



**Australian Government**

**Geoscience Australia**



# Type Means

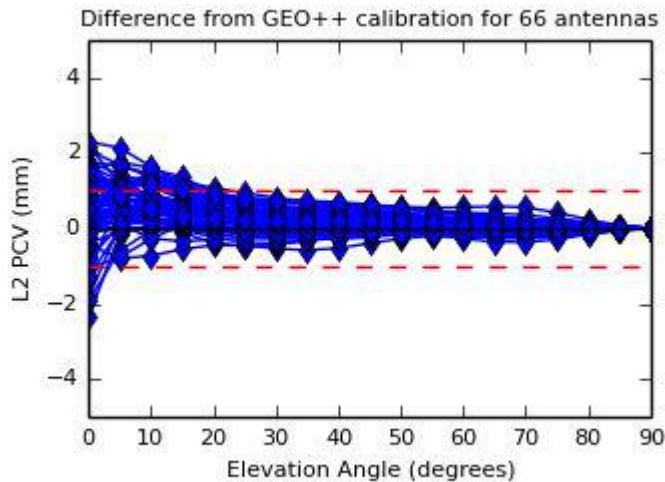
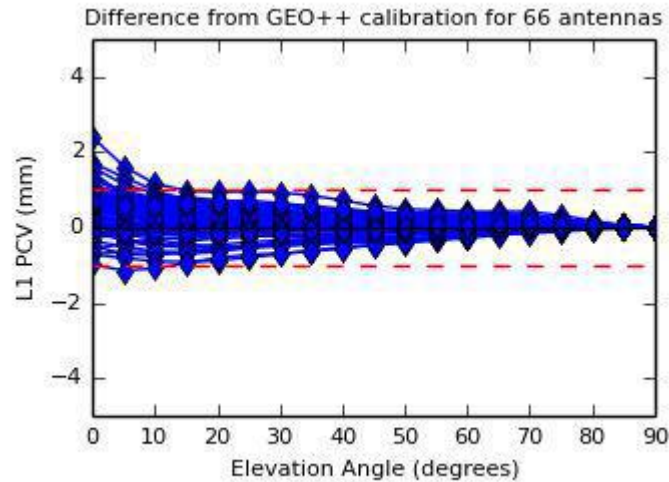
## Assumption:

The type mean is representative of all individual antenna.

## Reality:

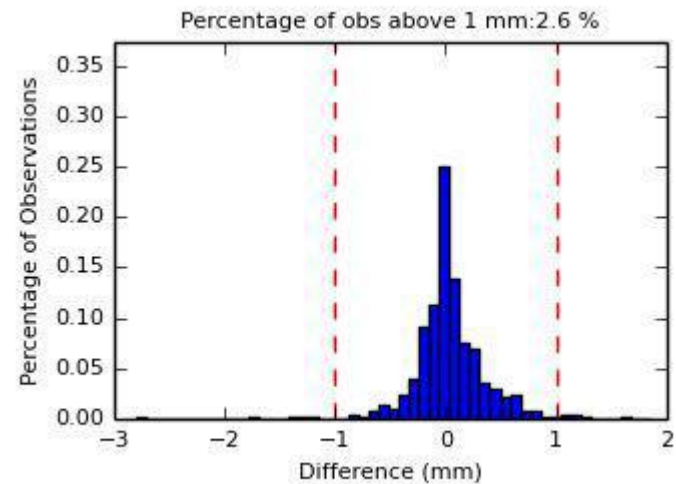
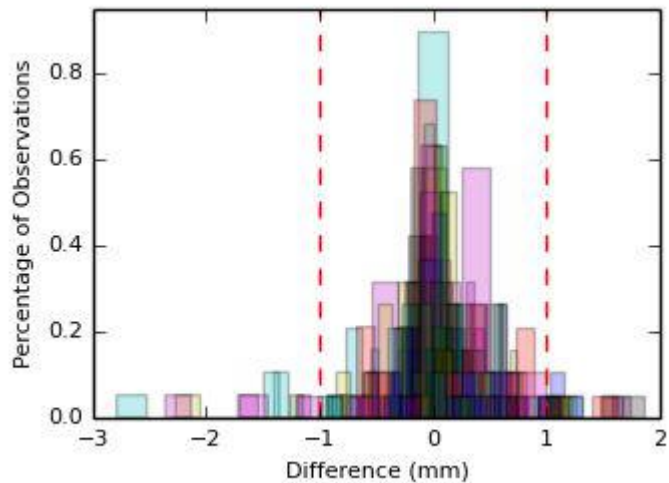
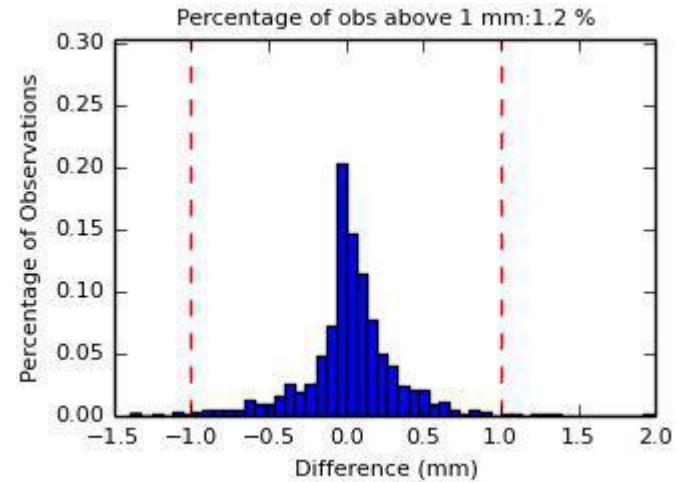
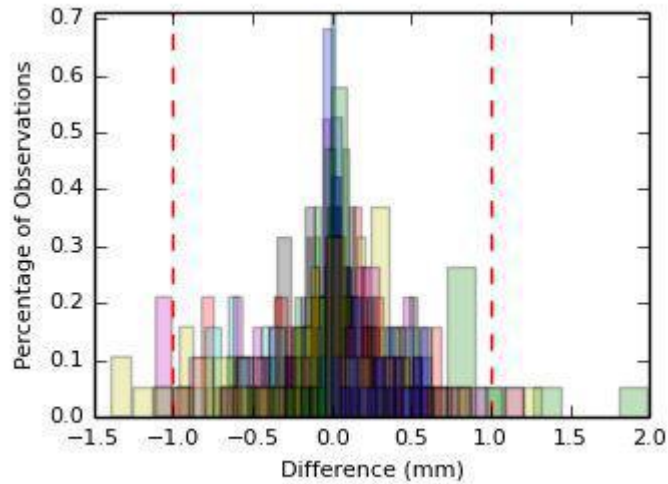
- The mean is of course derived from a sub-sample of antennas
- There is significant individual antenna variation
- the mean is not updated in ANTEX (very messy)
- should we start implementing and updating the rms values?

# Repeatability of robot

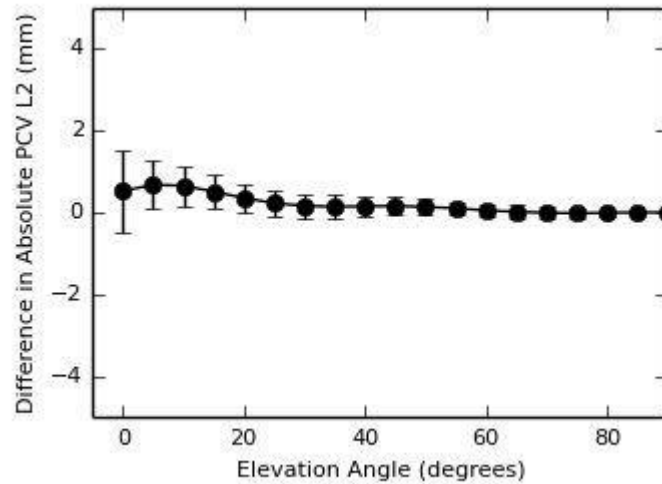
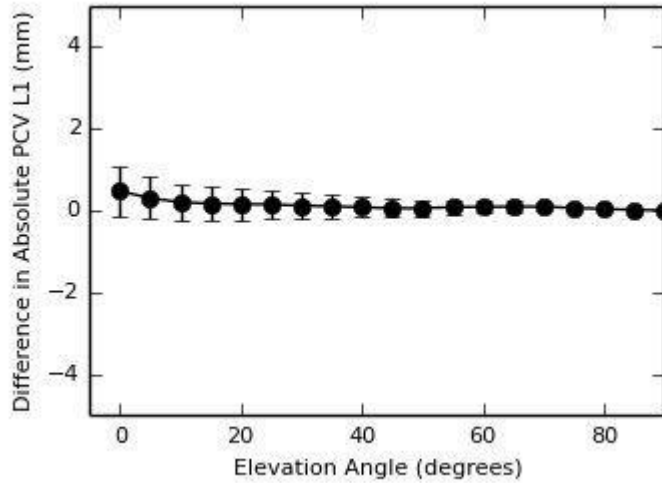


