

# Tropospheric estimation using DORIS data

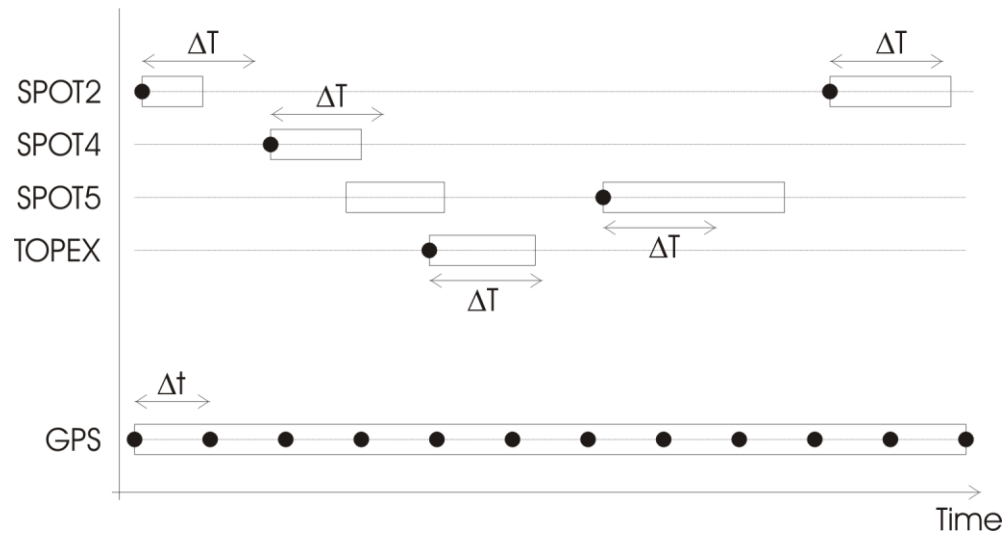
Pascal Willis

# 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

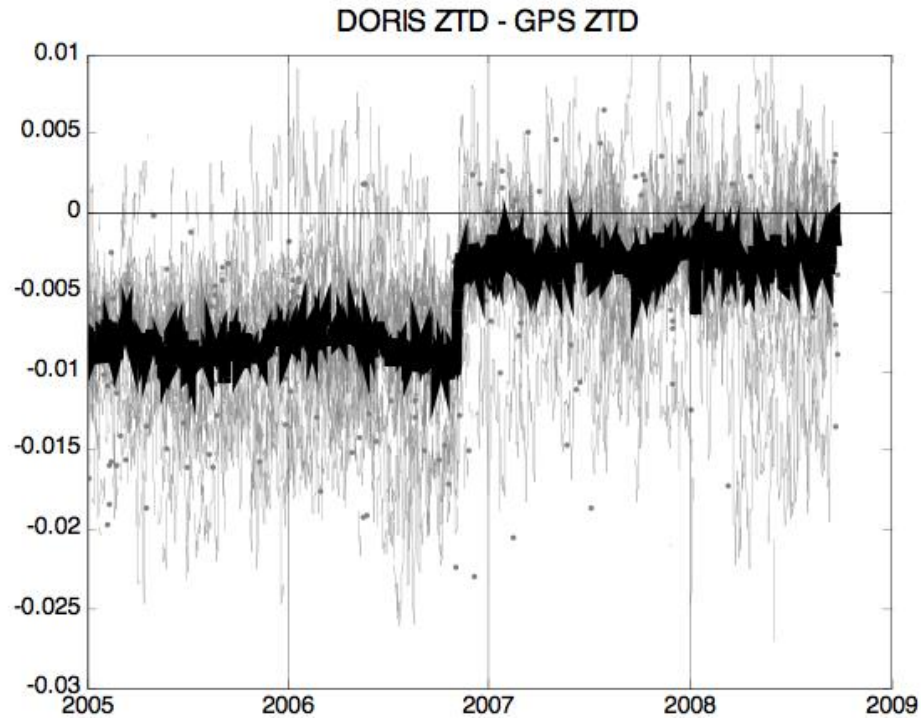




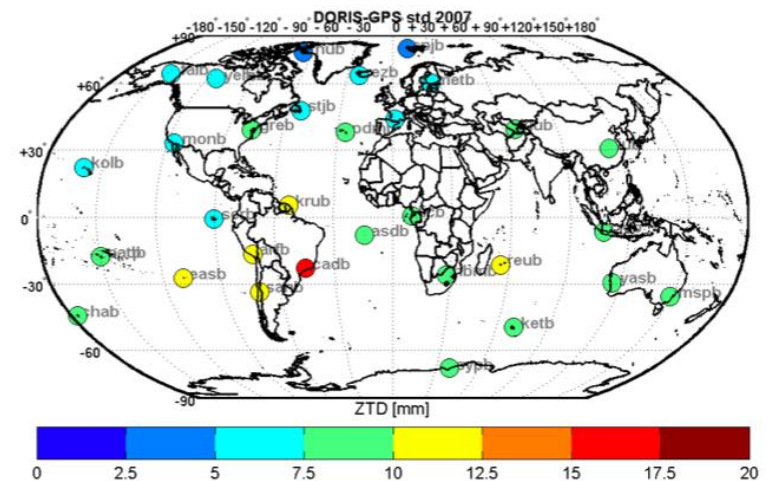
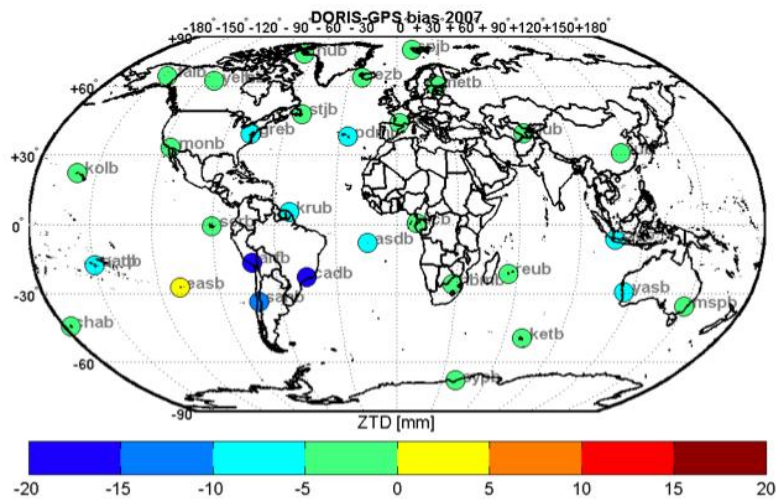
# GPS/DORIS tropo

