

An assessment of the tropospheric parameters estimated from the CONT17 campaign

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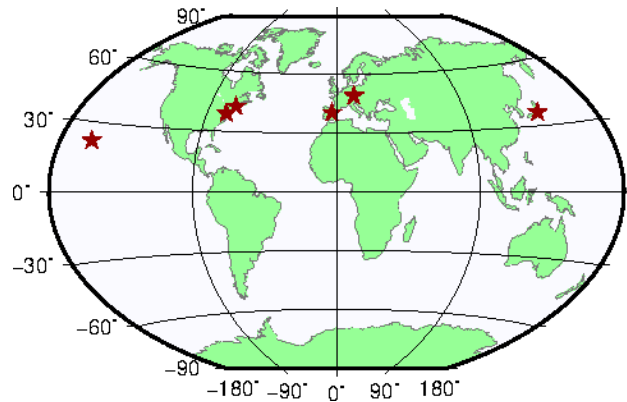
24th Meeting of the European VLBI Group for Geodesy and Astrometry
Las Palmas, Gran Canaria, Spain, 17-19 March, 2019

Introduction

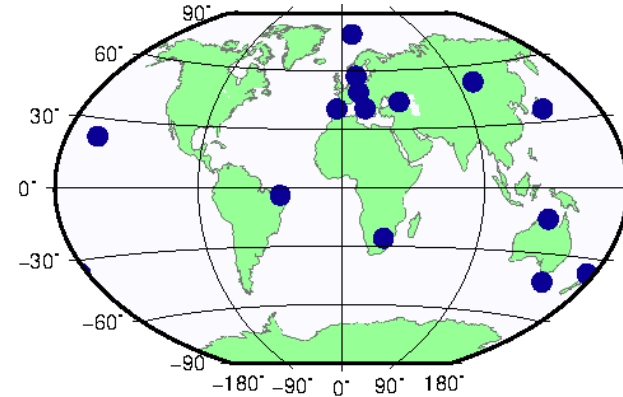
- The CONT17 campaign was observed between November 28 until December 12, 2017
- Two legacy network observed in parallel
- Additionally, a VGOS network observed for five days, 3-8 December, 2017
- It is interesting to compare the results from the different networks
 - especially the VGOS network with the legacy ones
- In this work we investigate the tropospheric parameters, i.e. the zenith total delays (ZTD) and gradients, estimated from the different networks
- External evaluation:
 - GNSS results
 - ECMWF data (ERA 5, ERA Interim, and ECMWF operational analysis)

The CONT17 campaign

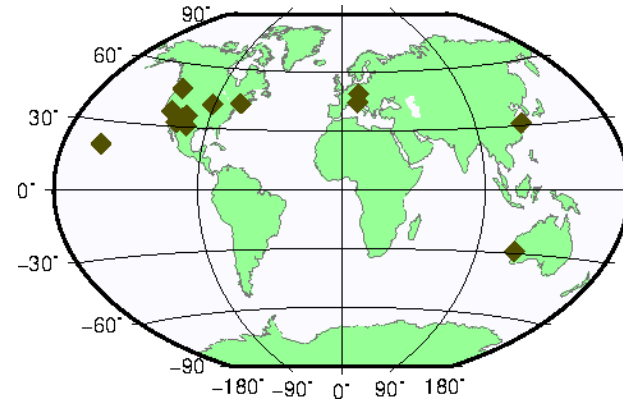
VGOS network, 6 stations
(RAEGYEB only one day)



Legacy 1, 14 stations



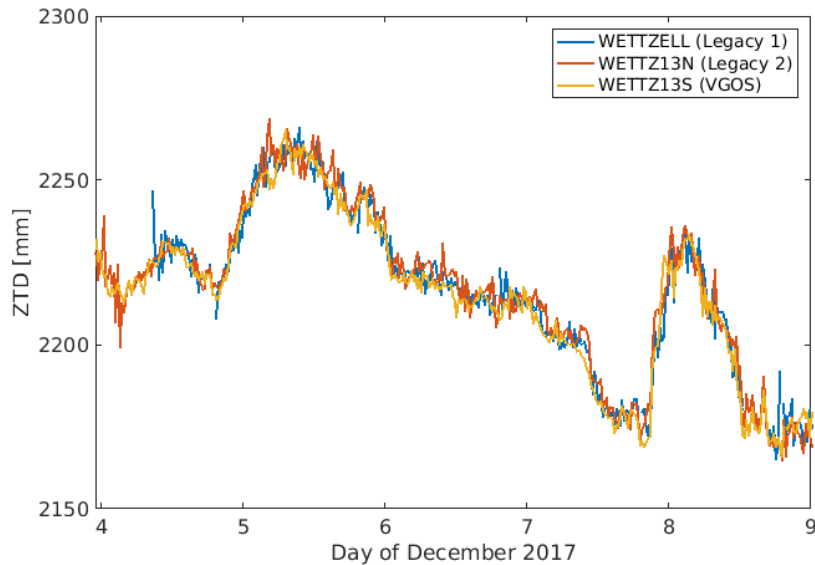
Legacy 2, 13 stations



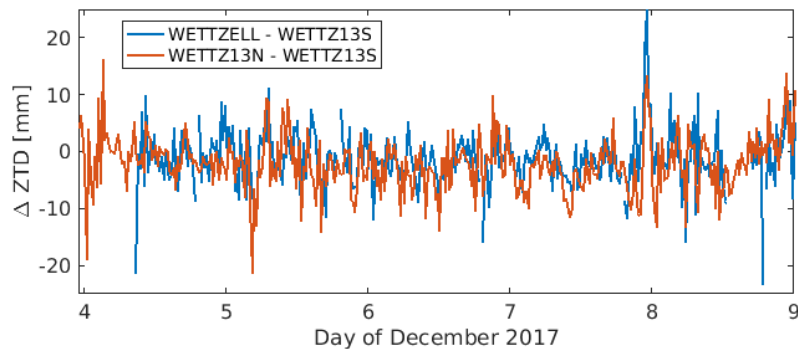
Data analysis

- VLBI data analysis
 - VieVS@GFZ software
 - Estimated parameters:
 - Clocks (30 min)
 - ZTD (20 min)
 - Gradients (2 h)
 - EOP (daily resolution)
 - Station coordinates (on set for whole CONT17 campaign)
 - Radio source coordinates (on set for whole CONT17 campaign)
- GNSS data analysis
 - Bernese software v 5.2
 - GPS and GLONASS (if available), some stations also Galileo
 - PPP mode
 - Estimated parameters:
 - ZTD (20 min)
 - Gradients (2 h)
 - Station coordinates (on set for whole CONT17 campaign)
- ECMWF data
 - Ray-tracing through the numerical weather models (ERA 5, ERA Interim, and ECMWF Operational analysis) in a number of pre-defined directions
 - Fit the gradients to the ray-traced delays

