Small scales variability of the Wet Tropospheric Correction

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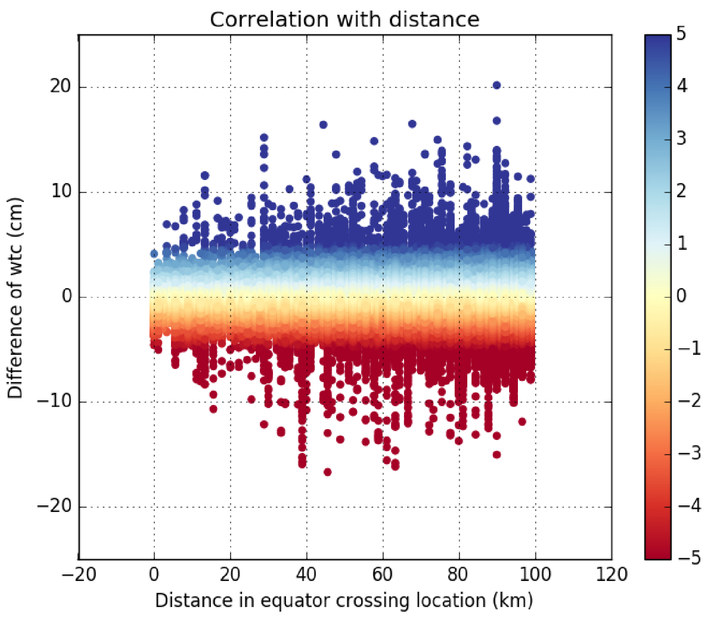
(1) CLS
(2) Fluctus SAS
(3) CNES

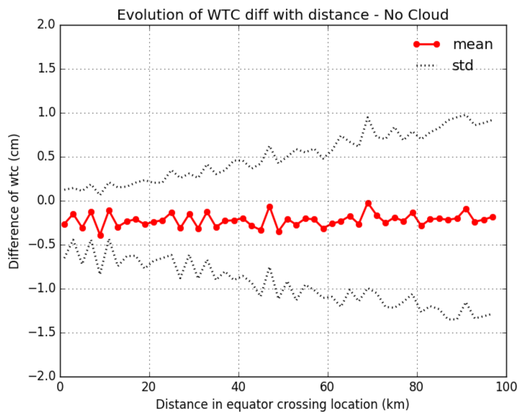
From conventional altimetry data …

How?

- Use colinear passes of conventional altimetry constellation (J1G/J2)
- Detect matchups with time lag <= 3h and distance <= 100km
- Compute ΔWTC

Results





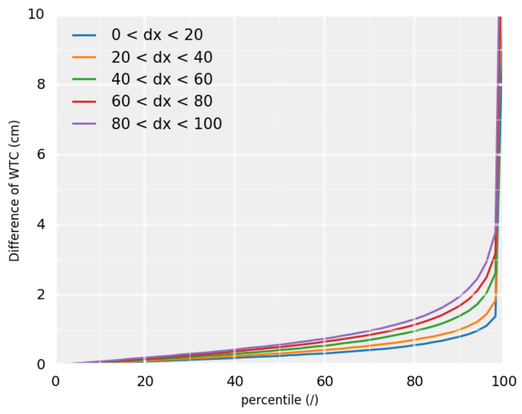
- Measurement error of 2mm
- Variability of $\sigma_{\Delta WTC}$~1cm @ 100km
- Higher variability for large distances in East Pacific

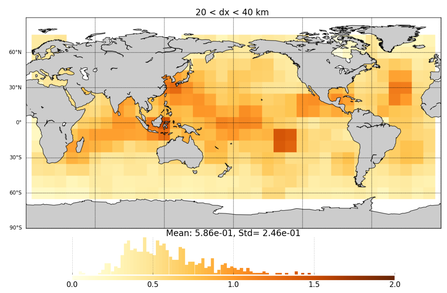
40km separation :

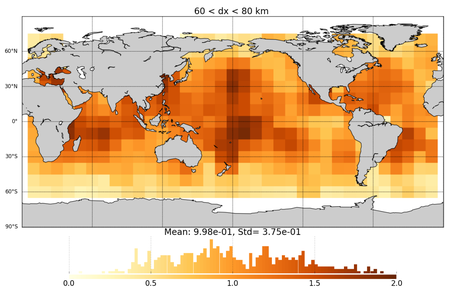
- 98% : ΔWTC<1.8cm
- 50% : ΔWTC<0.3cm

80km separation :