## GPS discontinuity

5 novembre 2006 = 5 mm



# Global comparisons (bias / standard deviations)

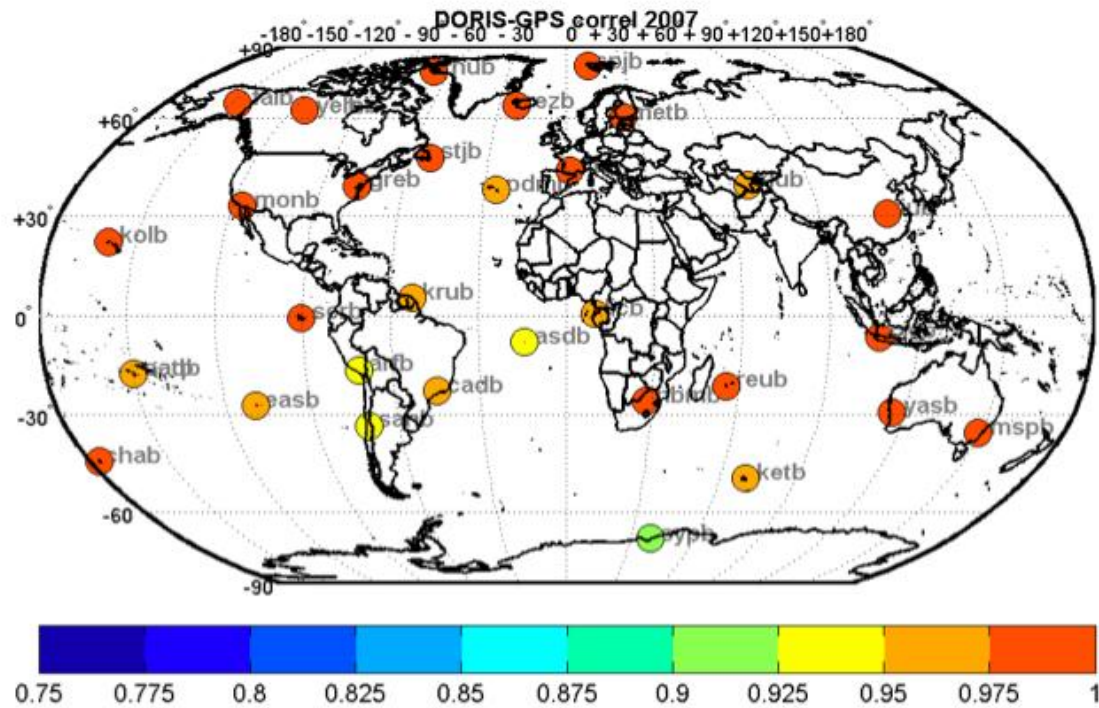


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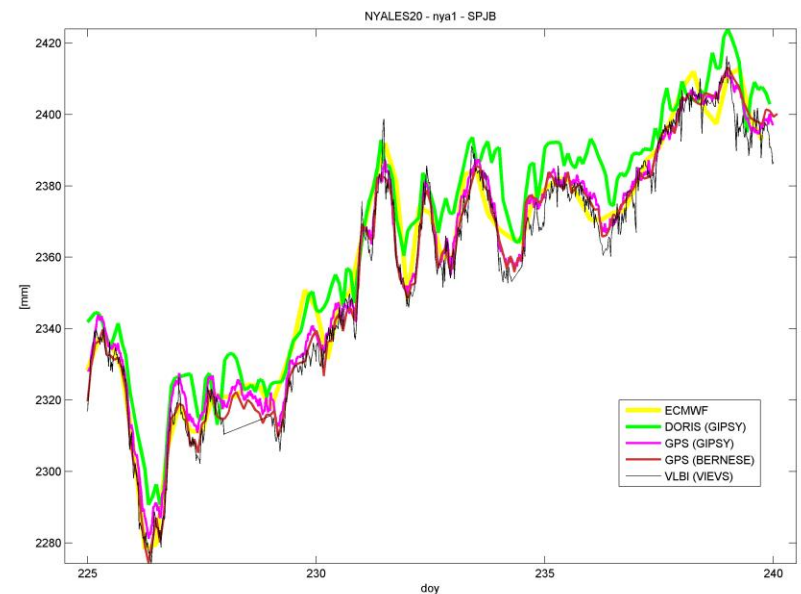
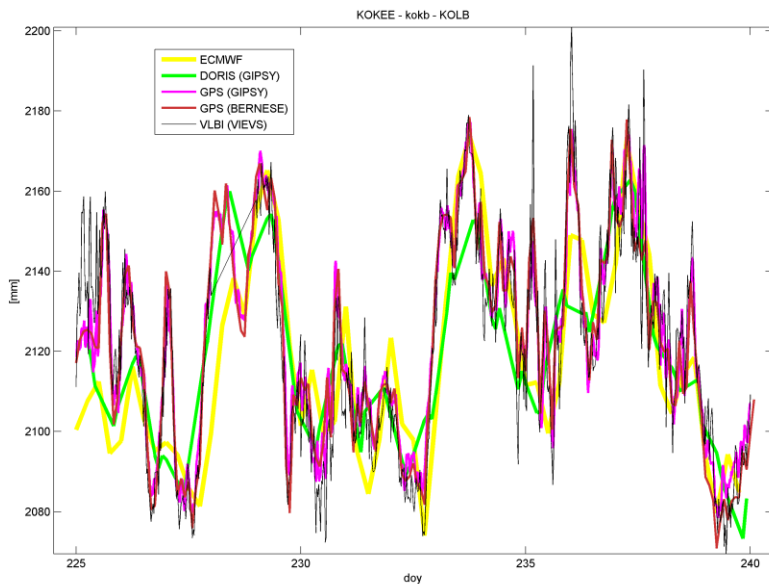
Possible problem related to SAA  
(see also SPOT5 : Stepanek et al., 2010)

