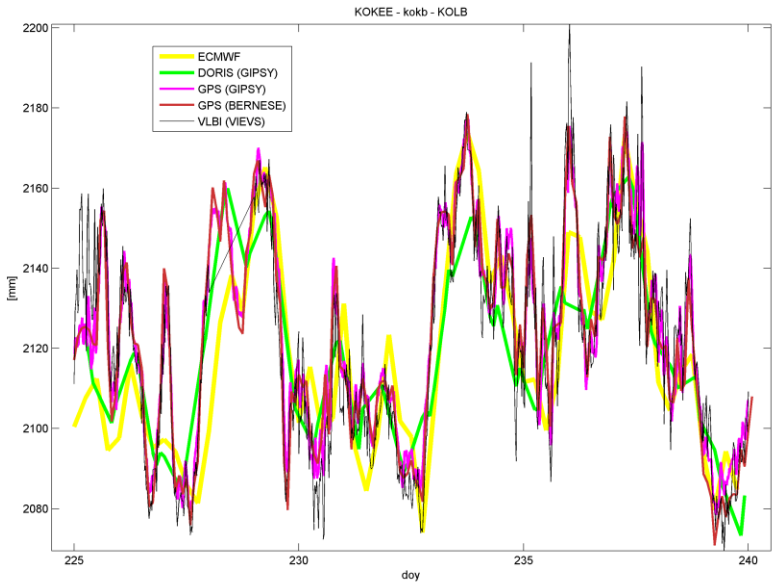
Possible problem related to SAA
(see also SPOT5 : Stepanek et al., 2010)