The Wettzell station: ZTD from VLBI

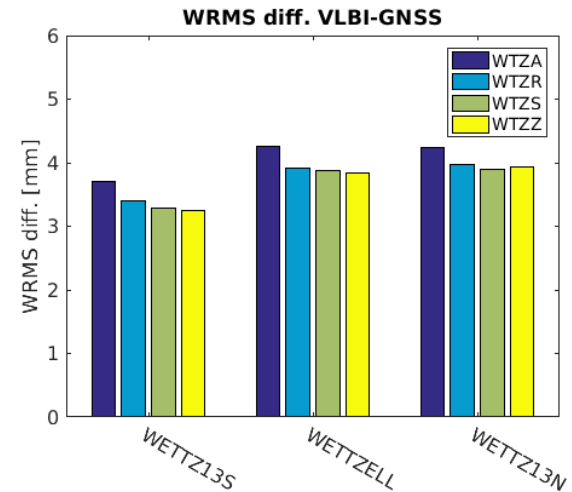
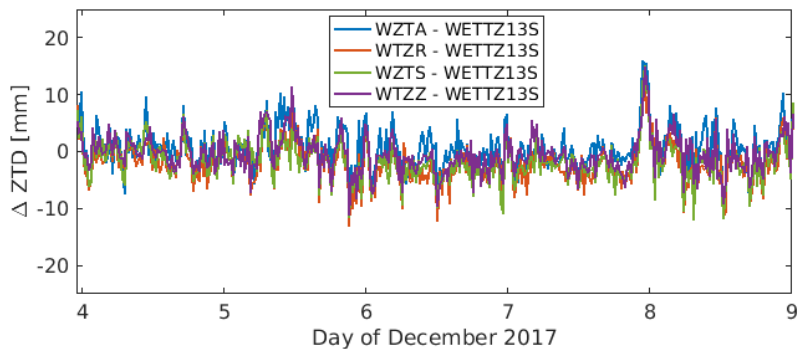
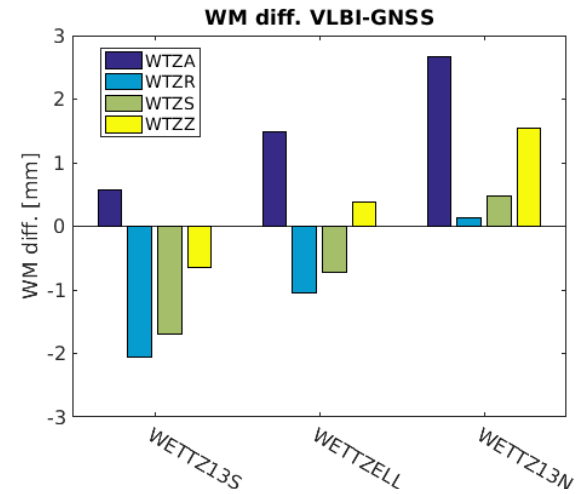
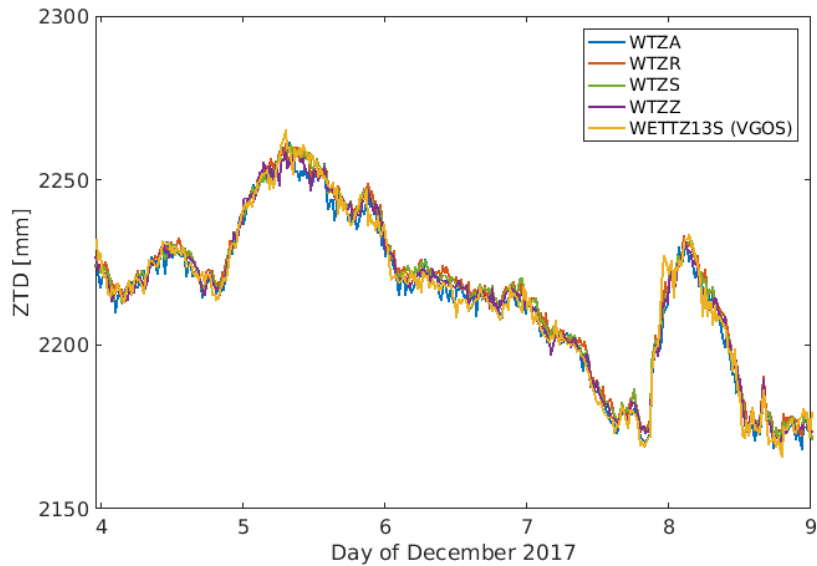


- ZTD from the Wettzell VLBI telescopes in the period 3/12, 23:00 – 8/12, 24:00, 2017