# ZTD correlation DORIS / GPS



# CONT08 ZTD comparisons

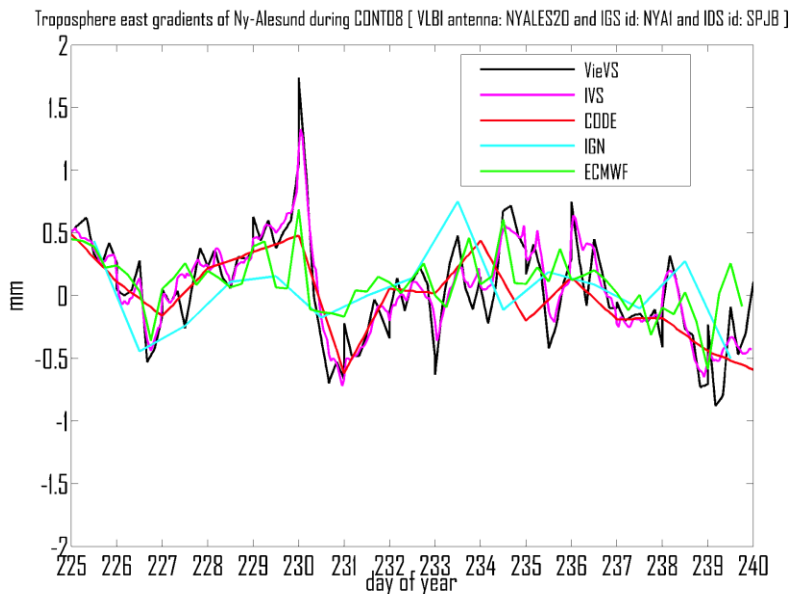
(Teke et al., J. Geod., in prep.)



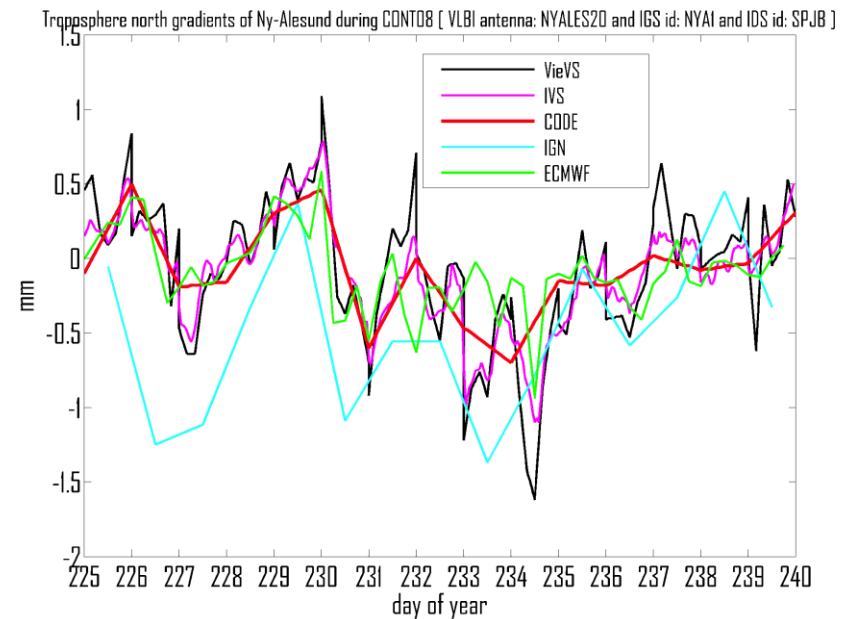
NB: much better than CONT02 (Snajdrova et al., J. Geod., 2006)



