

# *Atmospheric Refraction correction for SLR*

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# Arc definition & Processing

- Normal point data processed in monthly arcs
- Arcs reduced using iterated bayesian least squares (GeodynII)
- 3 different refraction models applied:
  - Marini-Murray (MM)
  - Saastamoinen & Mendes MF\* (MENDES)
  - Saastamoinen with Ciddor dispersion formula & Mendes MF\* (C-MENDES)

## Estimated Parameters

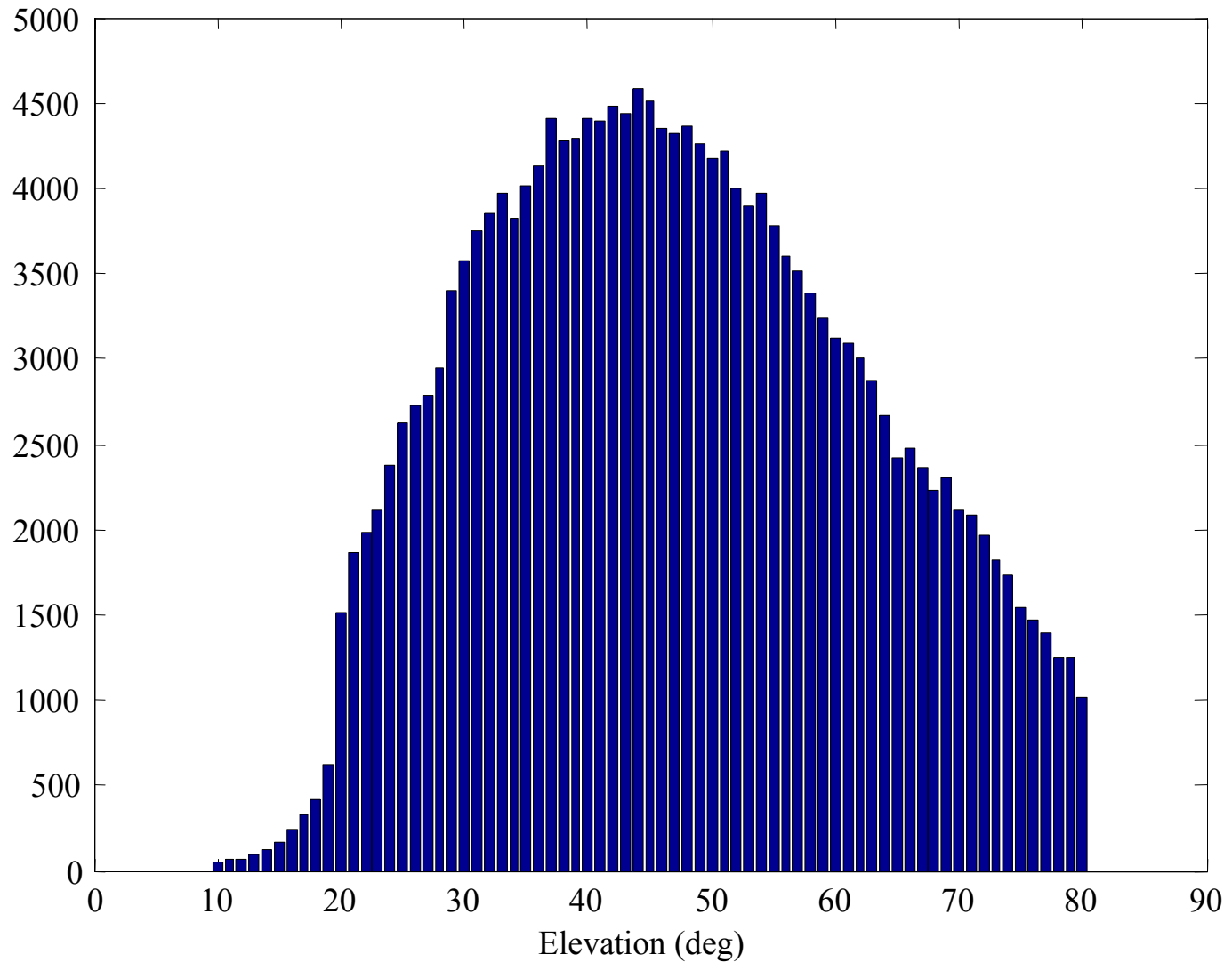
- state vectors
- 5-day constant along-track accel.
- 5-day once-per-rev along-track accel.
- 5-day once-per-rev cross-track accel.