Difference from GEO++ calibration  
Reference Antenna calibrated 65  
times, over a period of 3 years

# Repeatability Continued

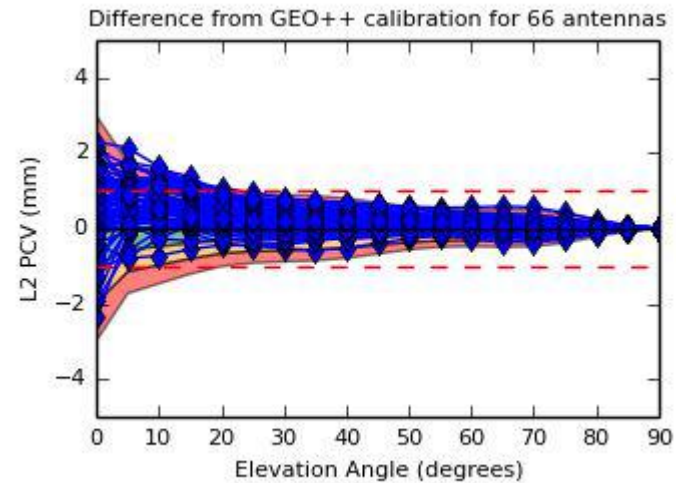
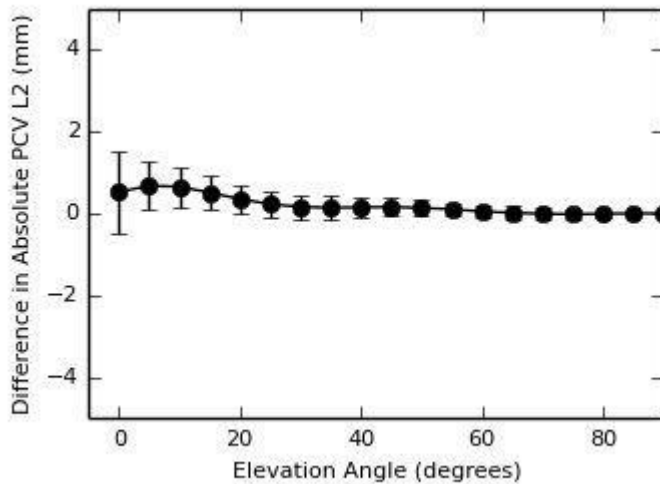
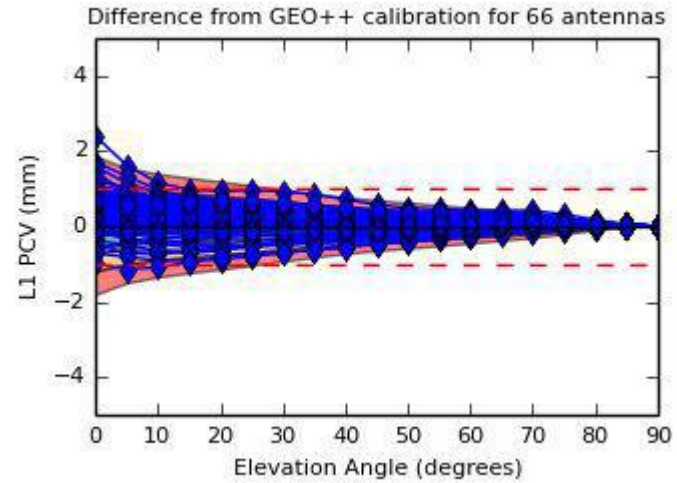
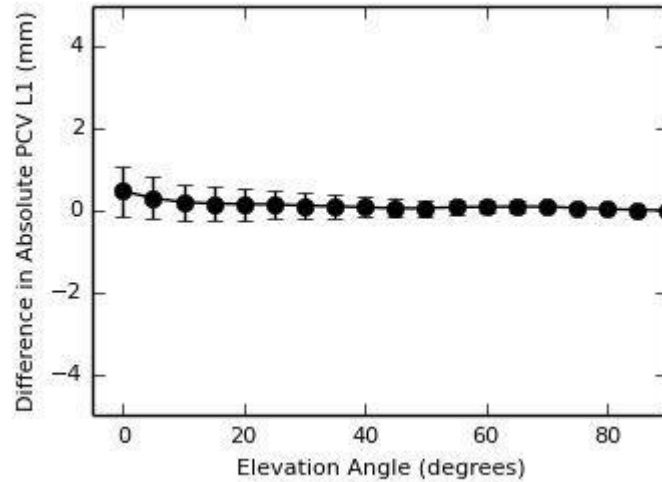


# Repeatability Continued

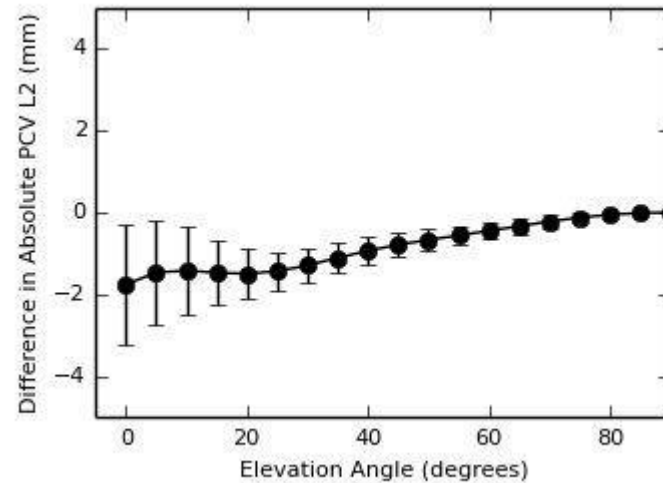
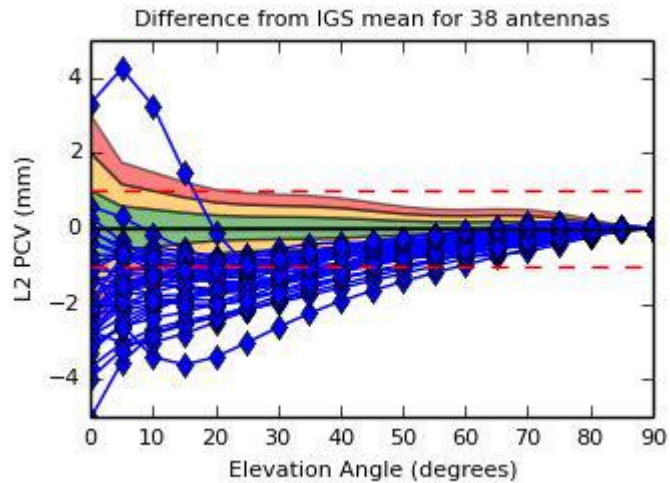
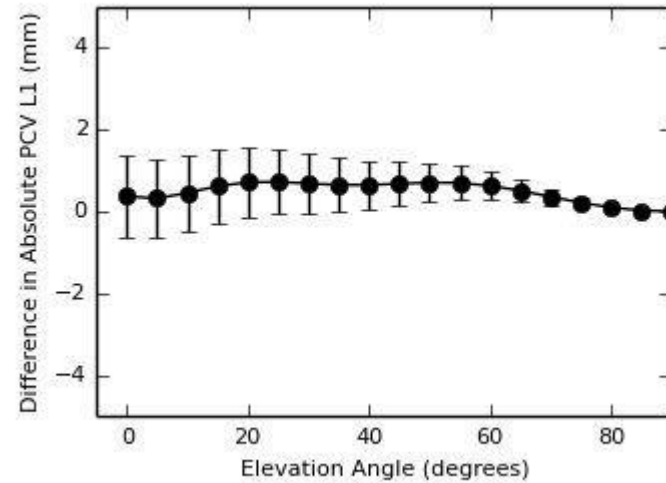
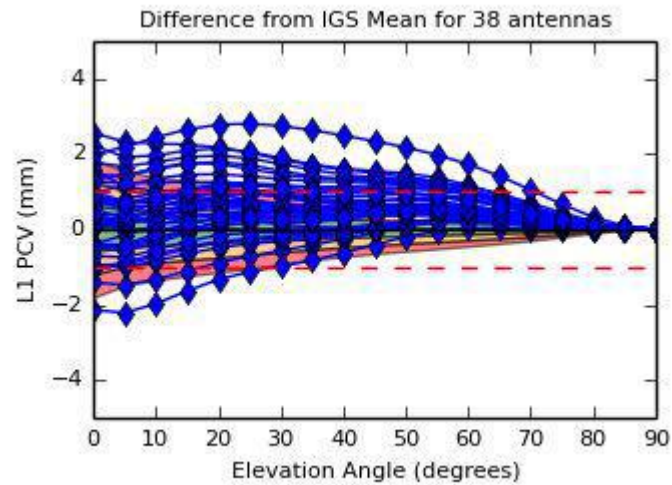