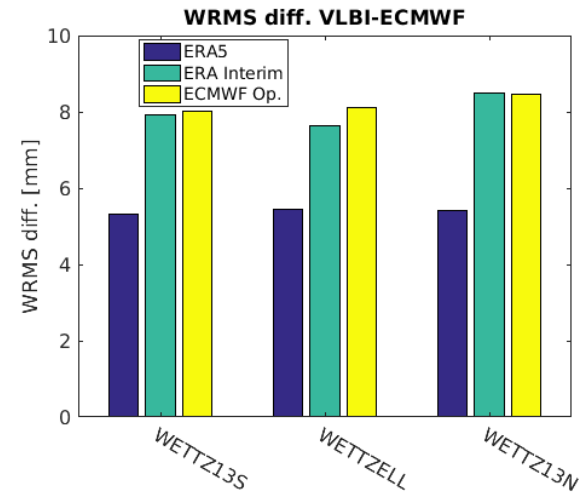
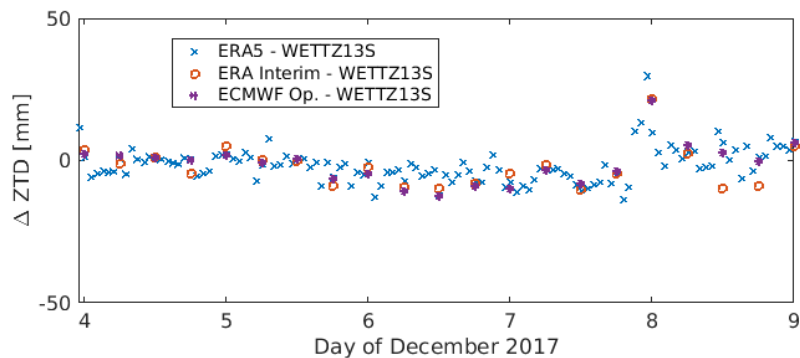
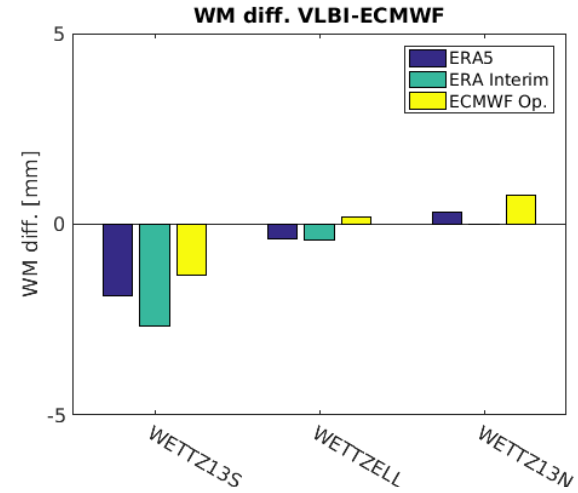
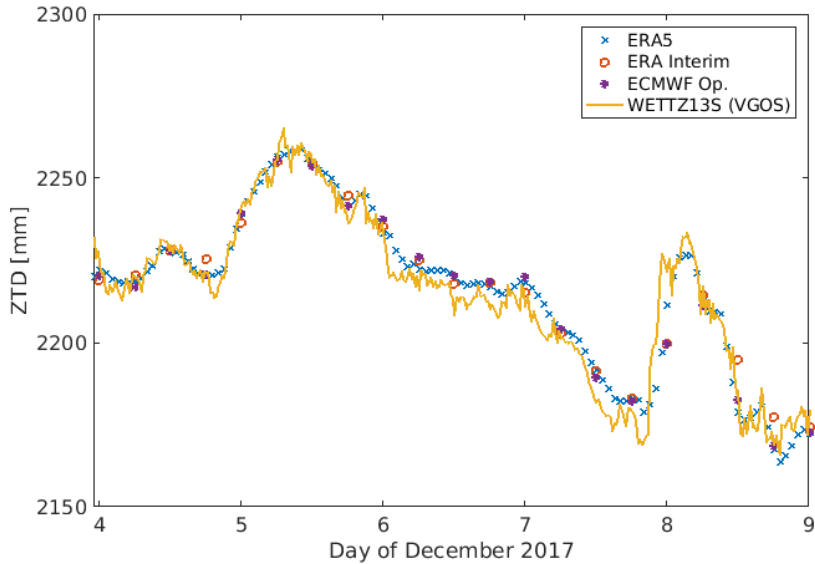


	WM diff. [mm]	WRMS diff. [mm]
WETTZ13S - WETTZELL	-1.1	4.5
WETTZ13S - WETTZ13N	-2.3	4.2
WETTZELL - WETTZ13N	-1.2	4.5

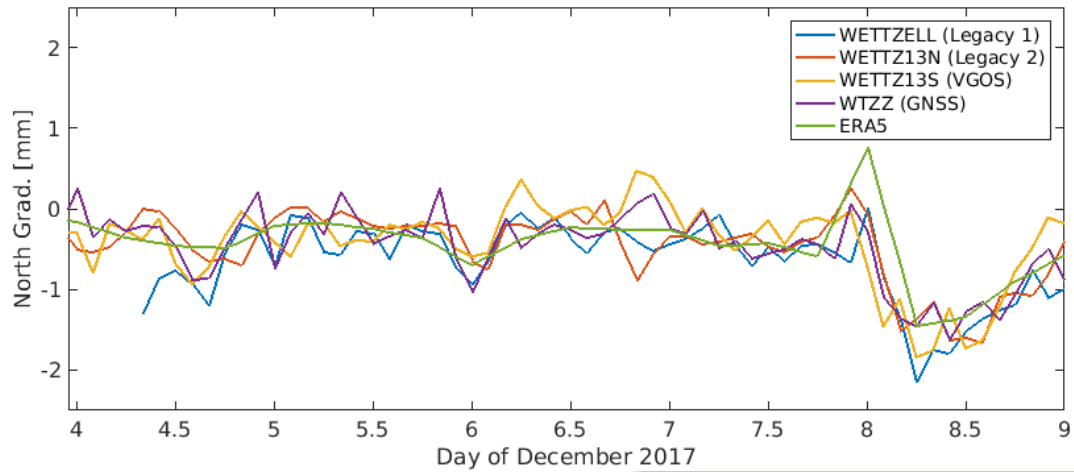
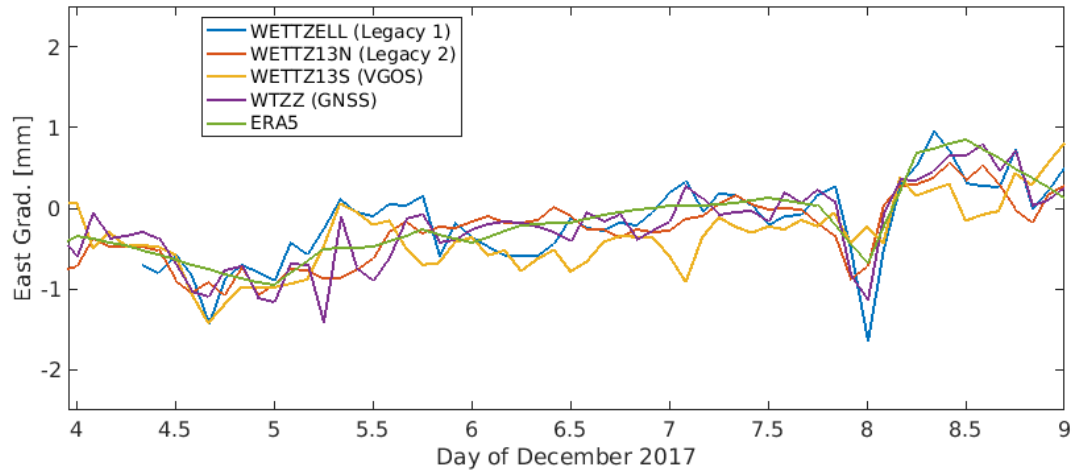
The Wettzell station: comparison with GNSS