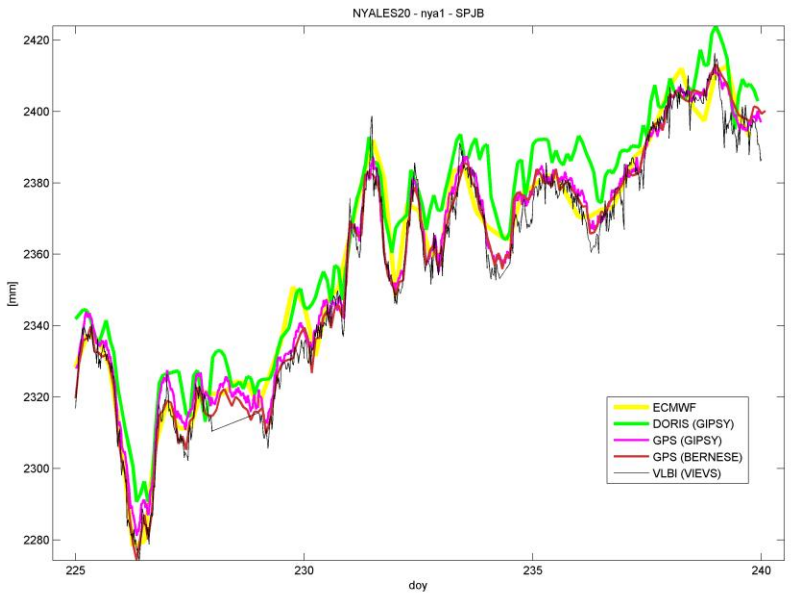
ZTD correlation
DORIS / GPS



CONT08 ZTD comparisons

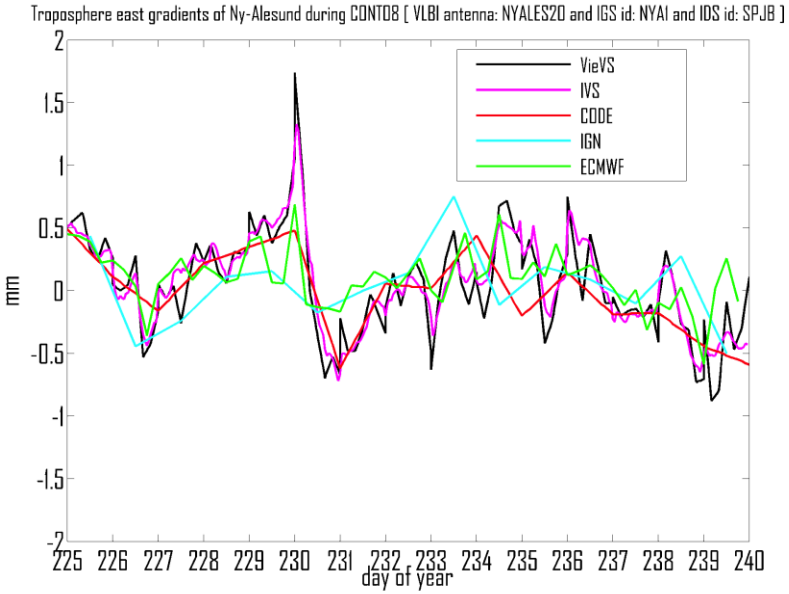
(Teke et al., J. Geod., in prep.)



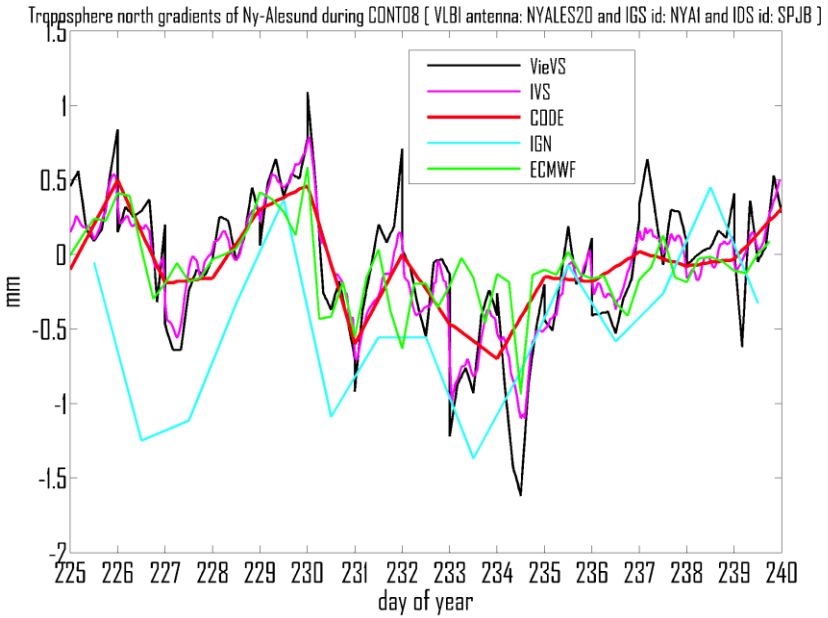


NB: much better than CONT02 (Snajdrova et al., J. Geod., 2006)