# CONT08 - horizontal gradients



East

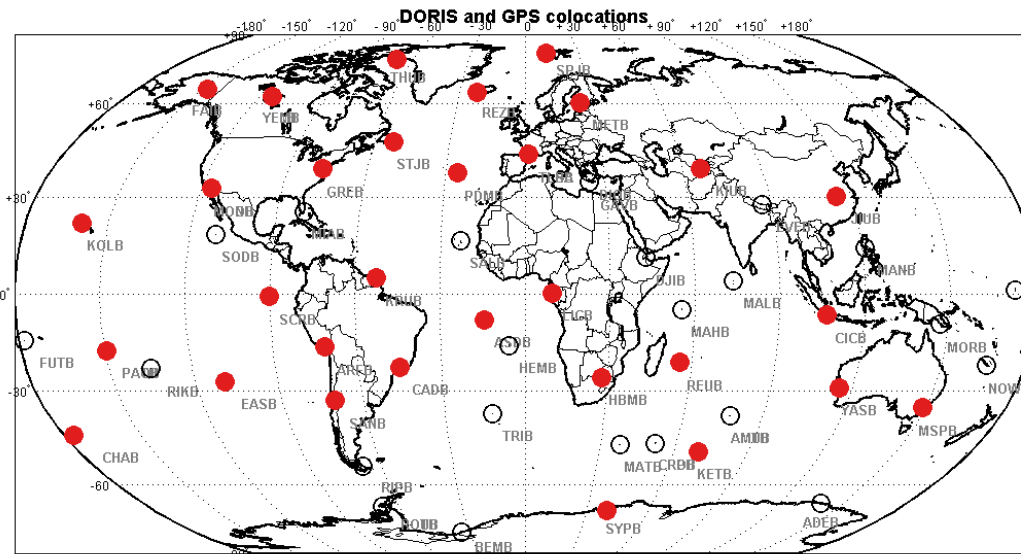


North

See also Boehm et al., EGU 2010

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