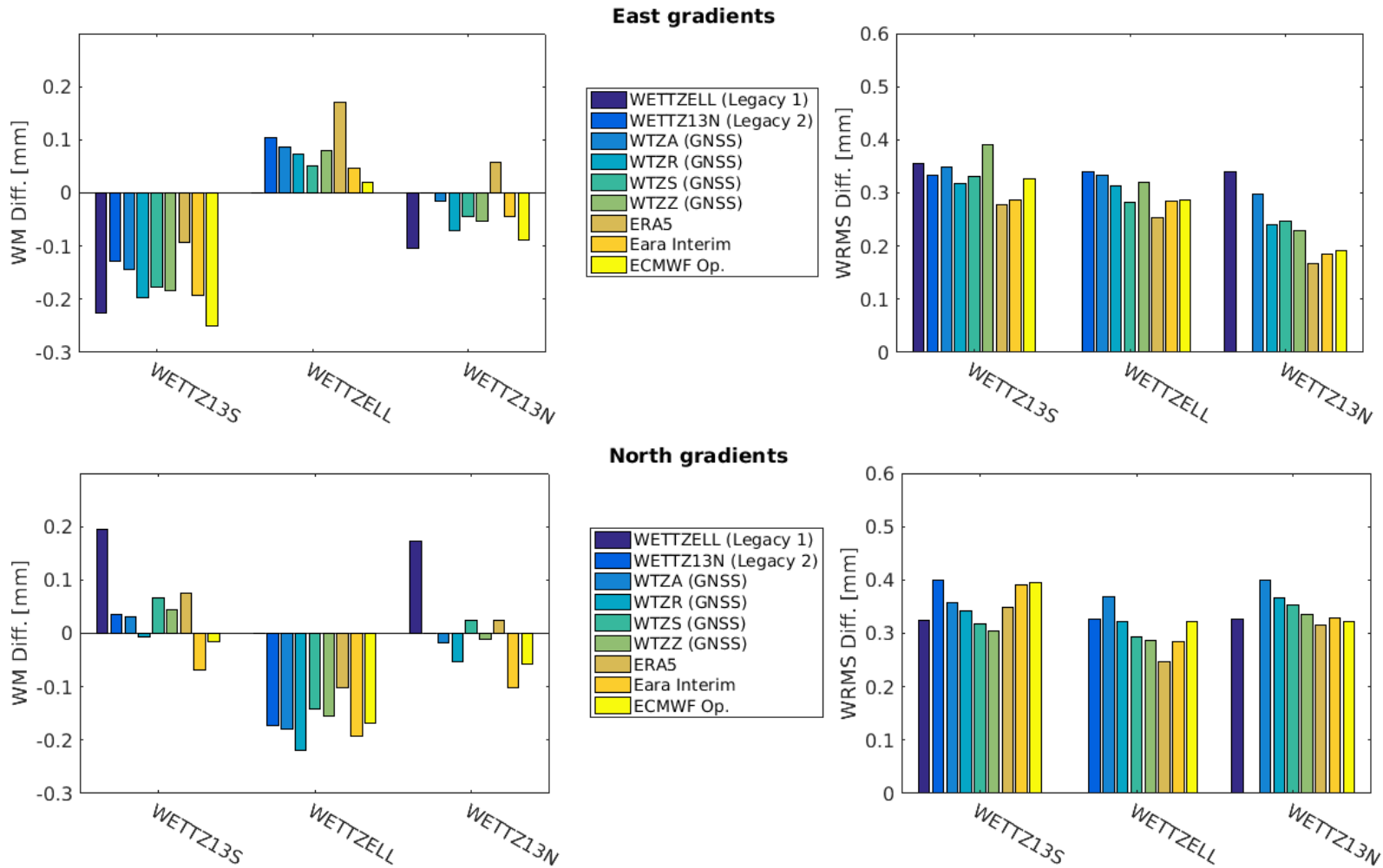
The Wettzell station: comparison with ECMWF



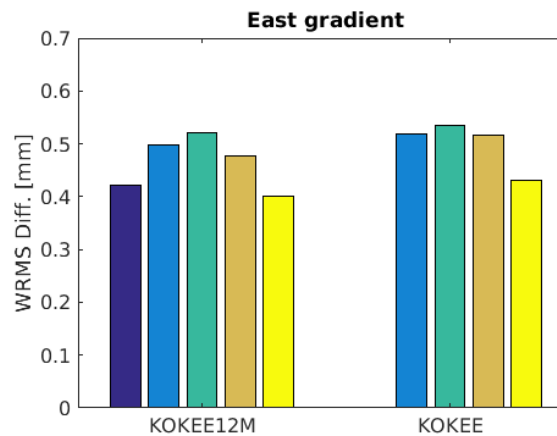
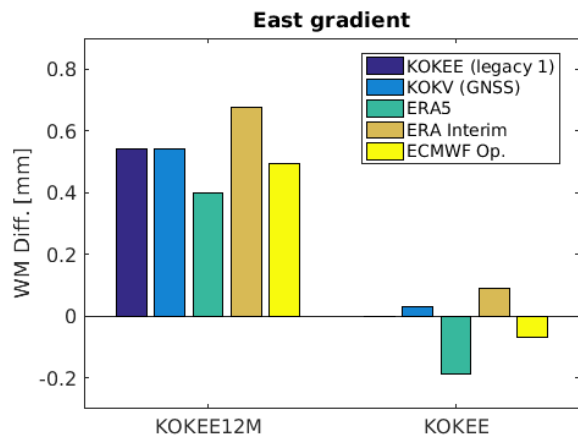
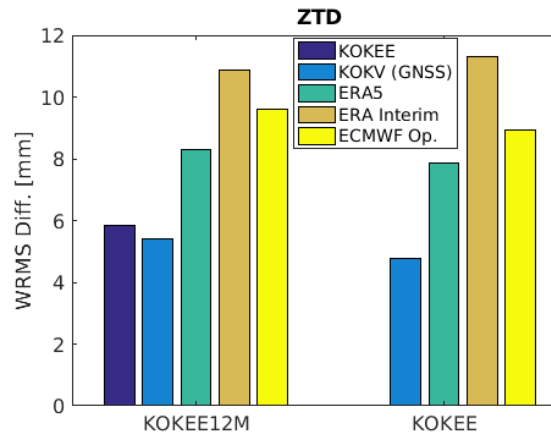
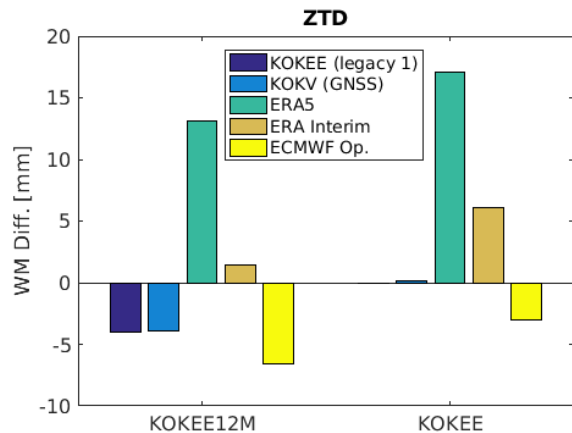
The Wettzell station: gradients