CONT08 - horizontal gradients



East

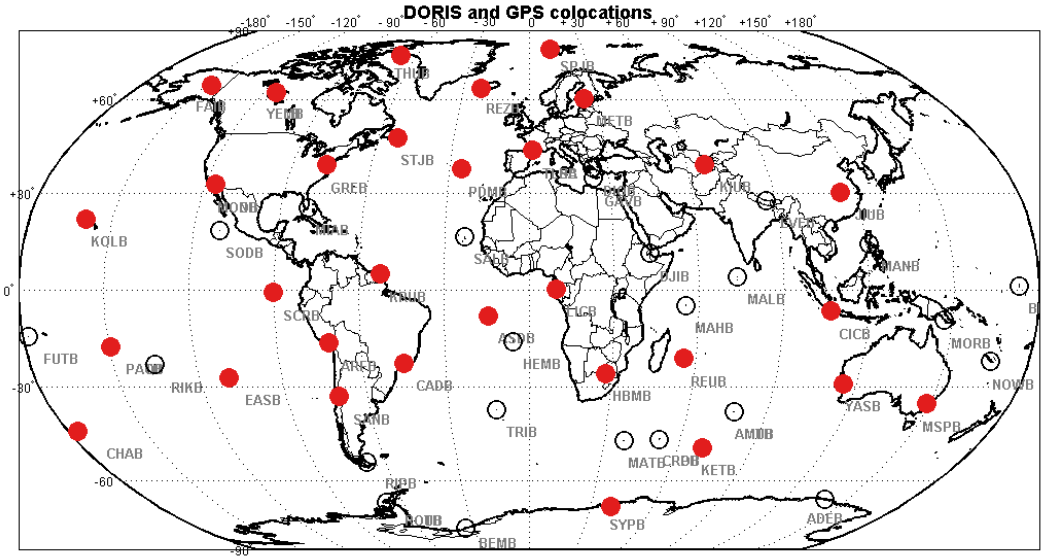


North

See also Boehm et al., EGU 2010

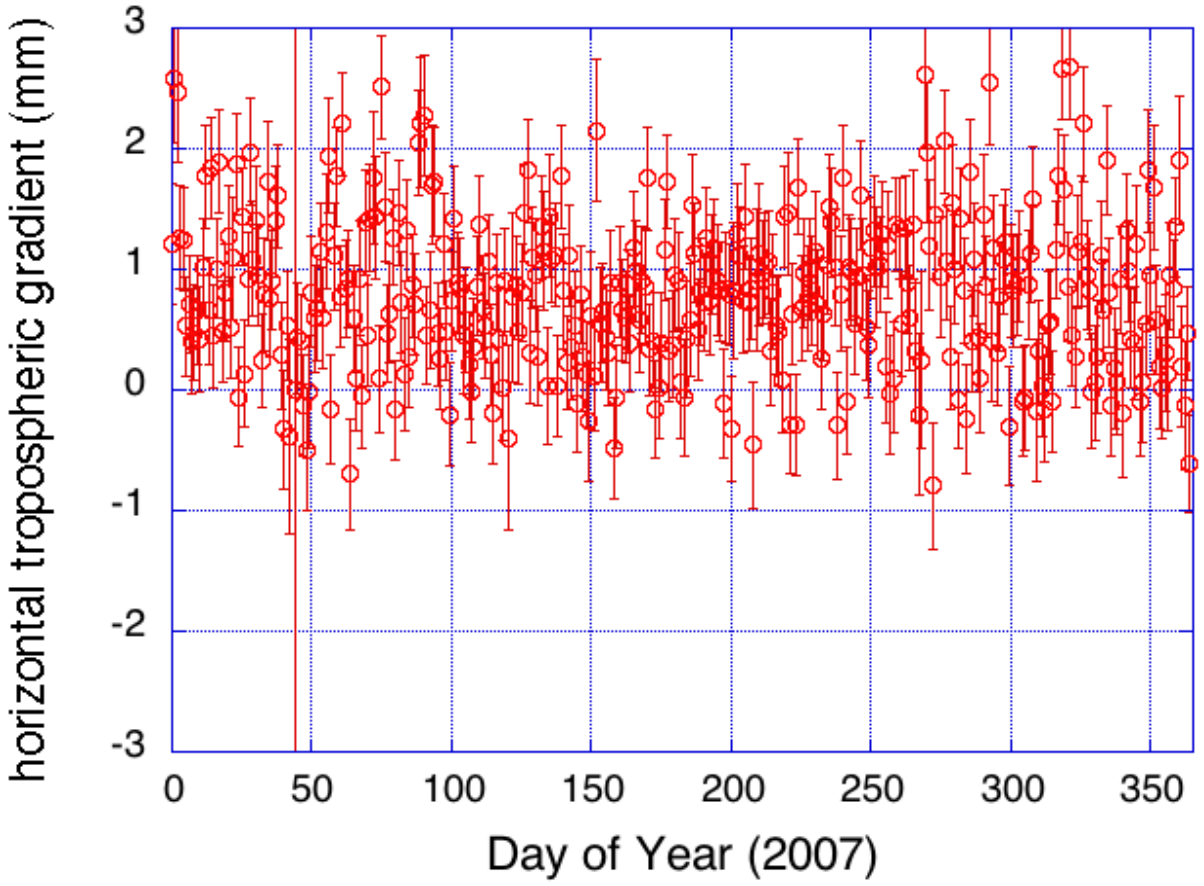
Horizontal tropospheric gradients
(Willis et al., IAG Symp., in press)