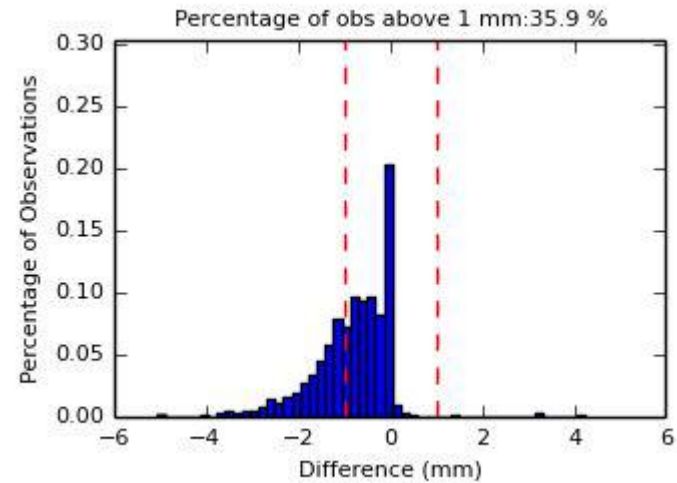
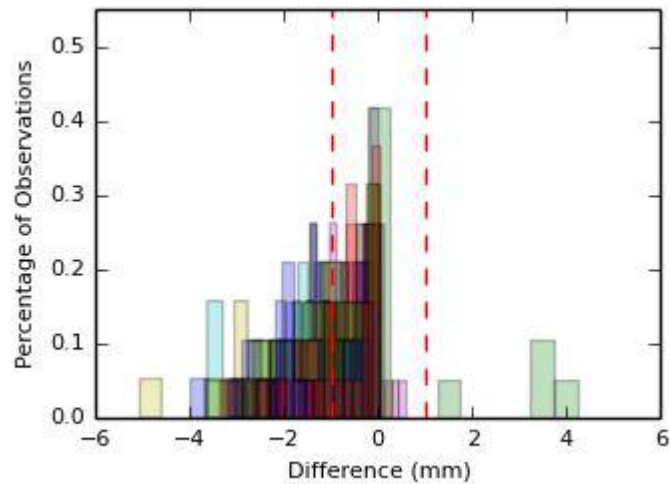
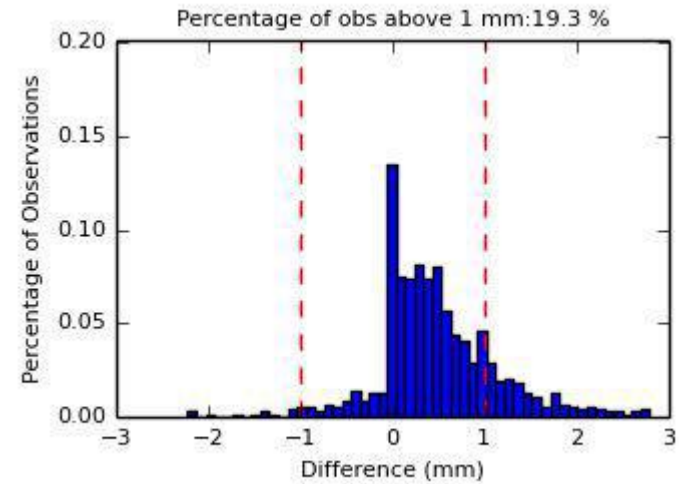
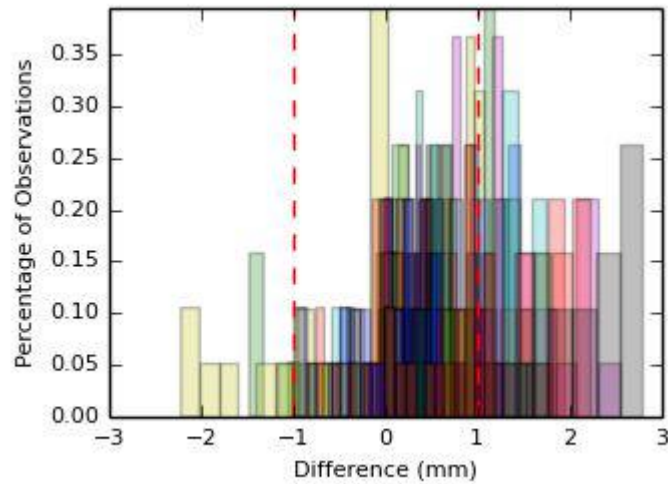
# Repeatability Continued



# TRM57971.00

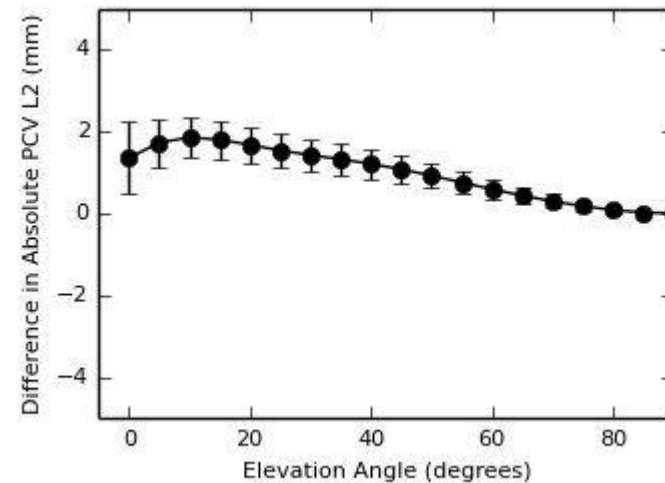
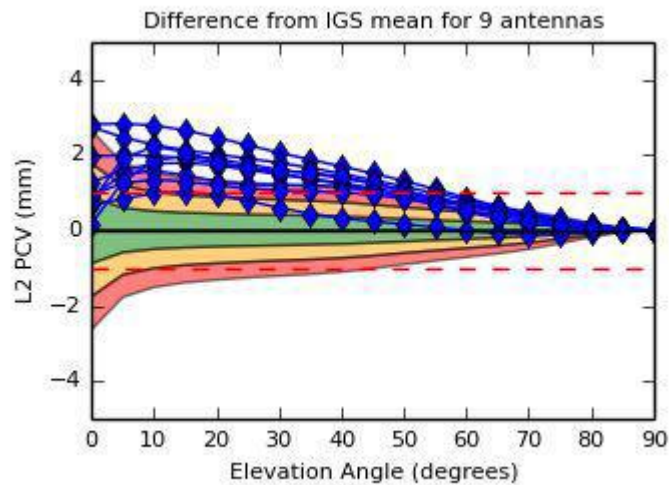
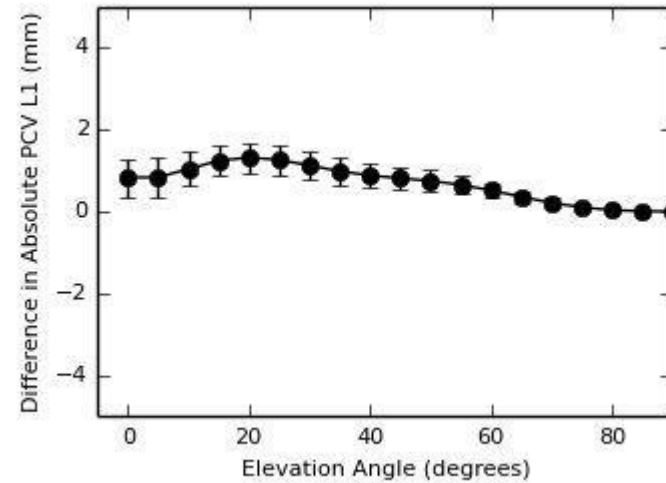
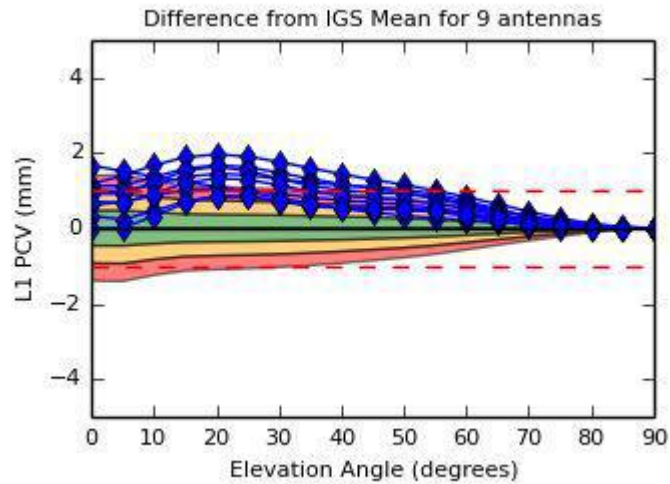
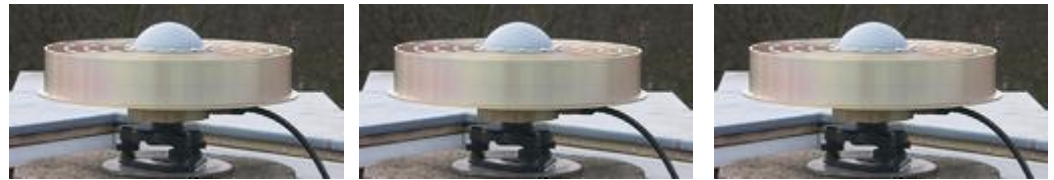