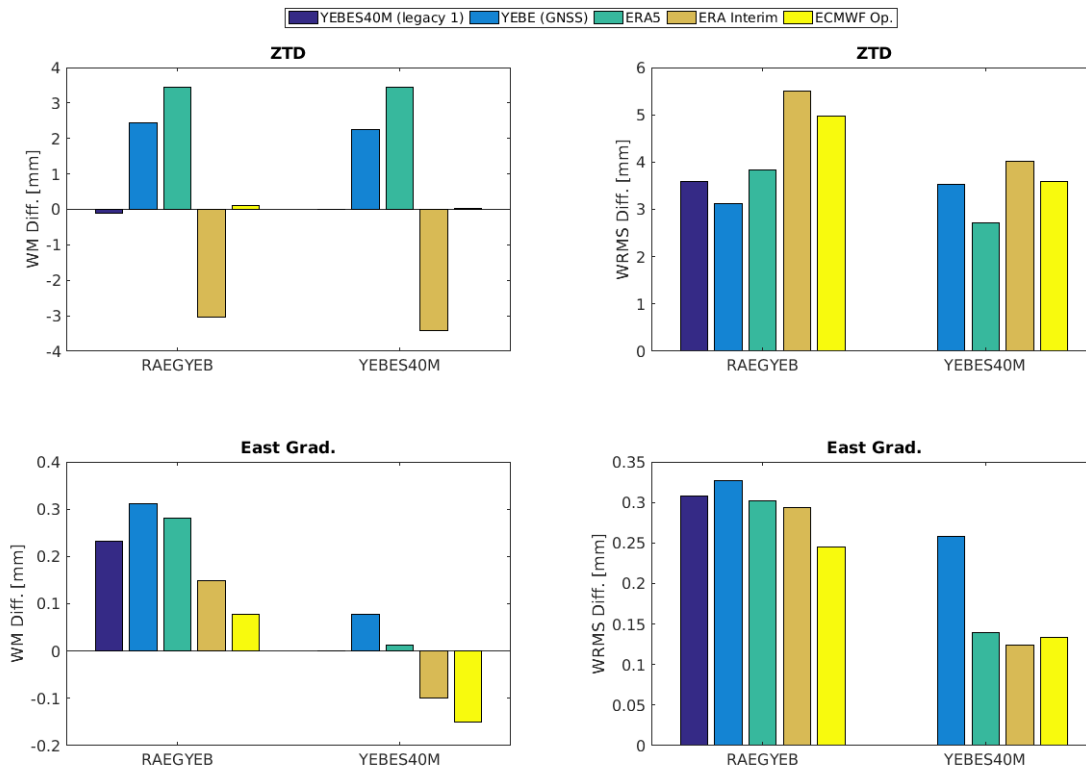
Wettzell gradients: WM and WRMS differences