## A priori values

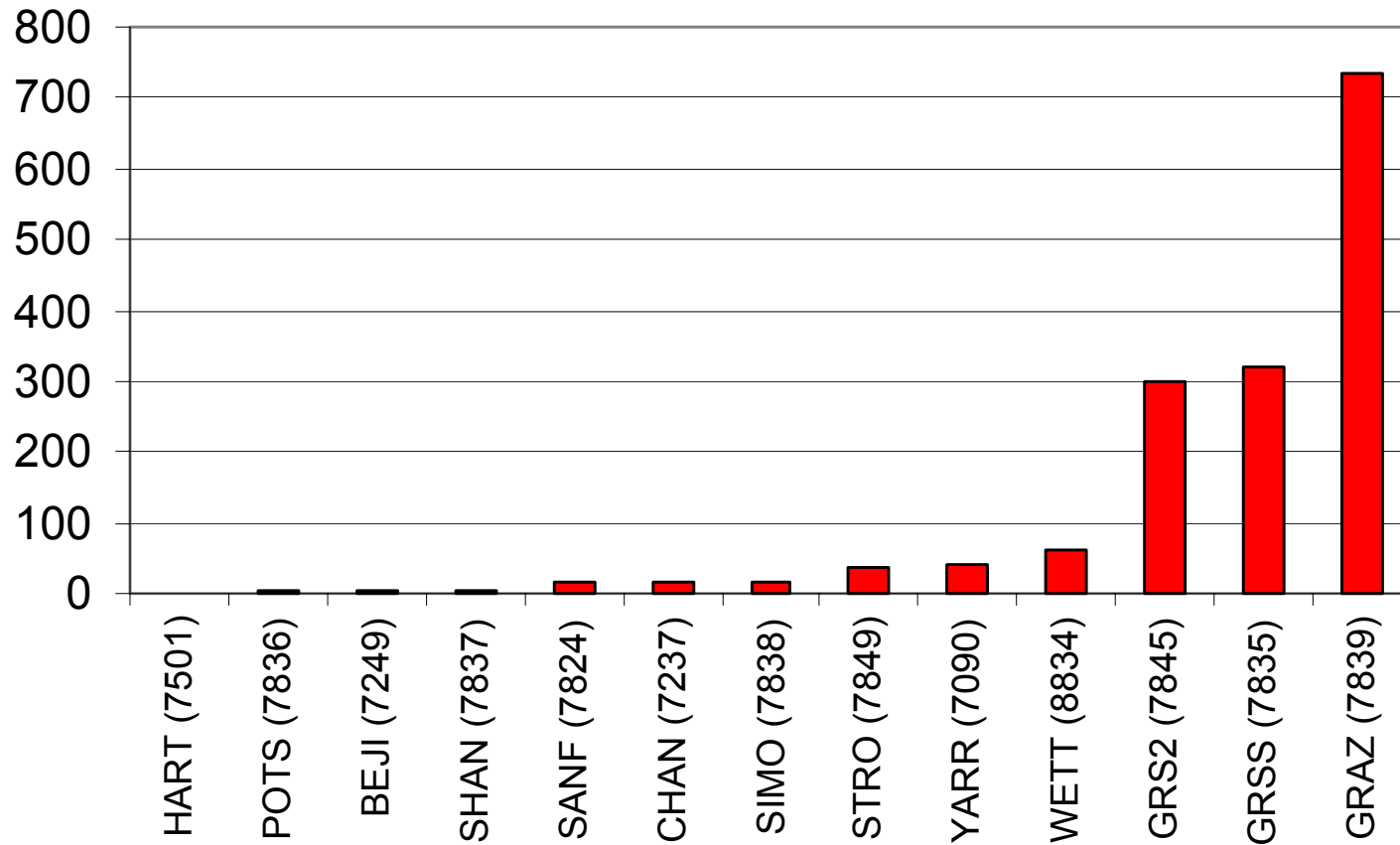
- ITRF2000
- EOPC04

\* Mendes Mapping Function using meteo data

# LAGEOS-2 observations (1999-2001)



## Number of L2 obs. collected at 10°-20° elevation (1999-2001)



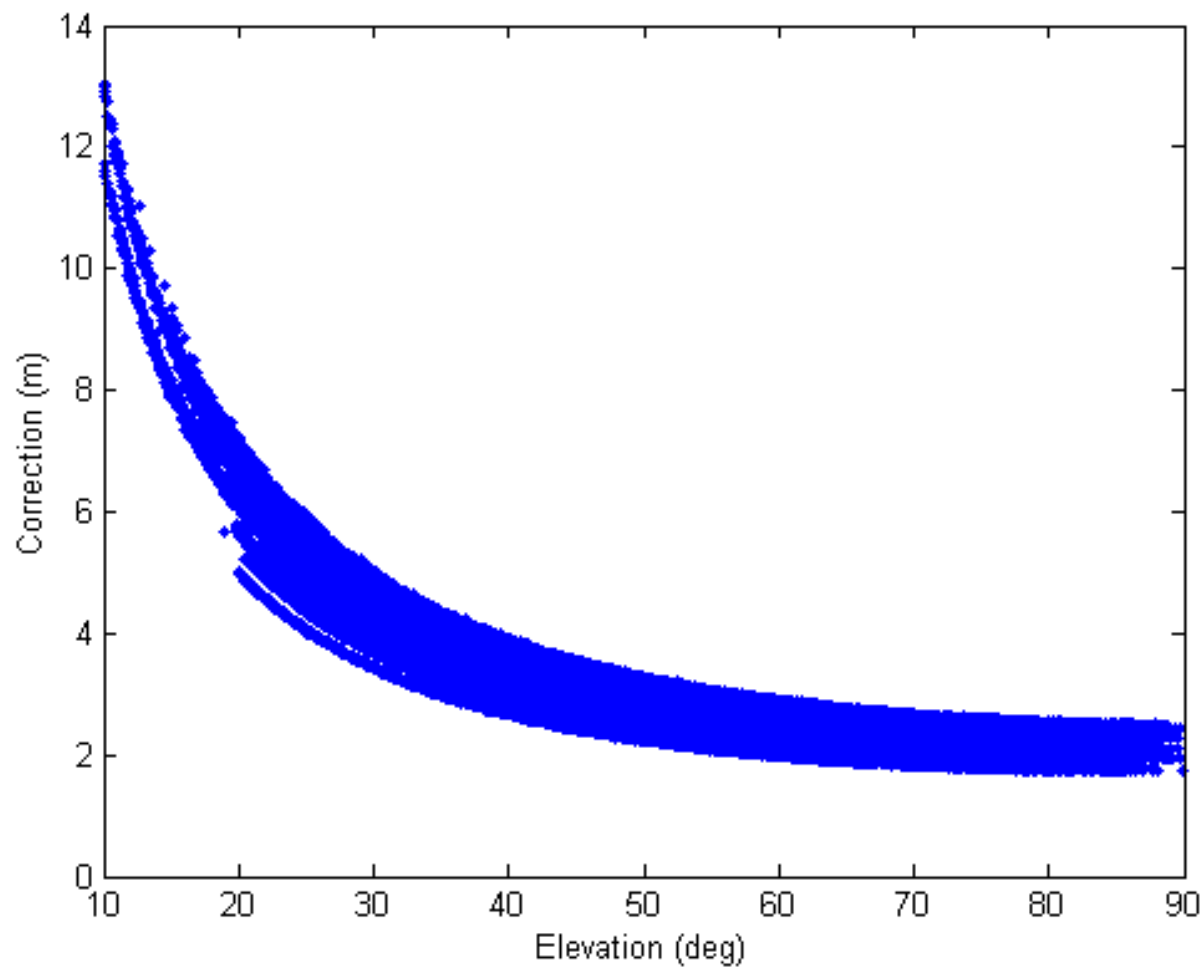