# TRM57971.00

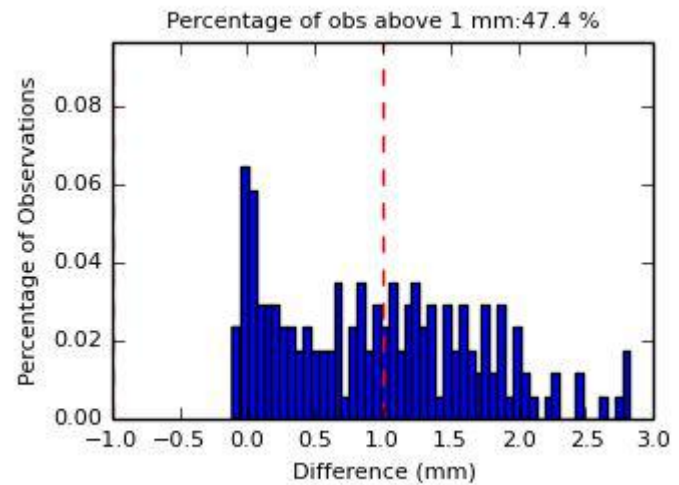
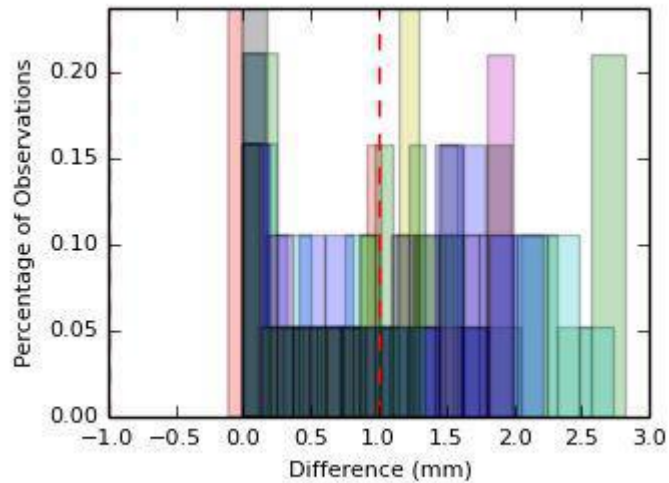
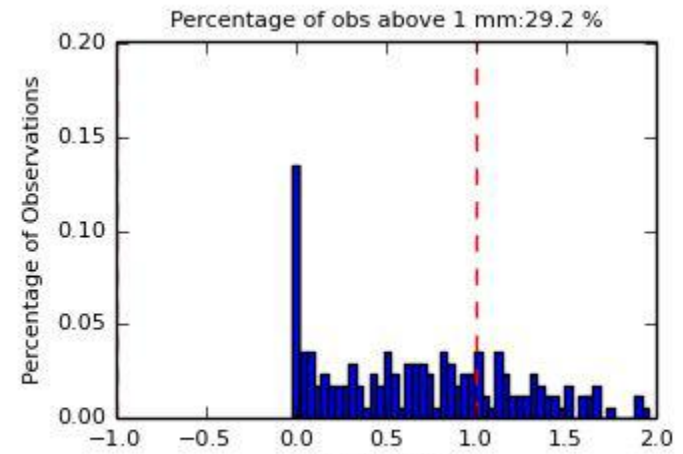
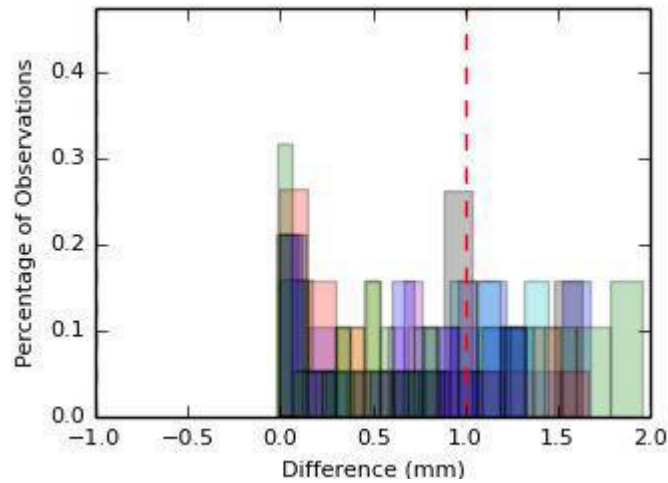
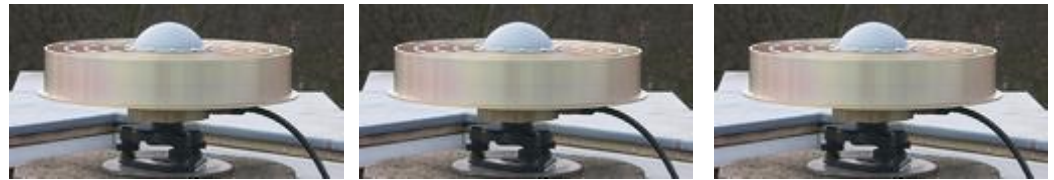