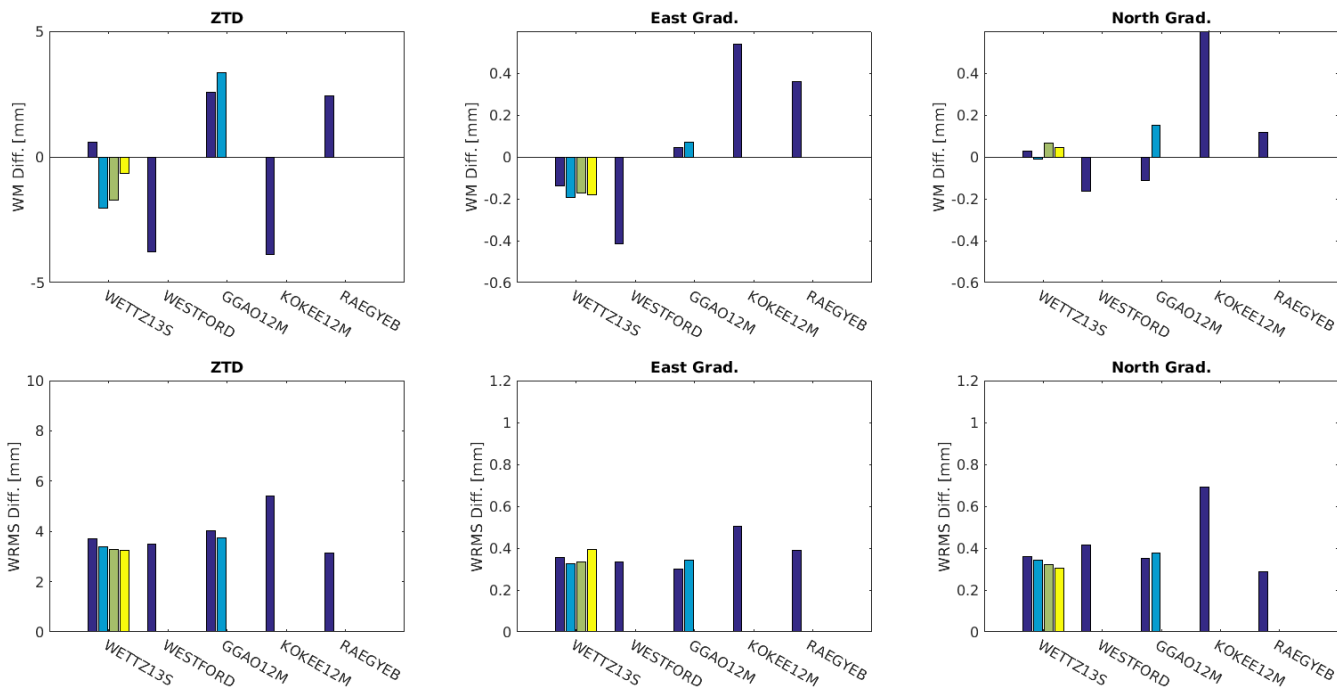
Results from Kokee Park



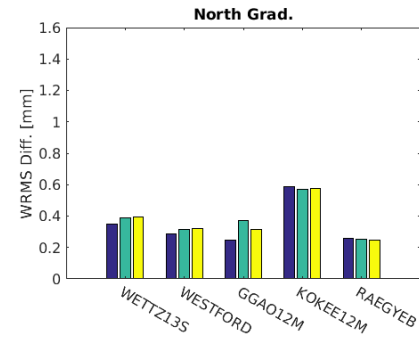
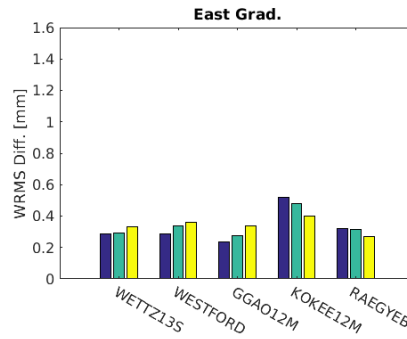
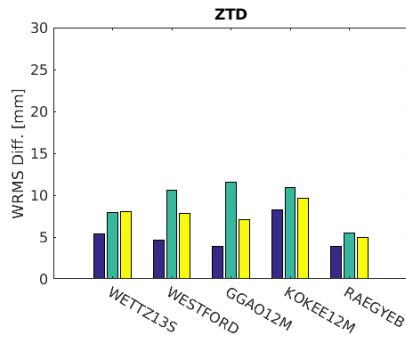
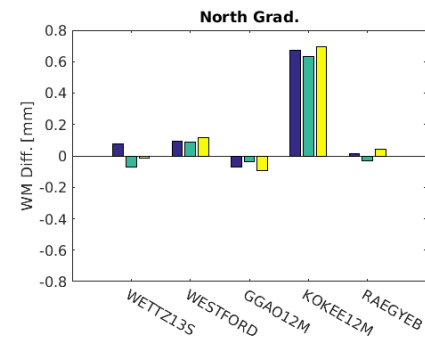
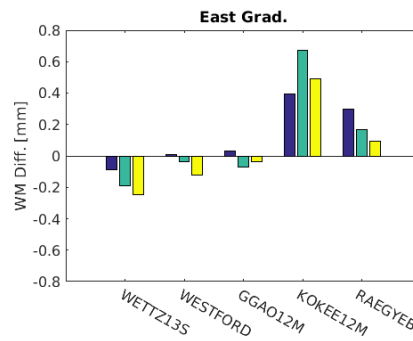
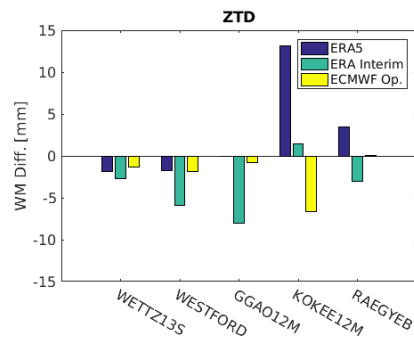
The Yebes station (only one day with VGOS data)



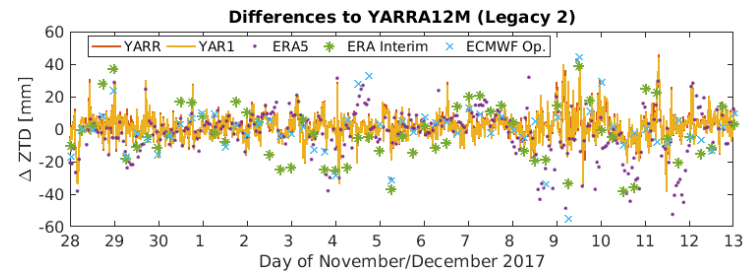
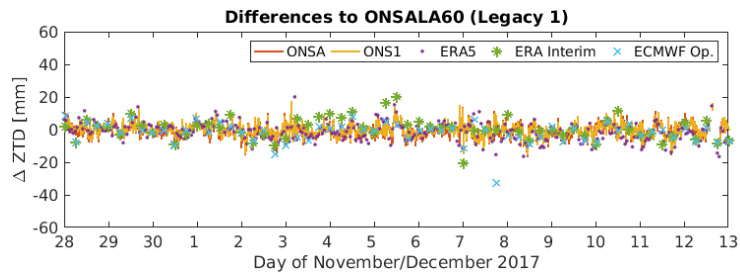
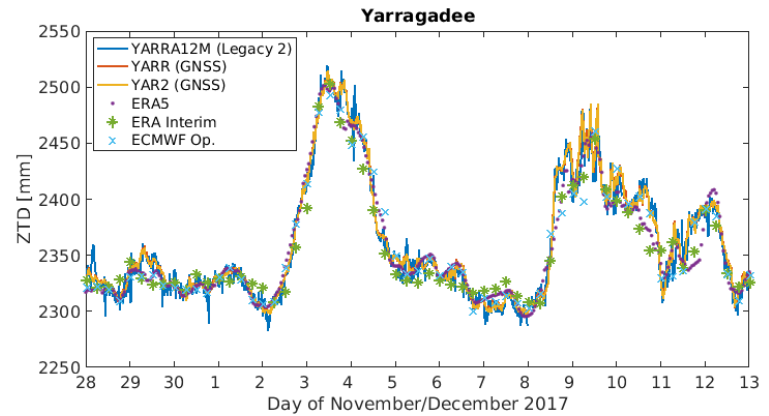
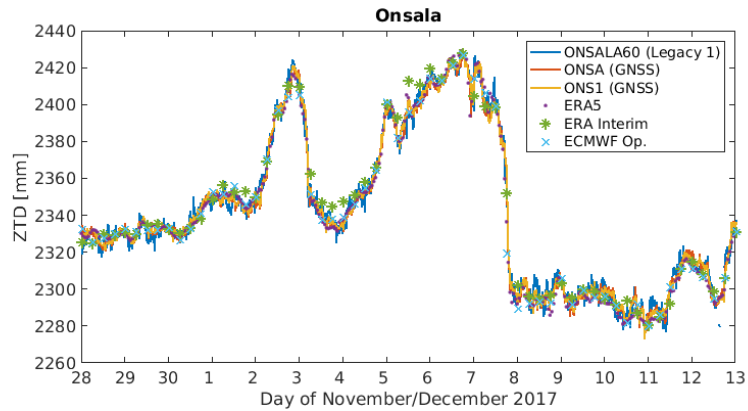
VGOS results: comparison with GNSS