- 2007 data : DORIS vs GPS/JPL/PPP

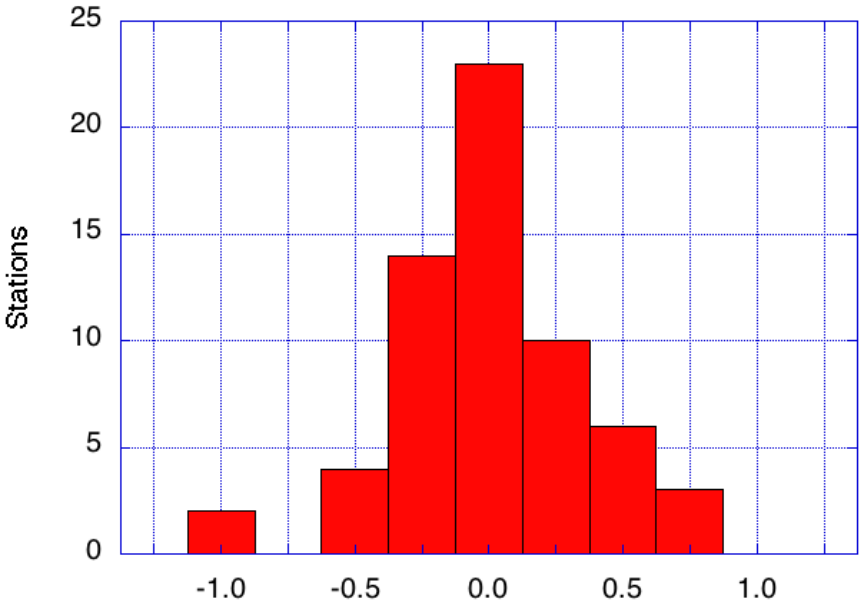


Goals:
-comparisons GPS/DORIS
-Impact on geodetic results

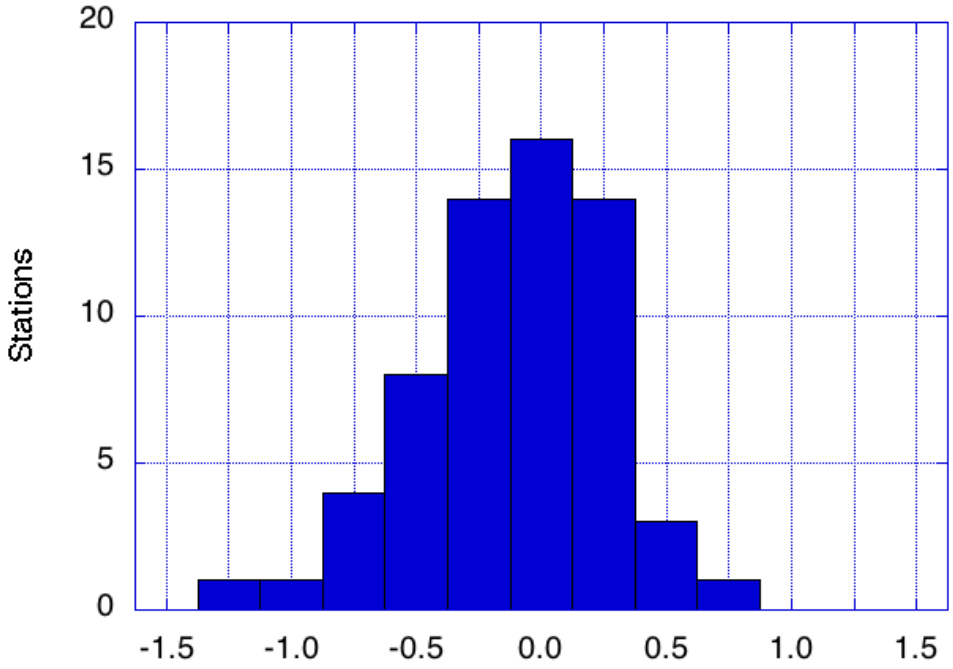
DORIS single station (Arequipa, daily results)