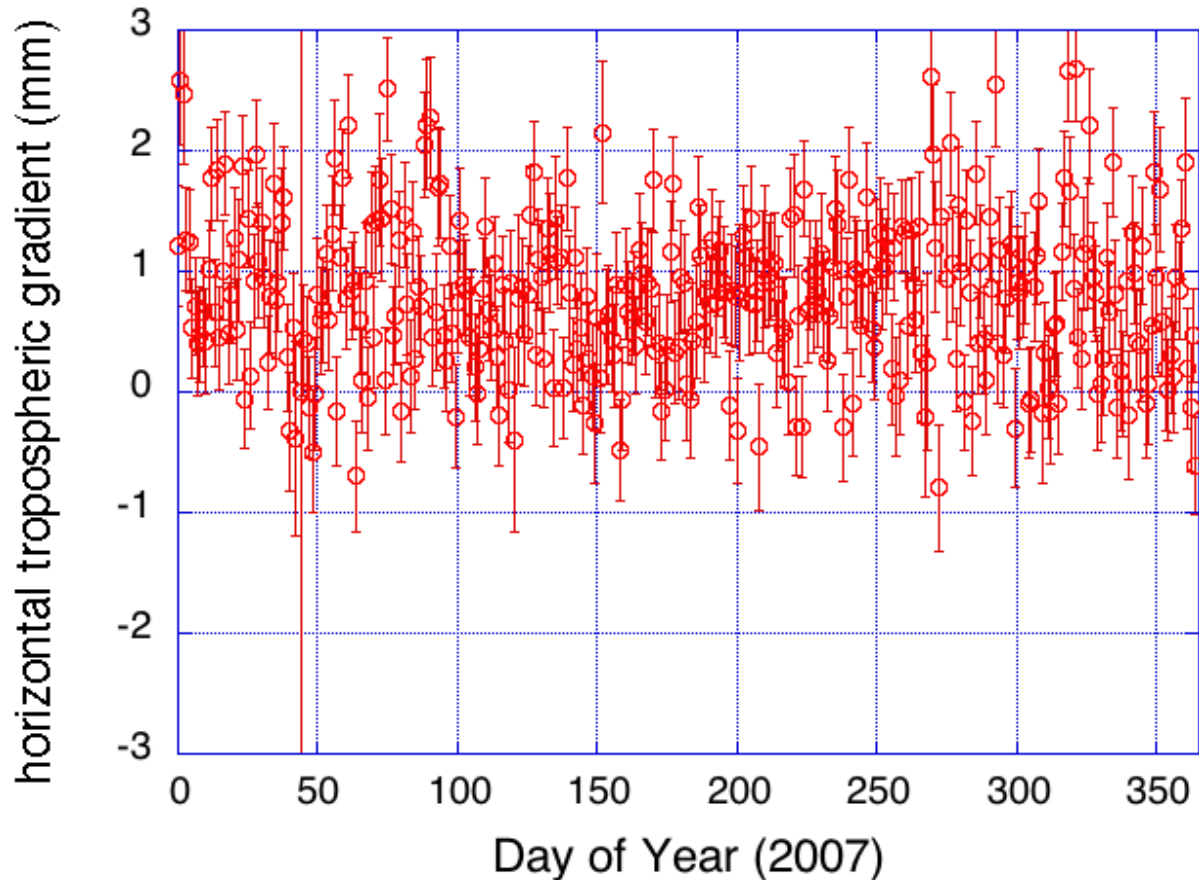
- 2007 data : DORIS vs GPS/JPL/PPP



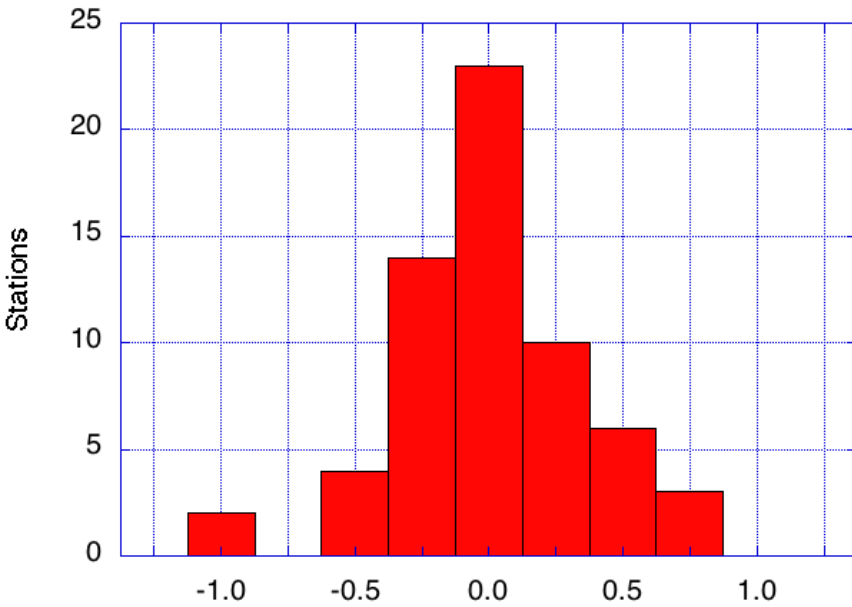
Goals:

- comparisons GPS/DORIS
- Impact on geodetic results

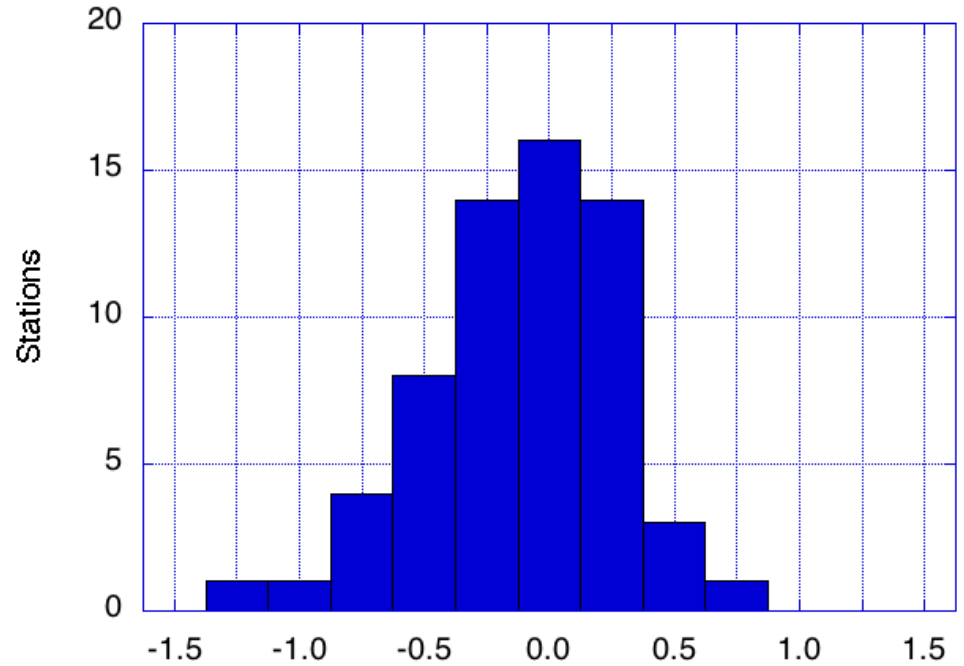
# DORIS single station (Arequipa, daily results)