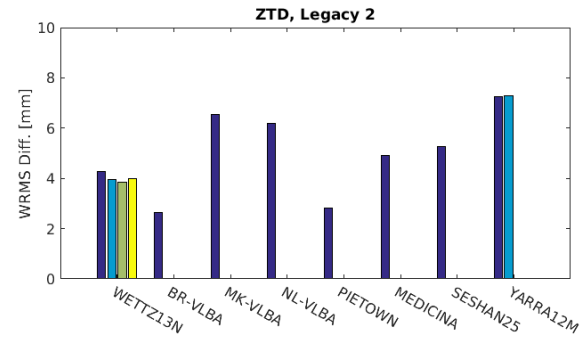
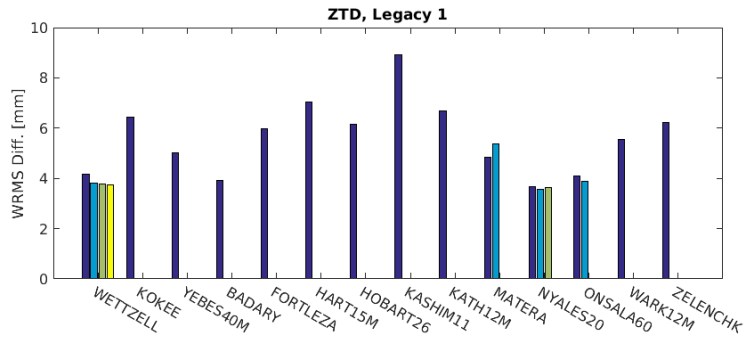
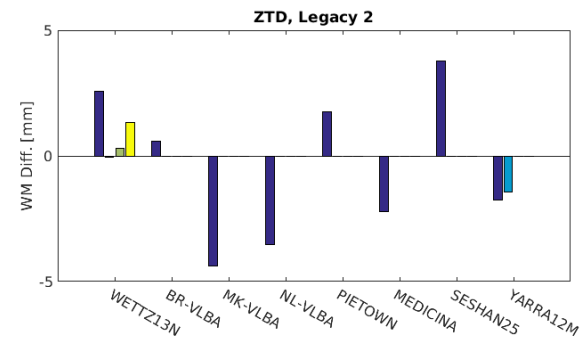
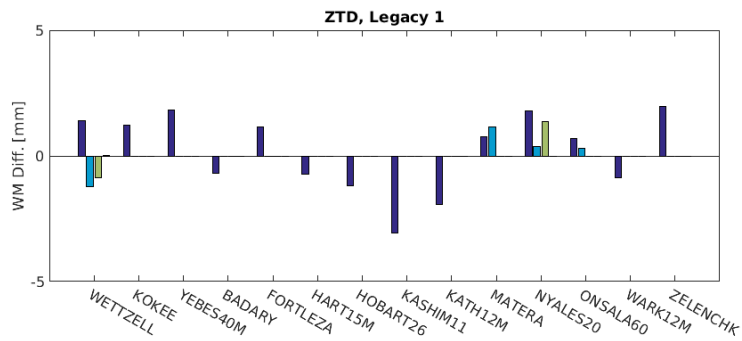
VGOS results: comparison with ECMWF models



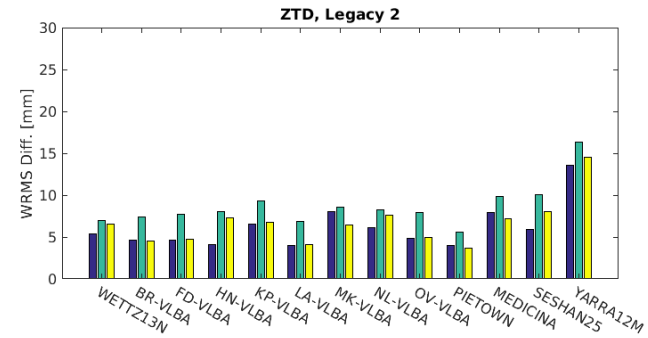
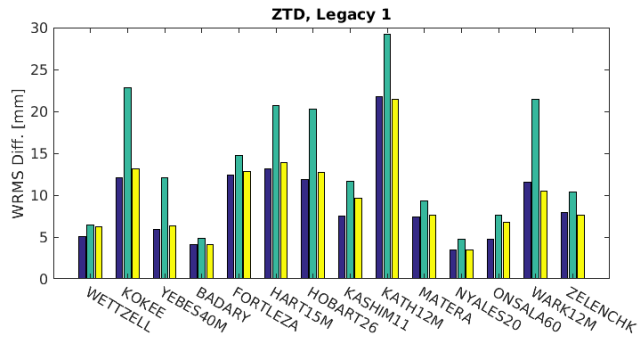
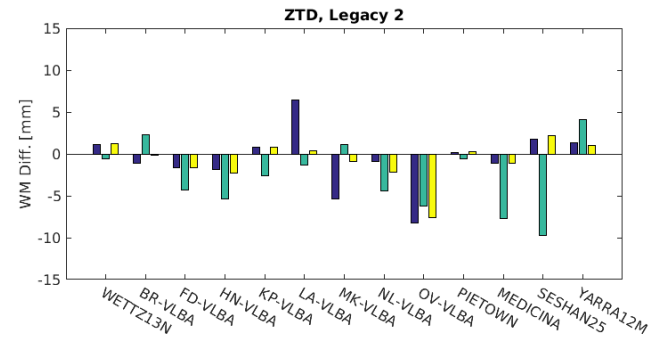
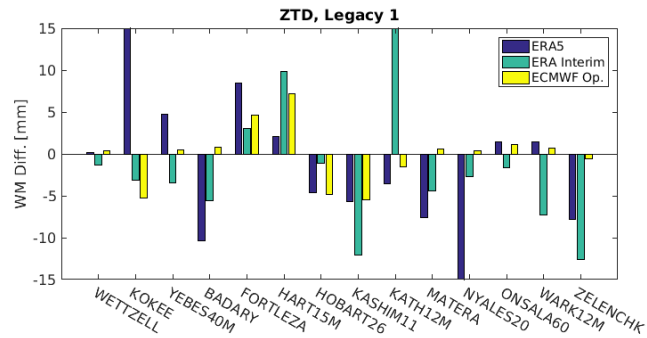
ZTD from the legacy networks