**Sites = 13**

**Total sites = 34**

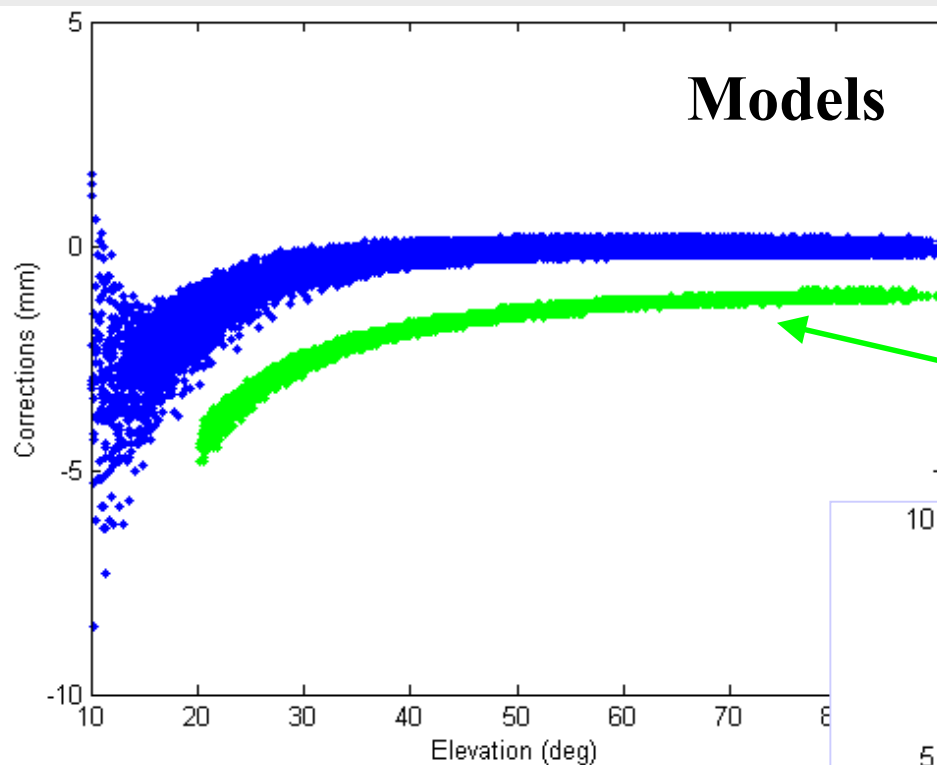
**Obs = 1500**

**Total obs = 200.000**

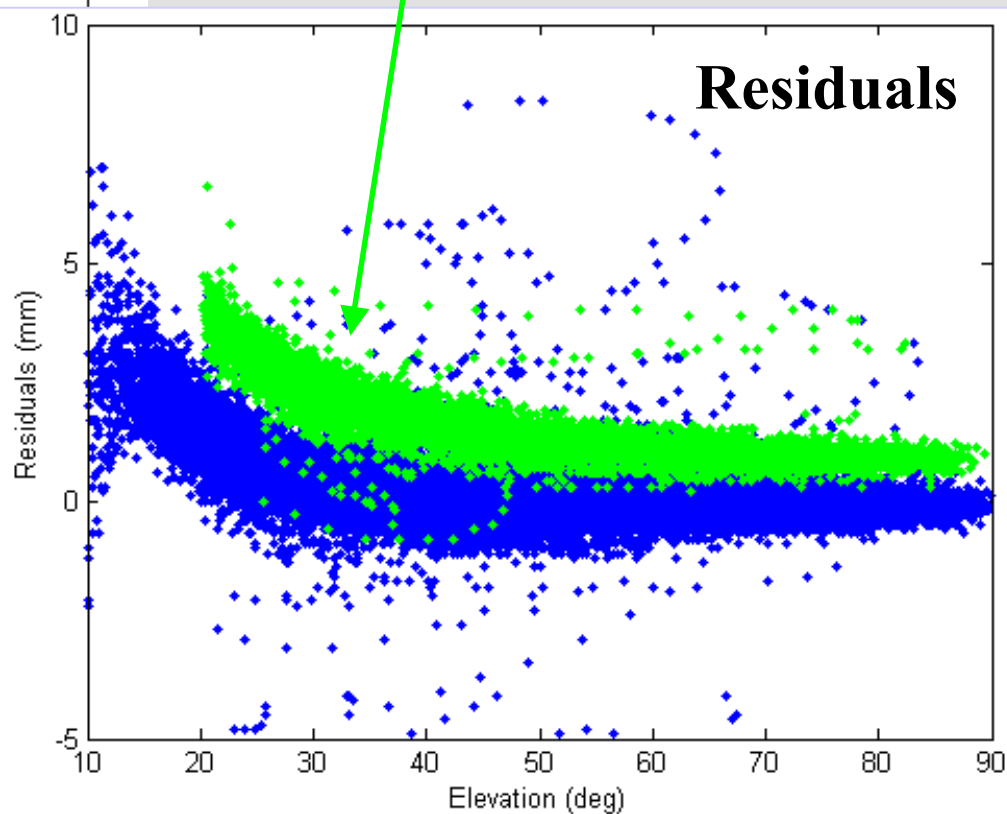
## Marini-Murray correction applied to real data (1999-2001)