# All stations

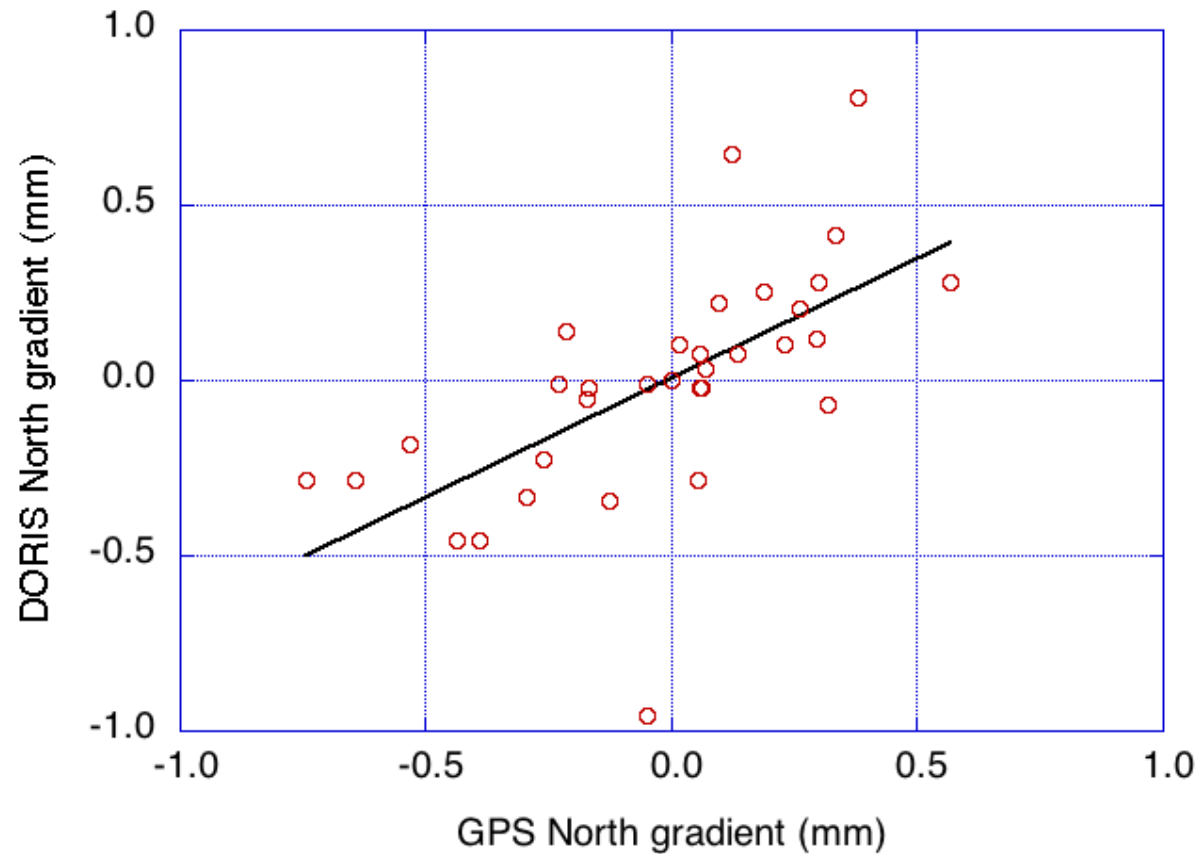


North  
(best)