ZTD from legacy networks: comparison with GNSS



ZTD from legacy networks: comparison with ECMWF models



Conclusions

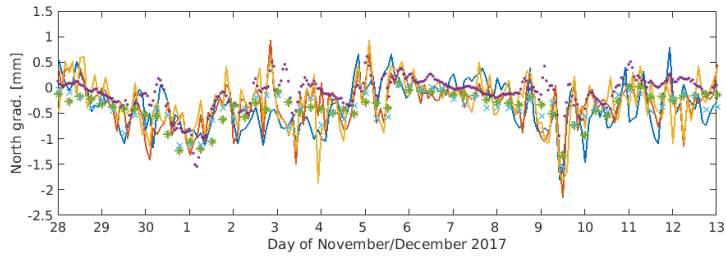
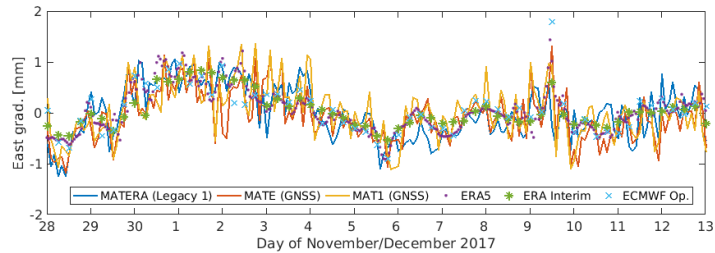
- The results from the three CONT17 networks are similar
- The VGOS network give similar results as the legacy networks
 - ZTD WRMS differences of 4-5 mm relative to collocated legacy antennas as well as to GNSS
 - 5-10 mm ZTD WRMS difference with the ECMWF models, smallest WRMS for the ERA 5 model
- There are still room for improvements

Thank you for your attention!

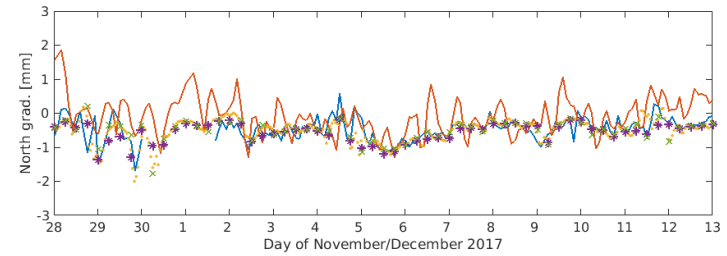
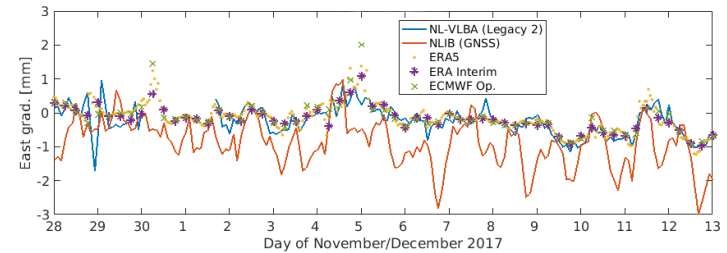


Gradients from the legacy networks

Matera

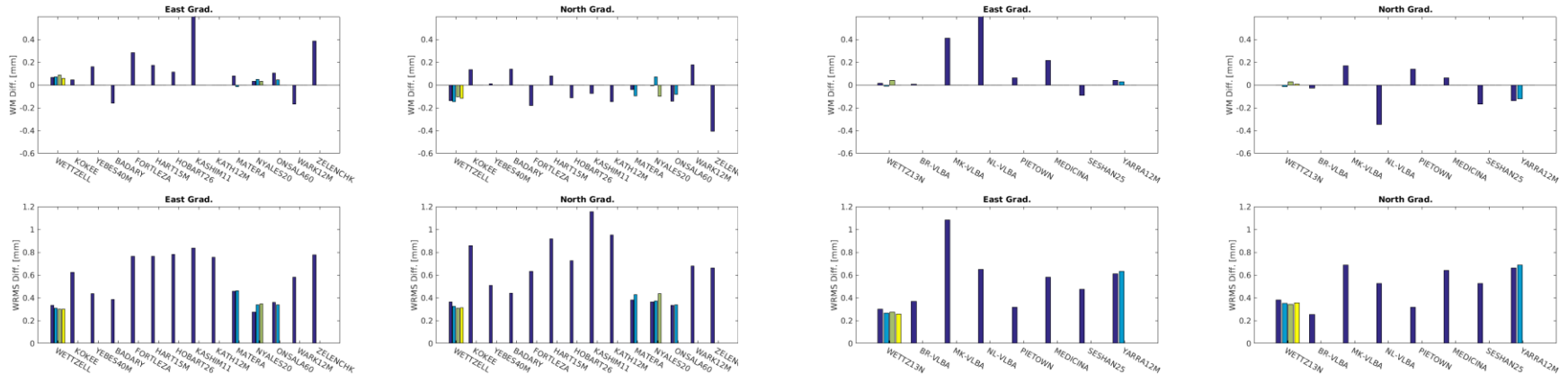


NL-VLBA



Gradients from the legacy networks: differences to GNSS and ECMWF

w.r.t. GNSS



w.r.t. ECMWF