- 98% ΔWTC<3.18cm
- 50% ΔWTC<0.5cm



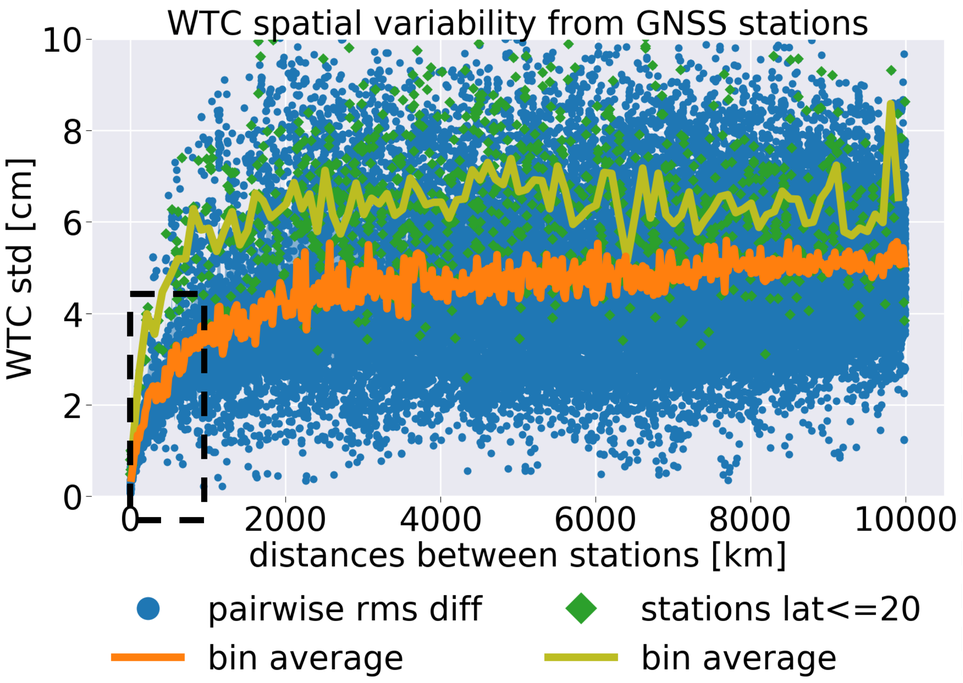


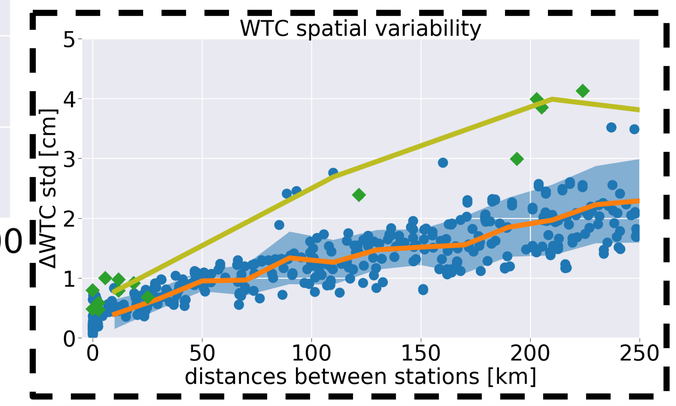


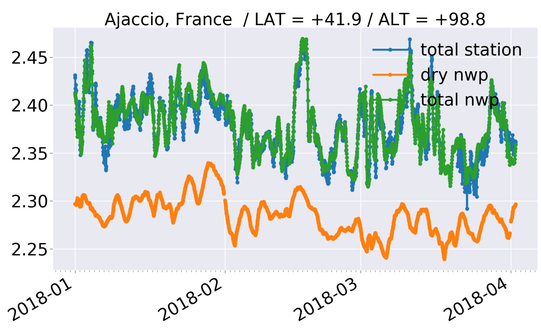
… from the pairwise comparison of GNSS stations

How ?

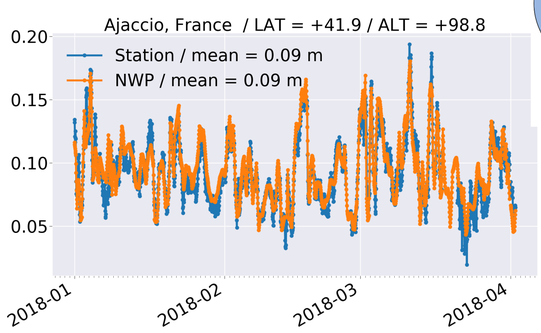
- select pairs of GNSS from the IGS global network
- compute WTC = station total delay – ERA5 hydrostat
- compute std(ΔWTC) for each pairs of stations (~400 stations ~90 000 pairs)



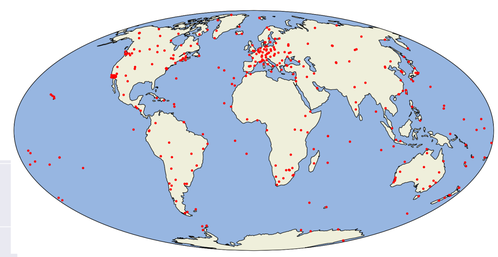




Ajaccio station



IGS network



First lessons learned

- Decorrelation at ~ 3000 km (std = 5 cm)
- Major part of the variability within 500 km
- Measurement error of ~2.5 mm (@0 km)
- Larger variability over tropics
- Variability @ 40 km: ~0.8 cm / @ 80 km: 1.2 cm

Next steps

- Include other networks (euref, suominet…)
- Zonal, Seasonal, Diurnal variability
- Feedbacks on WTC signal and errors spectrum for swath altimetry missions