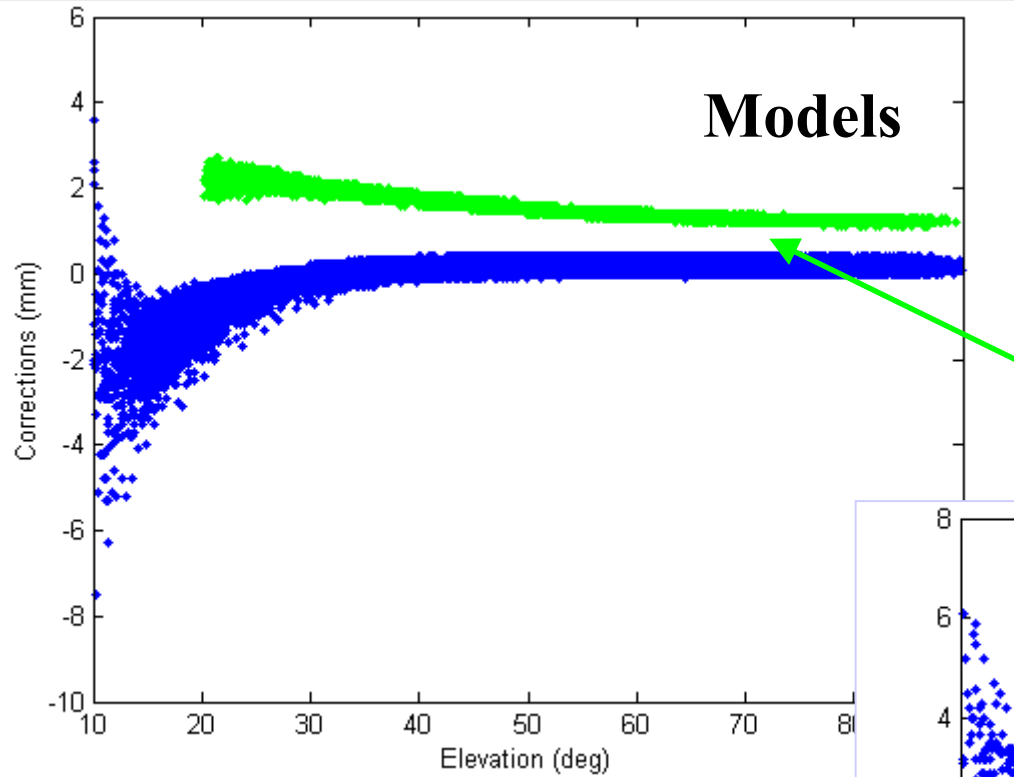
# Difference between MENDES and MM



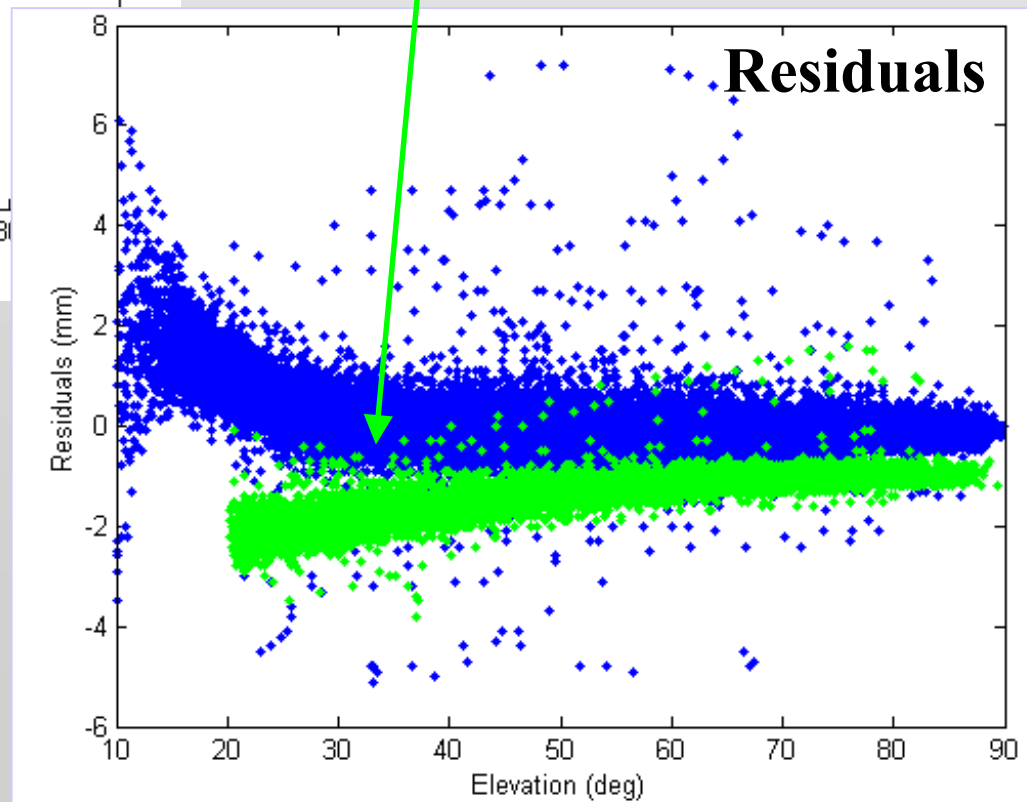
Station ZIMM(7810) ( $\lambda=423$  nm)