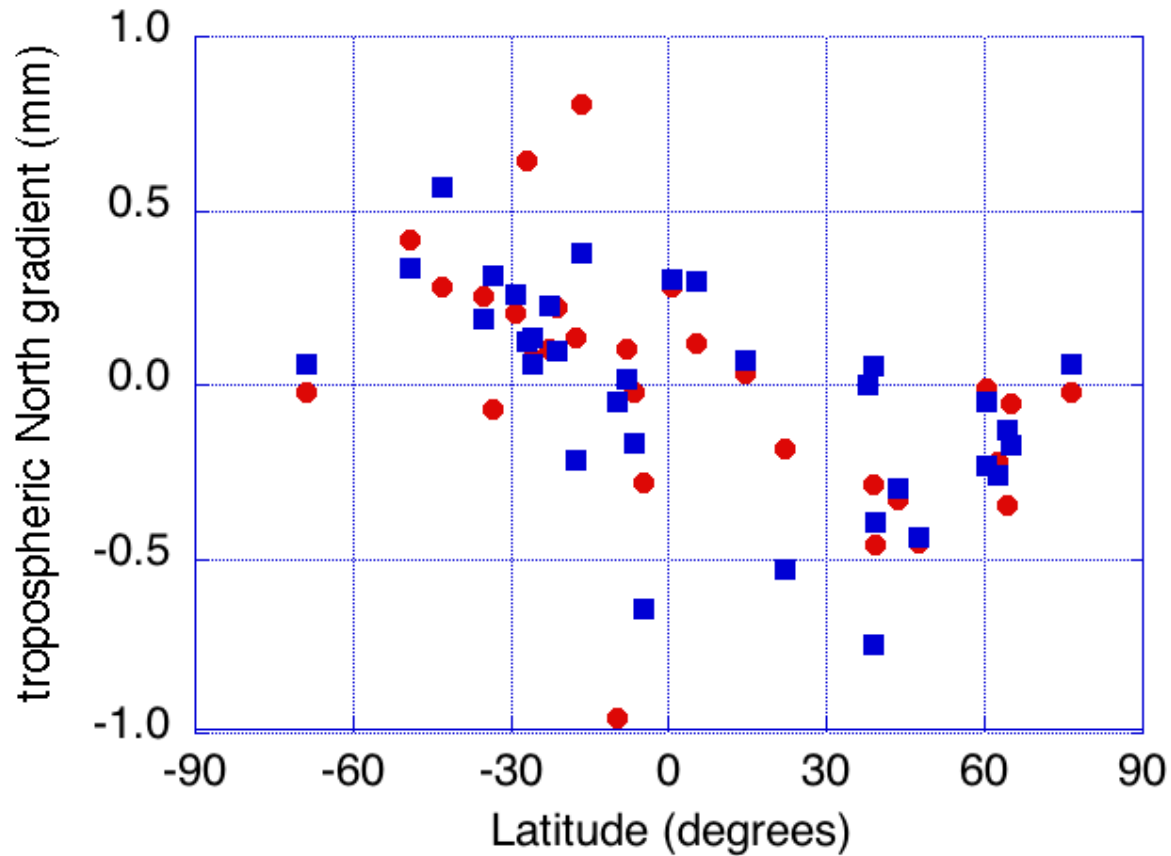
East

# 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