All stations

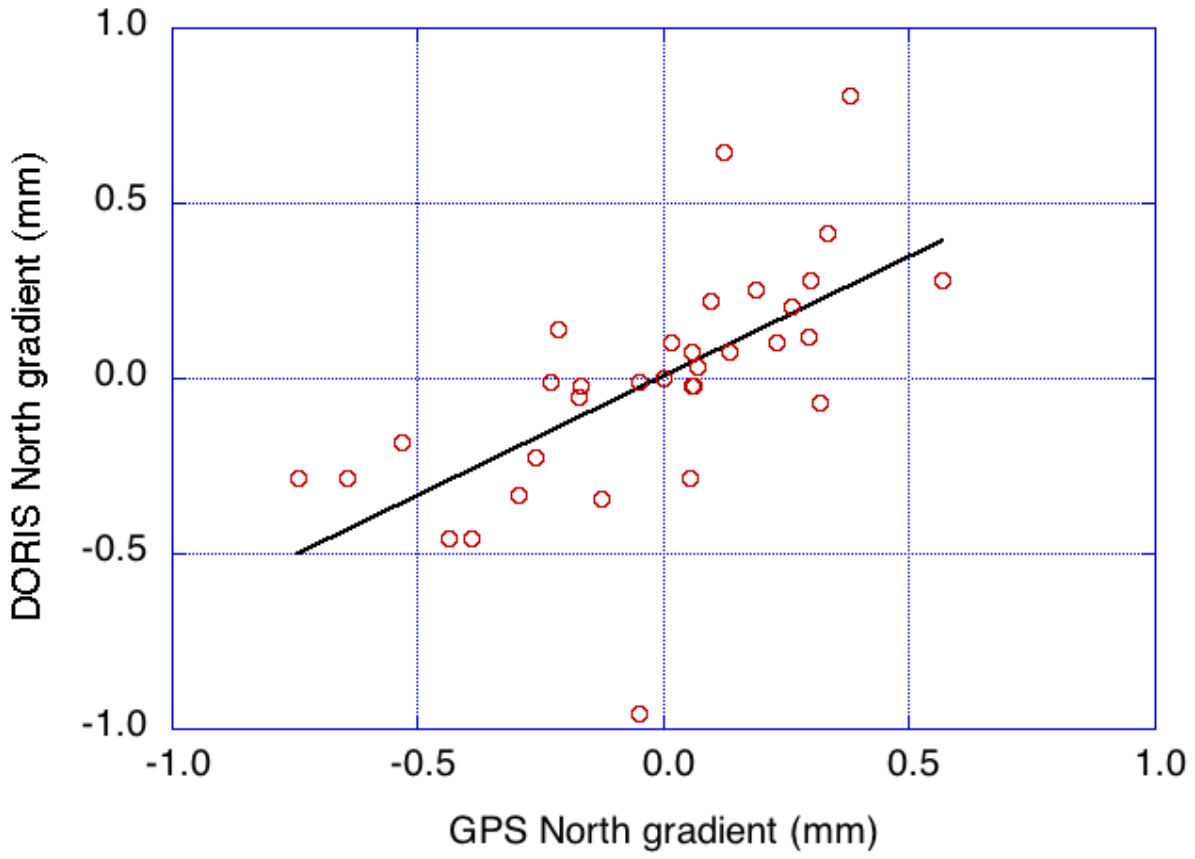


North
(best)