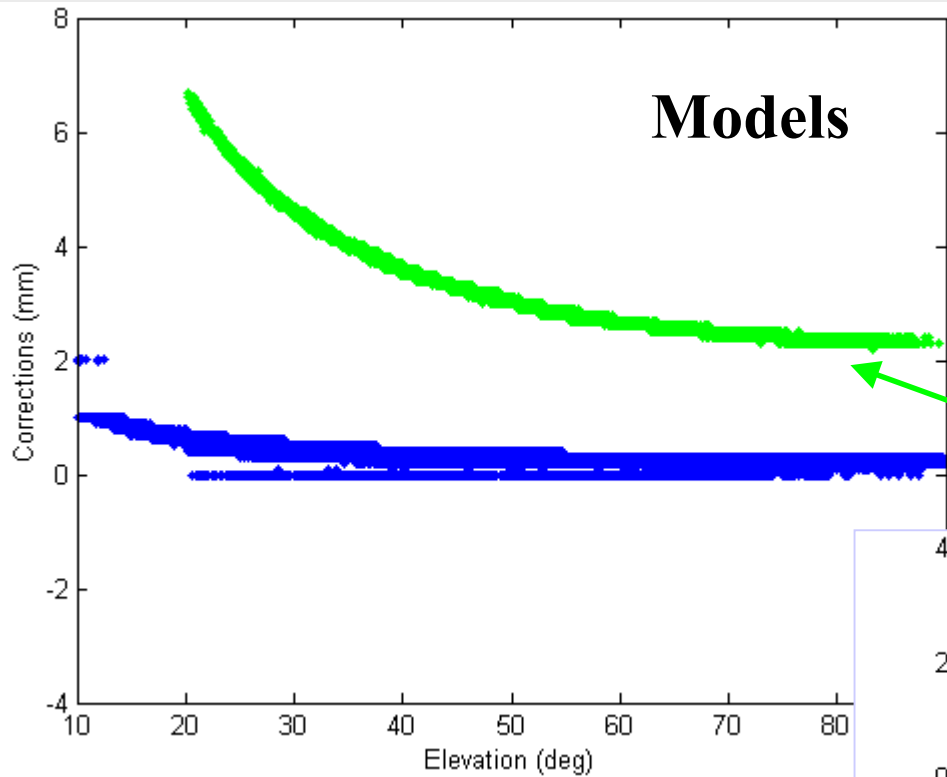
# Difference between C-MENDES and MM



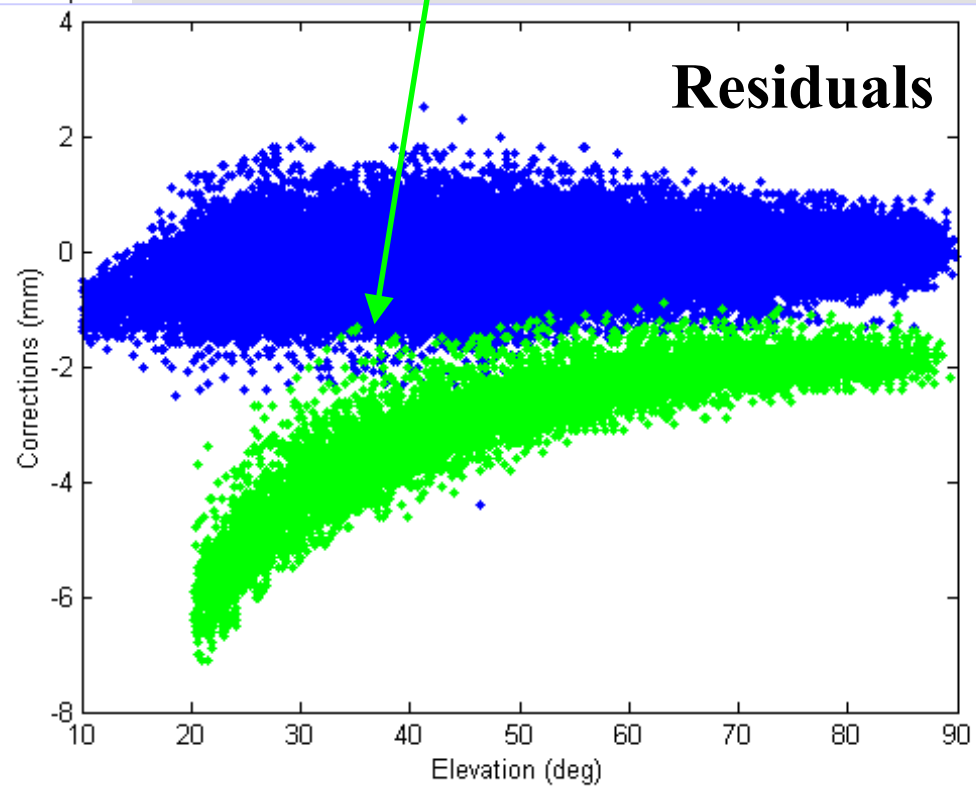
Station ZIMM(7810) ( $\lambda=423$  nm)