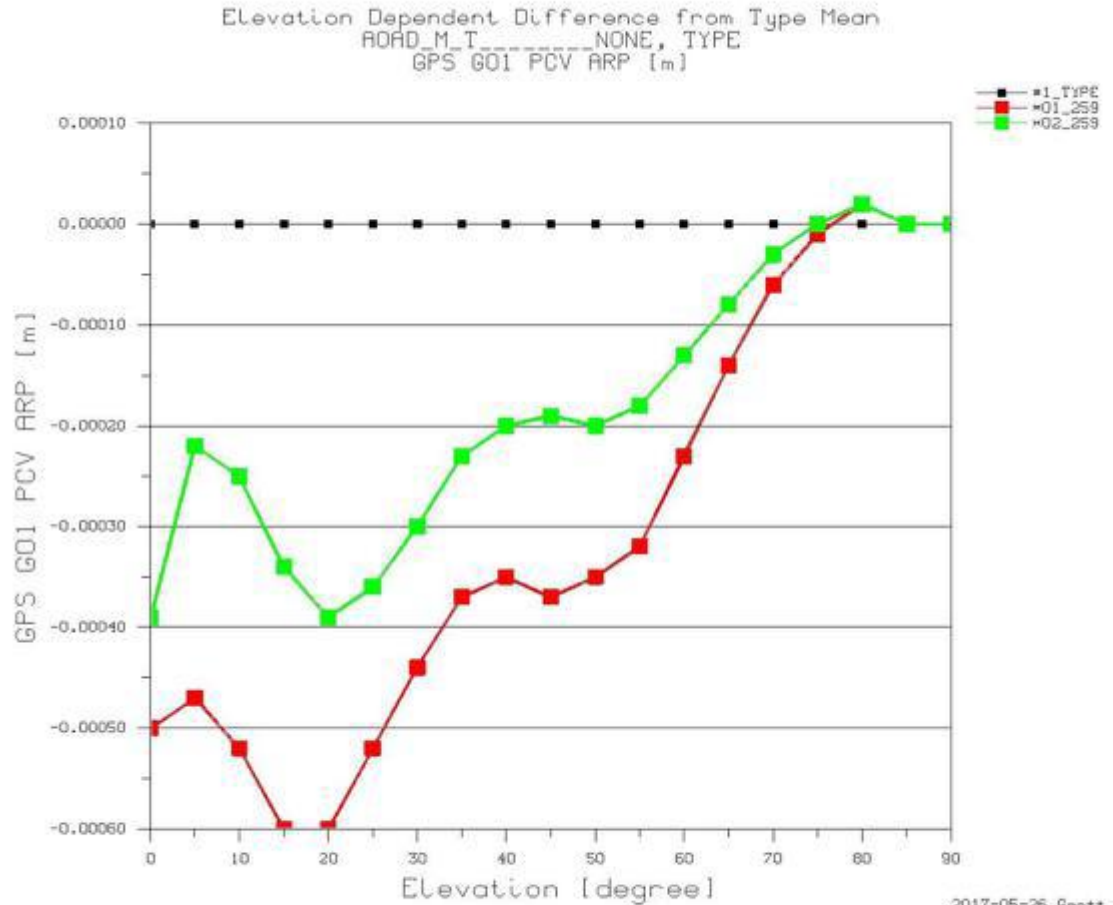
# AOAD/M\_T NONE



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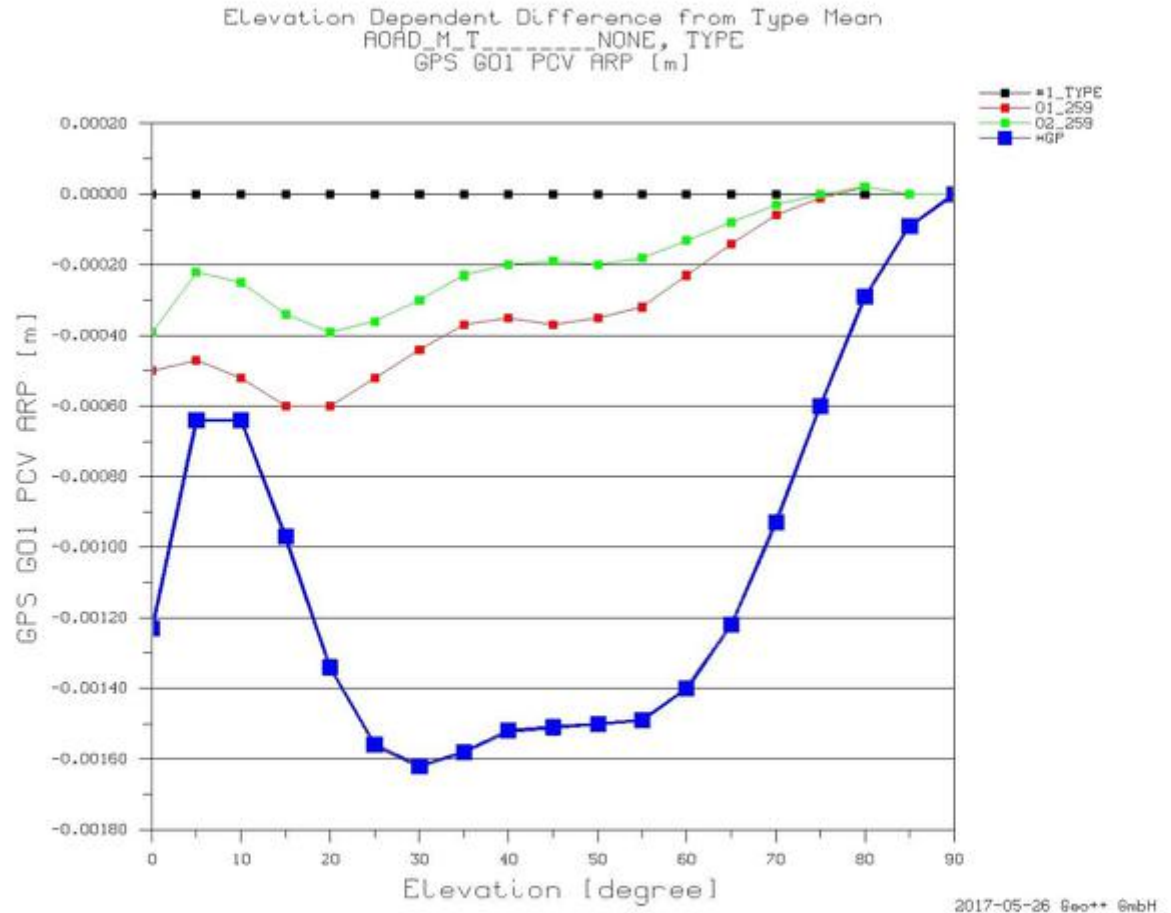