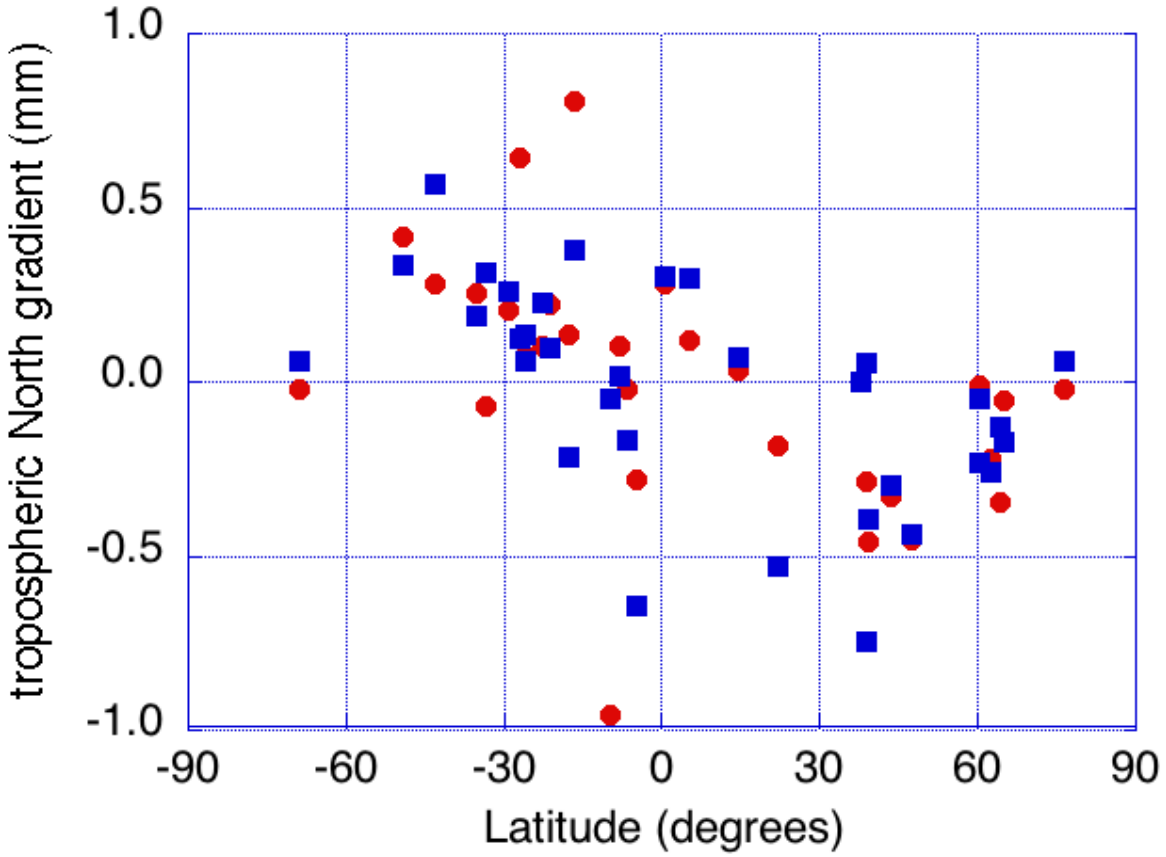
East

DORIS / GPS correlation



Mean value over 2007 (North)

North gradient / latitude



(slope predicted by McMillan et al., 1994)

Impact on station coordinates

Solution	Chi2/ DOF	North (mm)	East (mm)	Up (mm)
ignwd08	3.11	9.1	11.1	9.2
this study	2.39	8.8	11.5	9.0

TBD: reprocess all data and check repeatability

Post-ITRF2008 strategies (IGN)

- A priori: use GPT (TBC)
- Mapping function: VMF-1 (TBC)
- Elevation cutoff: 5 degree (TBC)
- Horizontal gradients (1 per day) (TBC)

NB: use of gradients needs to be coordinated between ACs