# Difference between C-MENDES and MENDES

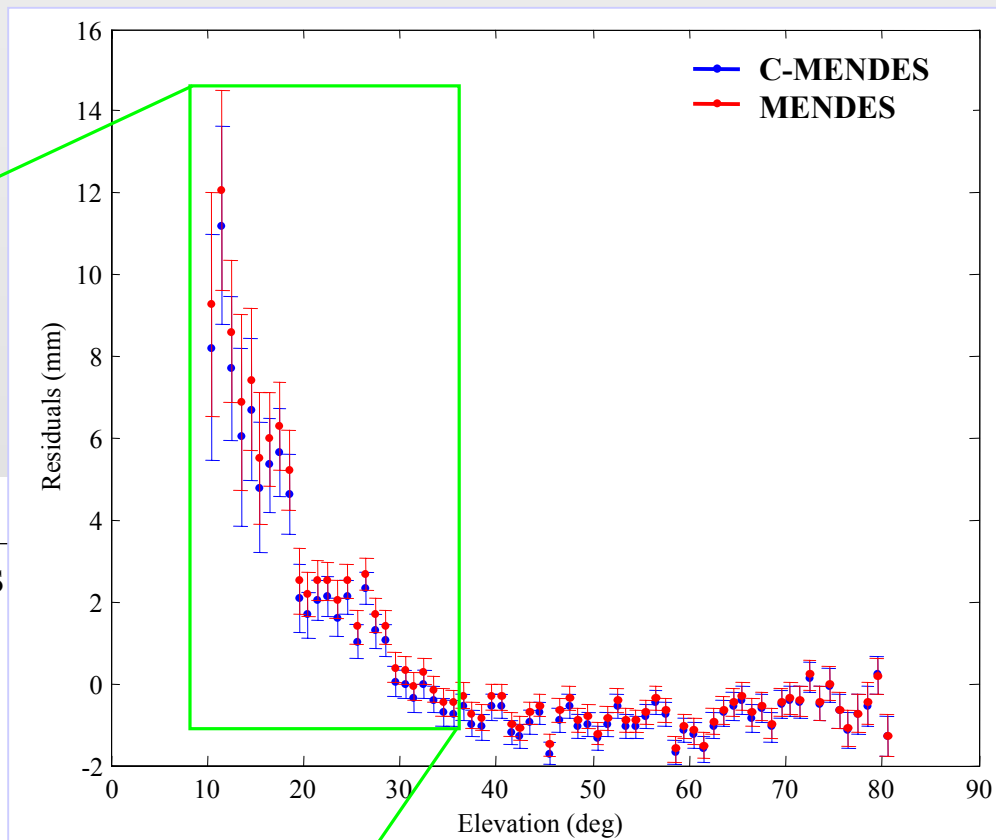
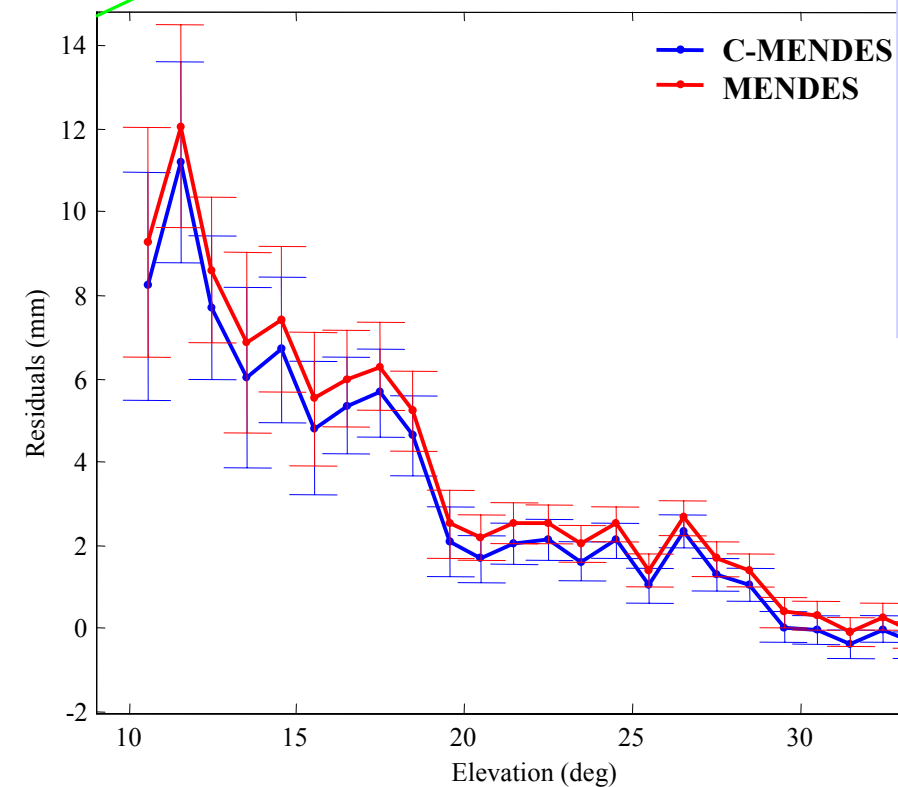