# Near-field effects: Normal Calibration



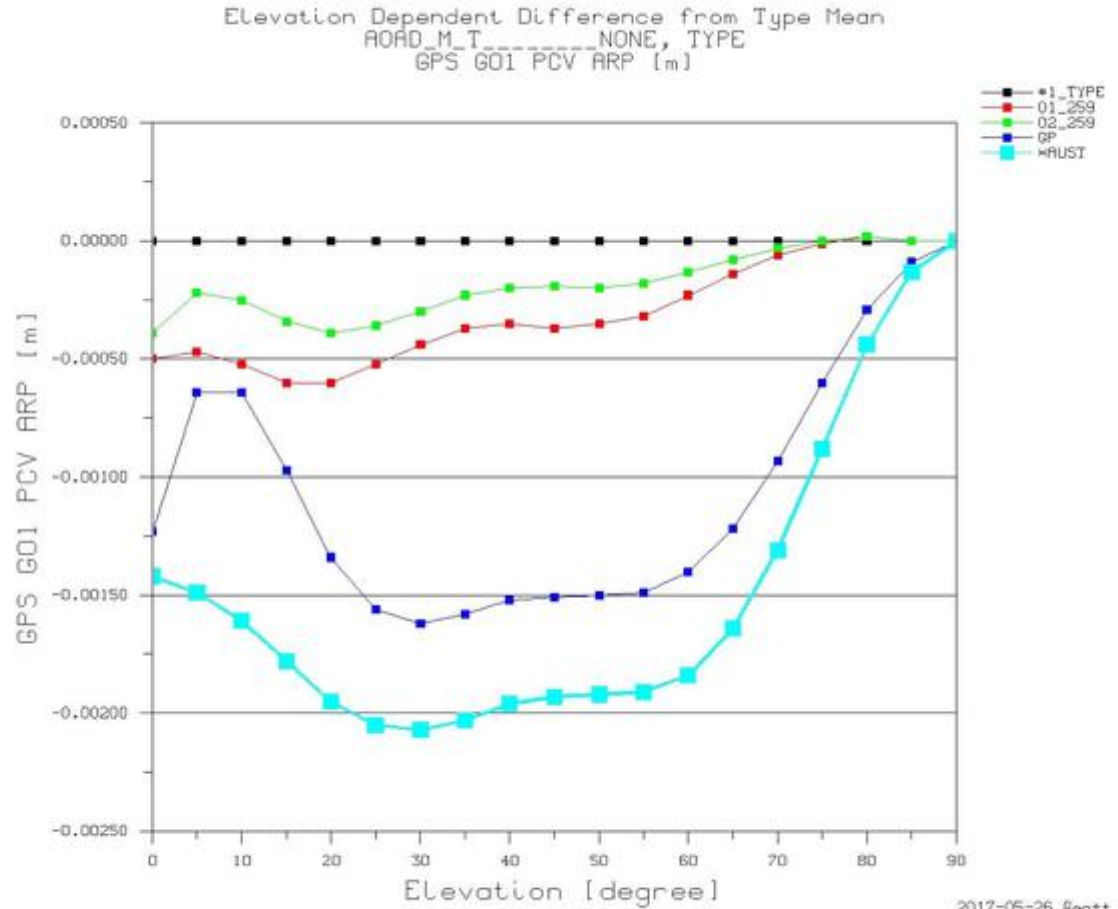
2017-05-26 Geo++ 6mbH

# Near-field effects: 'Concrete Pillar'





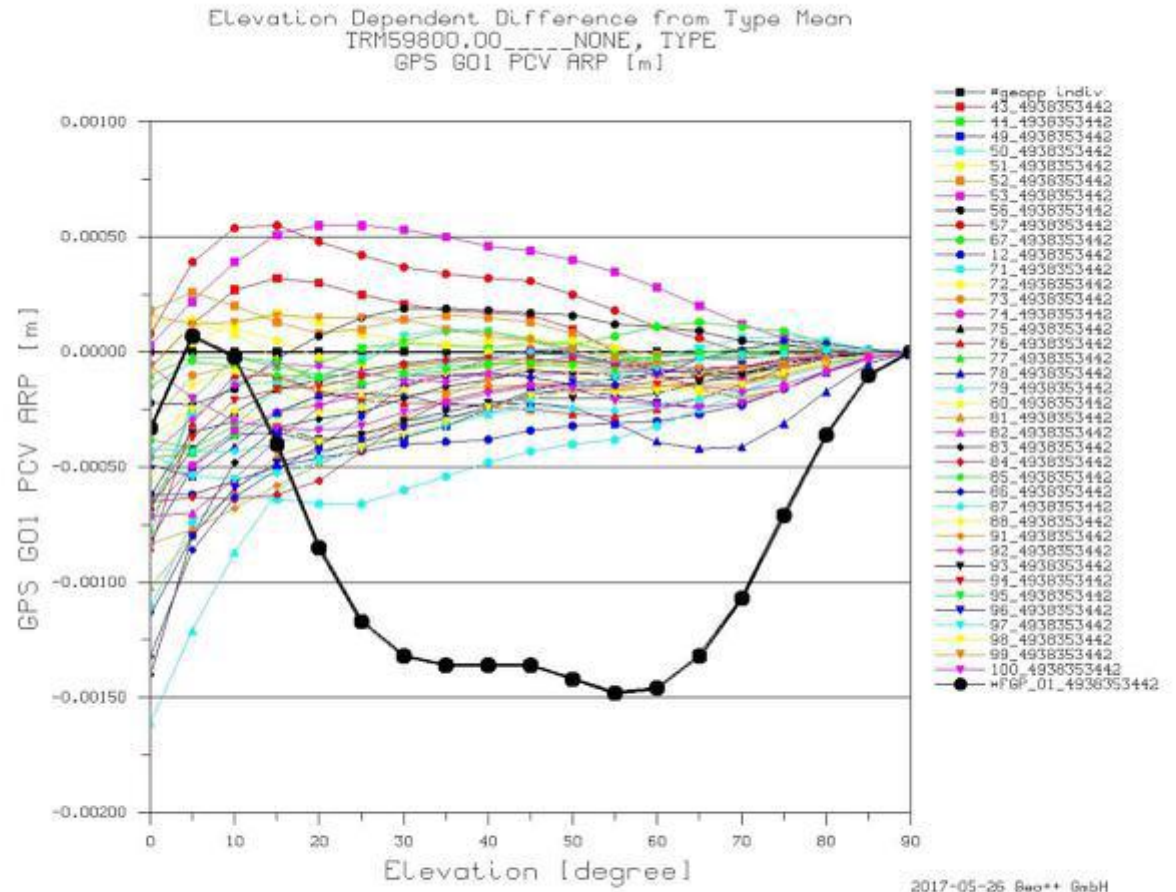
# Near-field effects: 'Concrete Pillar' + AUST Dome