Station ZIMM(7810) ( $\lambda=423$  nm)



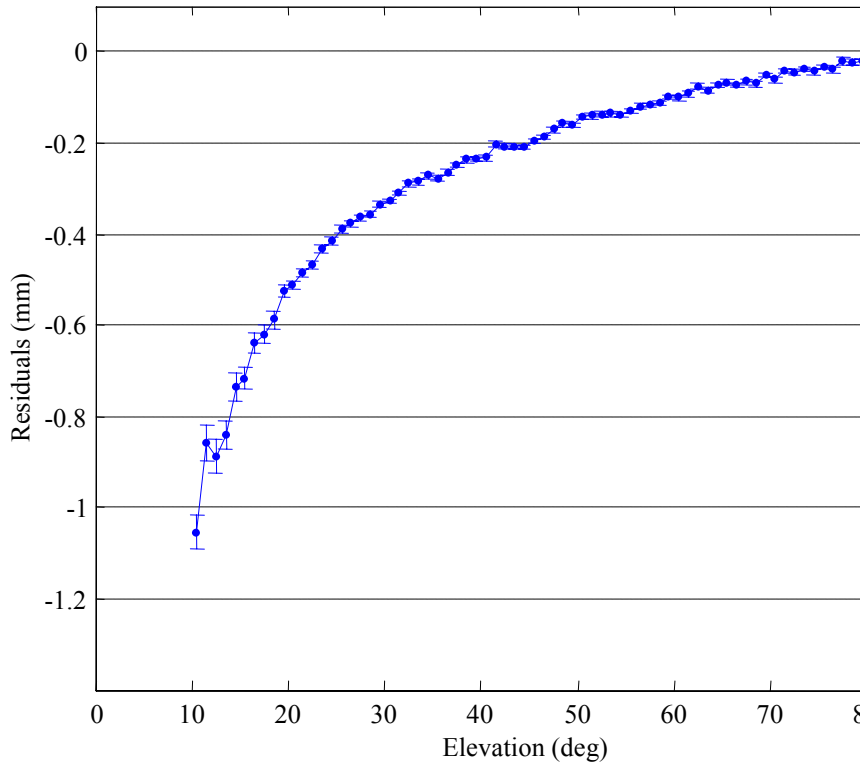


# Orbit residuals for C-MENDES and MENDES ( $\lambda=532$ nm)

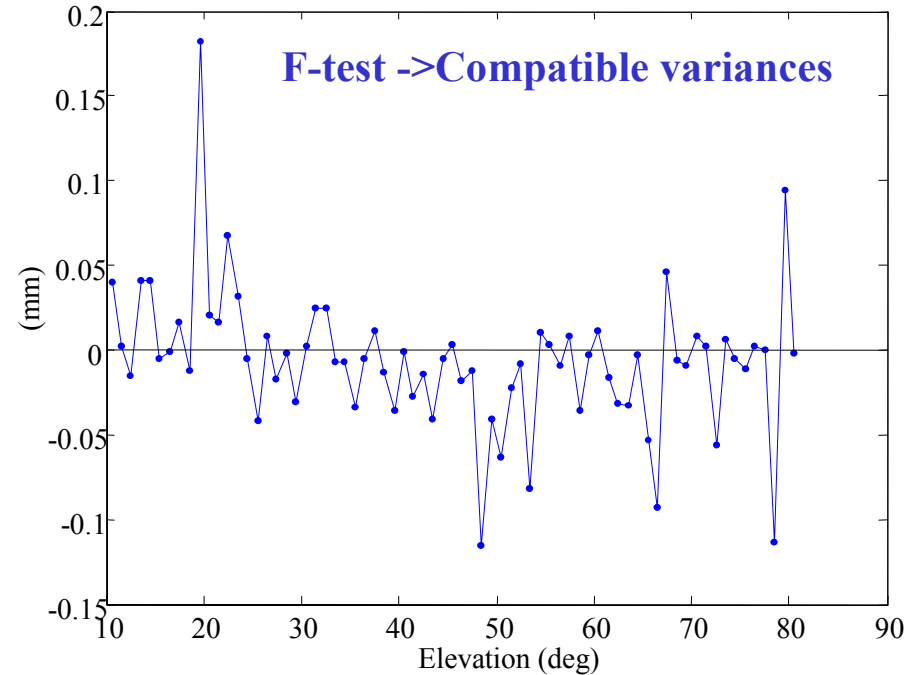