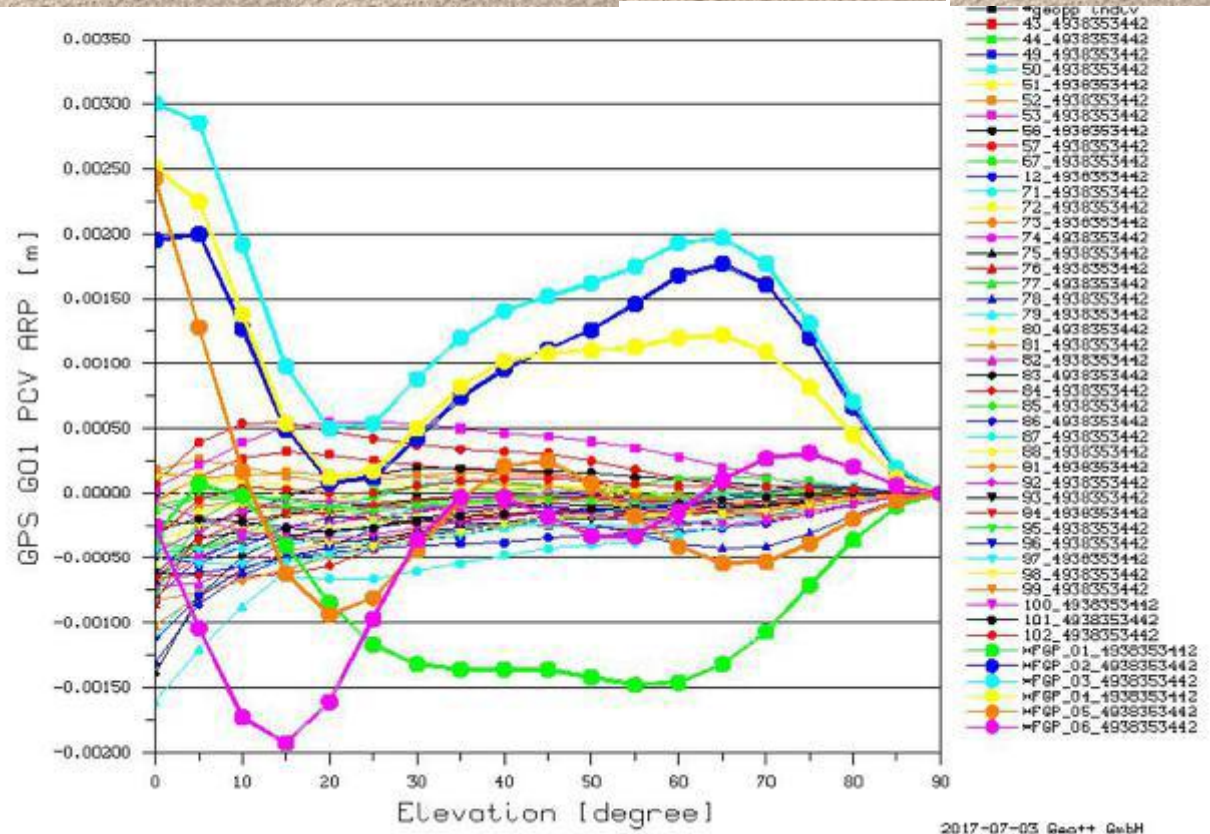
2017-05-26 Geo++ GmbH



# Near-field effects: 'Concrete Pillar' – Trimble 49800.00

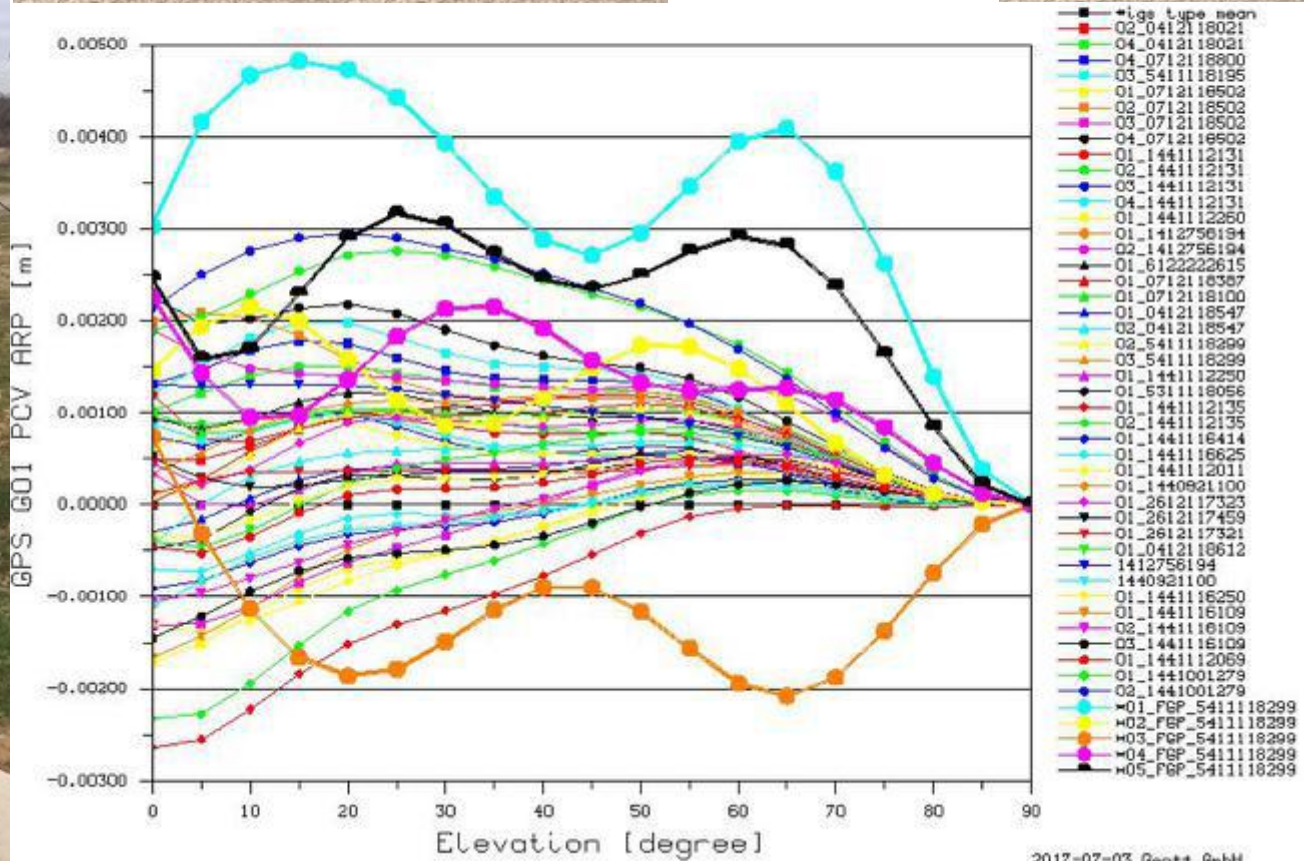


# Near-field effects: 'Concrete Pillar' – Trimble 49800.00





# Near-field effects: 'Concrete Pillar'



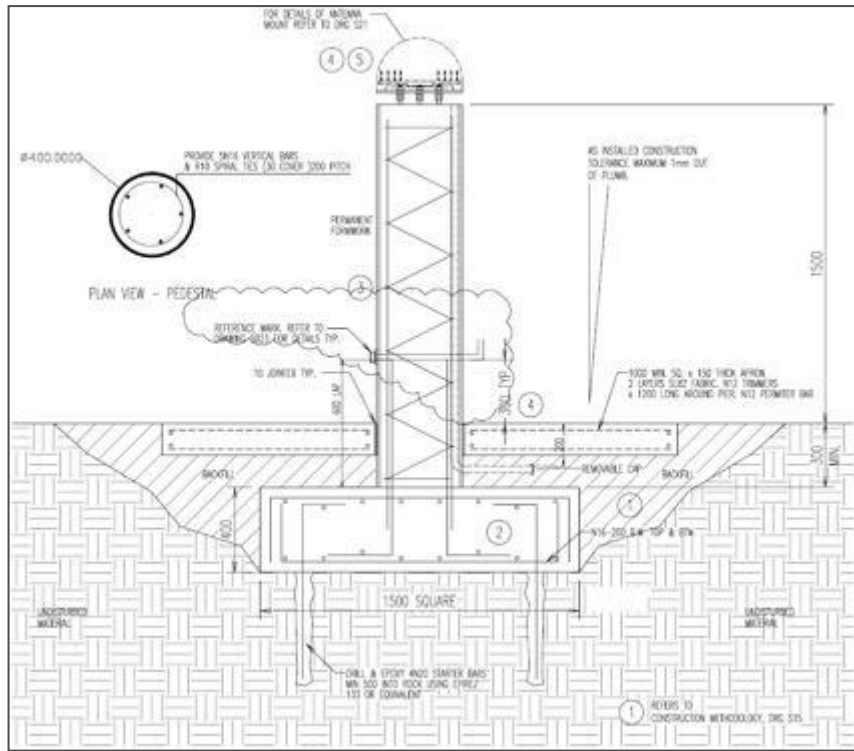
2017-07-03 Geo++ GmbH

# A higher payload Robot Calibration is on the way





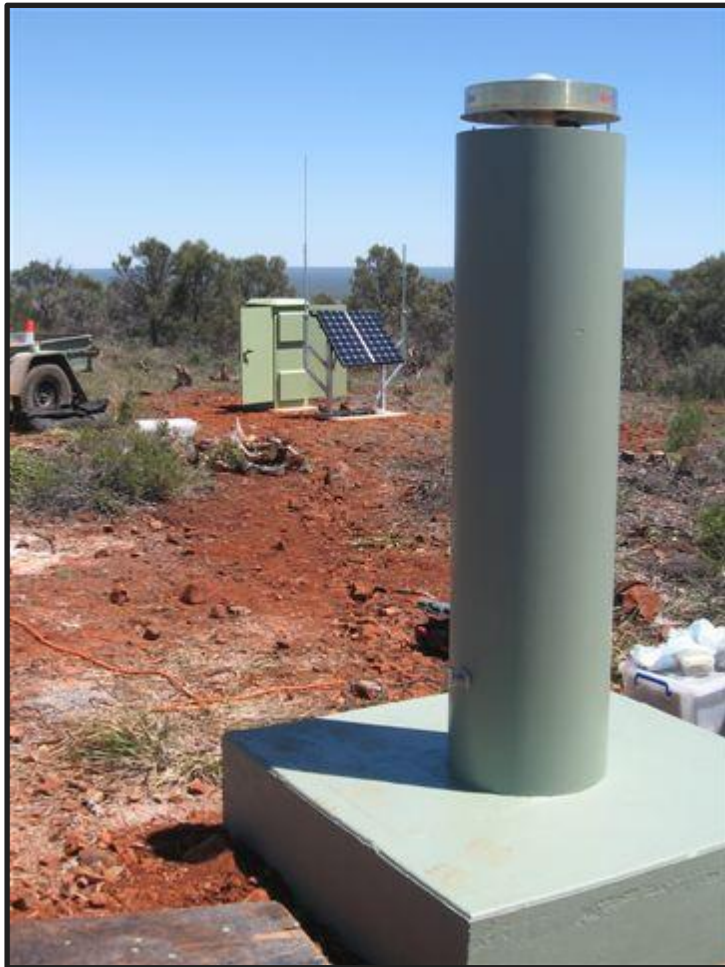
# National GNSS Network





# Typical ARGN/AuScope GNSS Station

- **NORS: Norseman, Western Australia**



# Recommendations

We start preparing for the application of individual calibrations

Processing software to allow for the application of individual antennas

All new stations have an individually calibrated antenna made publically available

IGS maintains an accumulated individual calibration file

# Recommendations

Planned antenna changes are made for historic antennas, and are sent for calibration before end of life

Intercomparisons between antenna calibrations facilities are done on an annual/bi-annual basis and reported on at IGS WS

Recreating the near-field environment is going to be difficult

-need very documentation/survey of monument/antenna/radome geometry

Develop Recommendations for station operators move antennas away from ground planes, approx  $> 0.15$  m

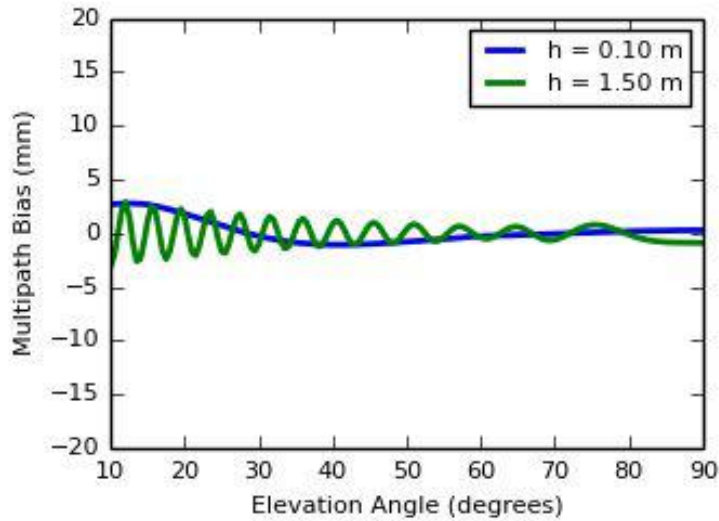
-more research is needed

# Comments/Questions?

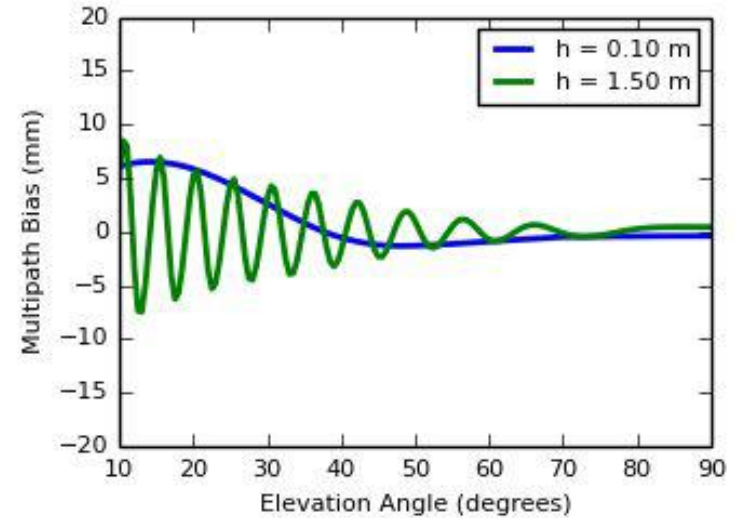


# LC amplification of a bias:

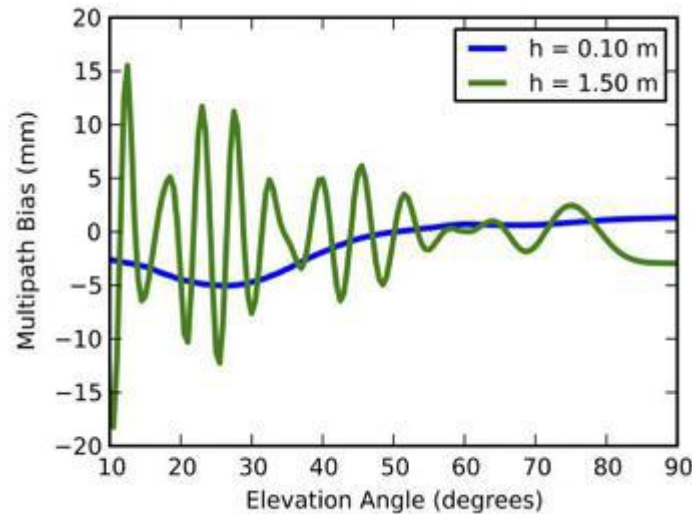
L1



L2



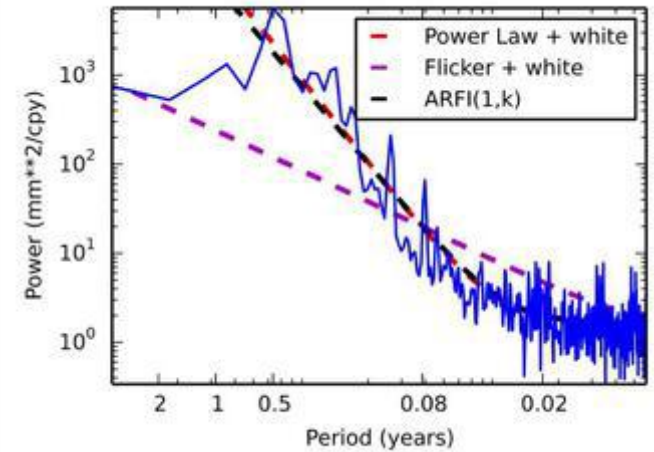
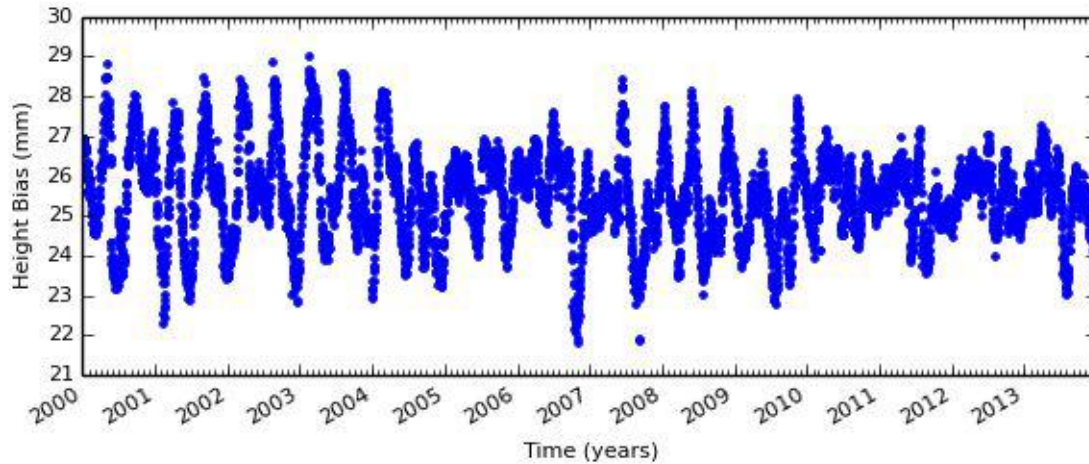
LC



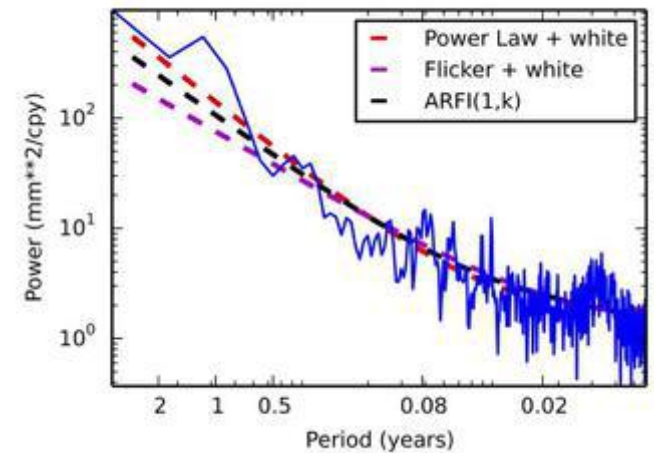
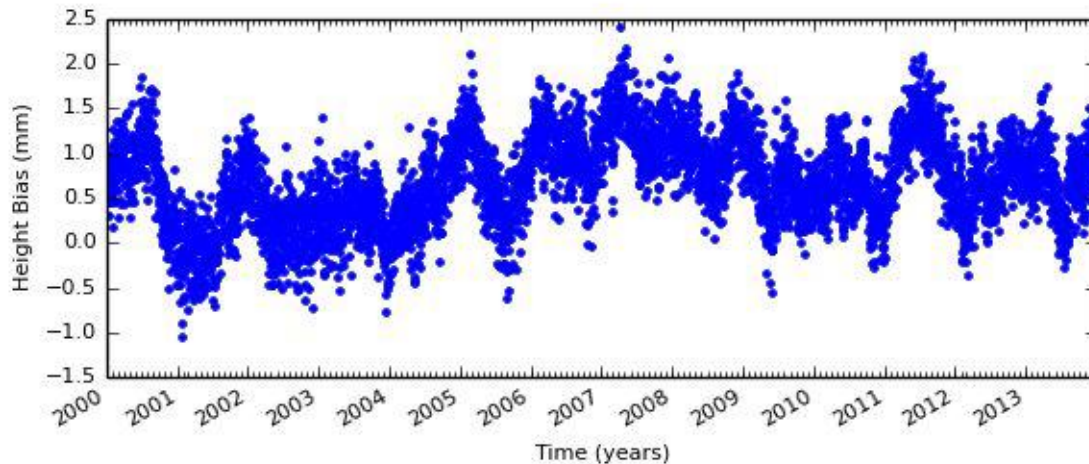


# Simulation of propagation of a bias

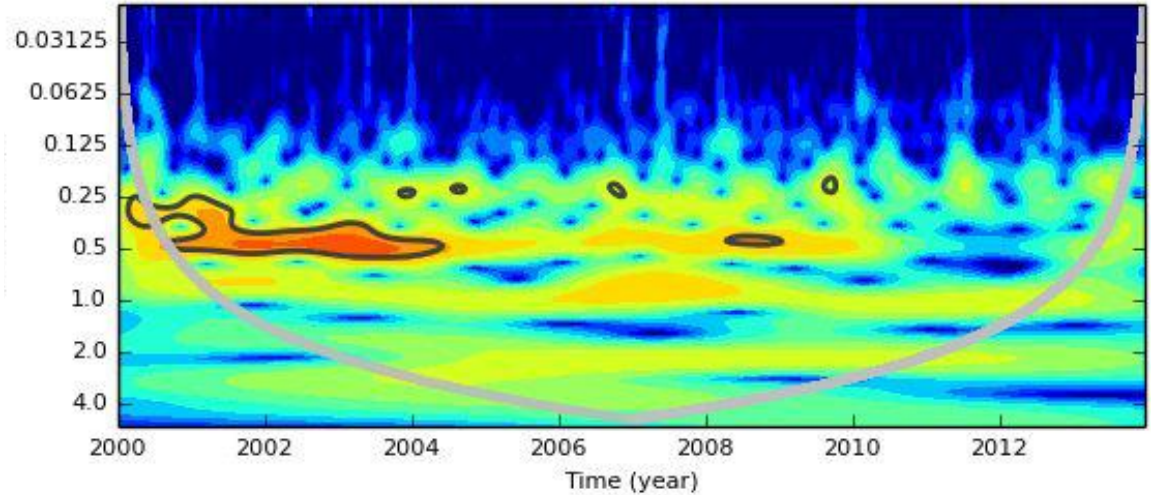
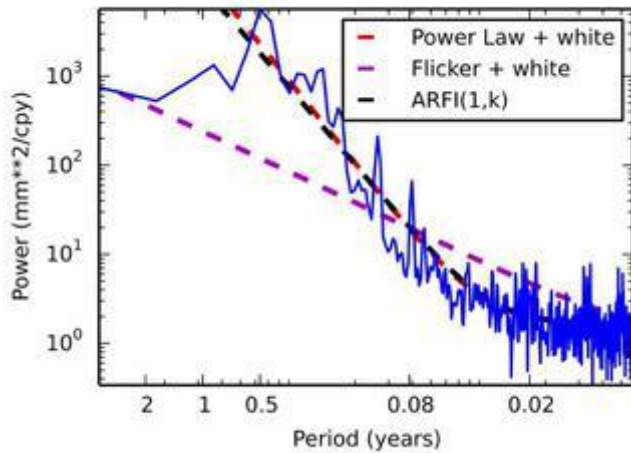
Low ( $h = 0.17\text{m}$ )



High ( $h = 1.5\text{m}$ )



## Low ( $h = 0.17\text{m}$ )



## High ( $h = 1.5\text{m}$ )