# Residual Differences C-MENDES - MENDES ( $\lambda=532$ nm)

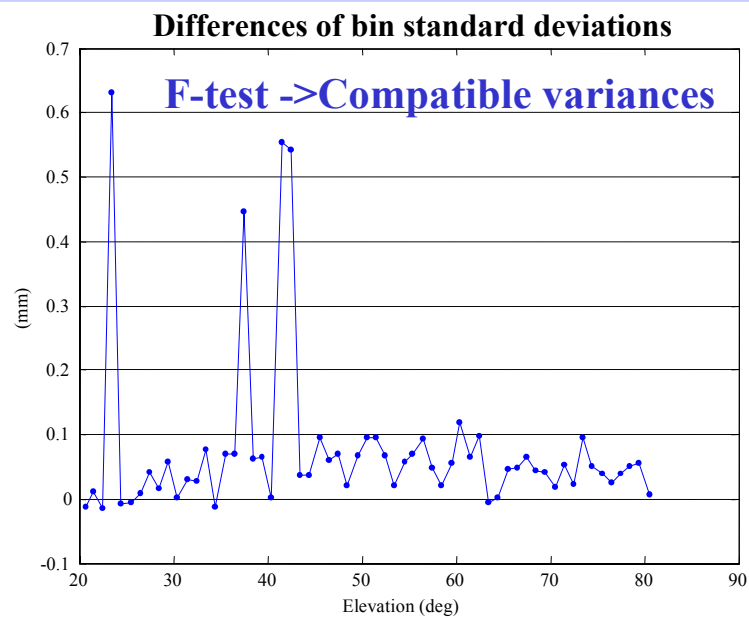
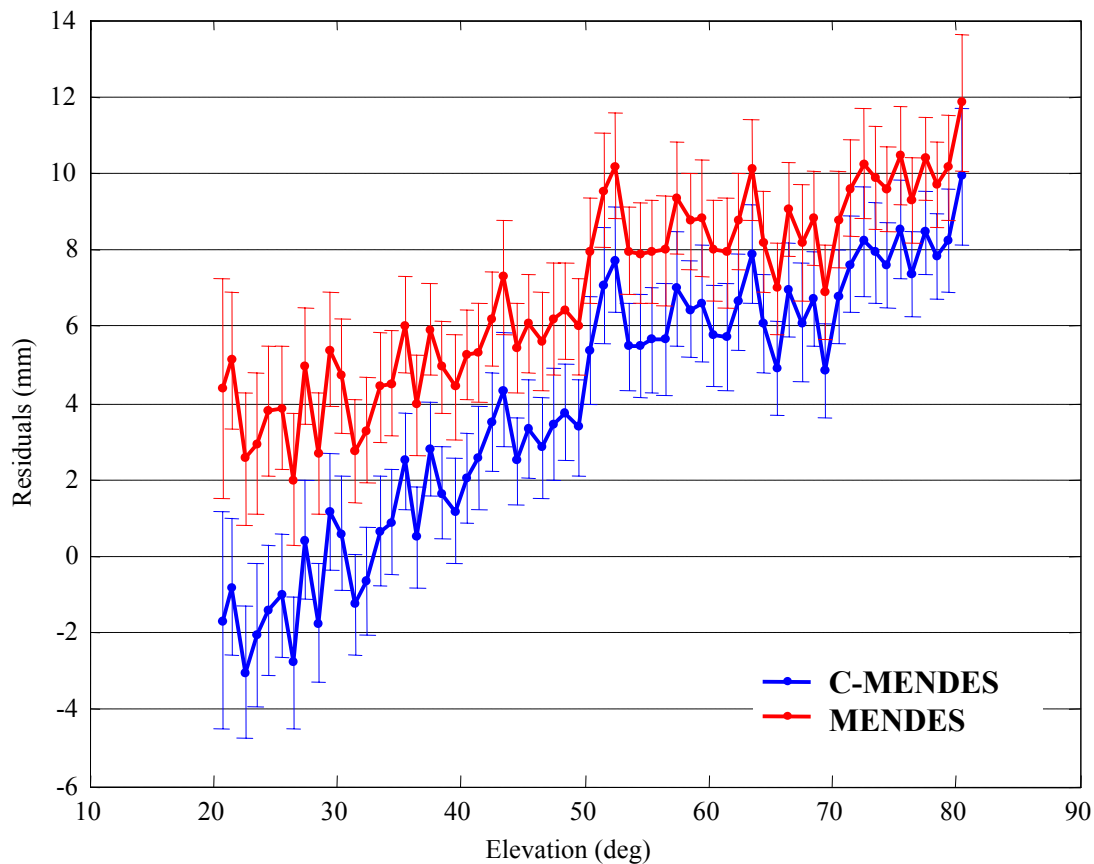
## Mean Differences



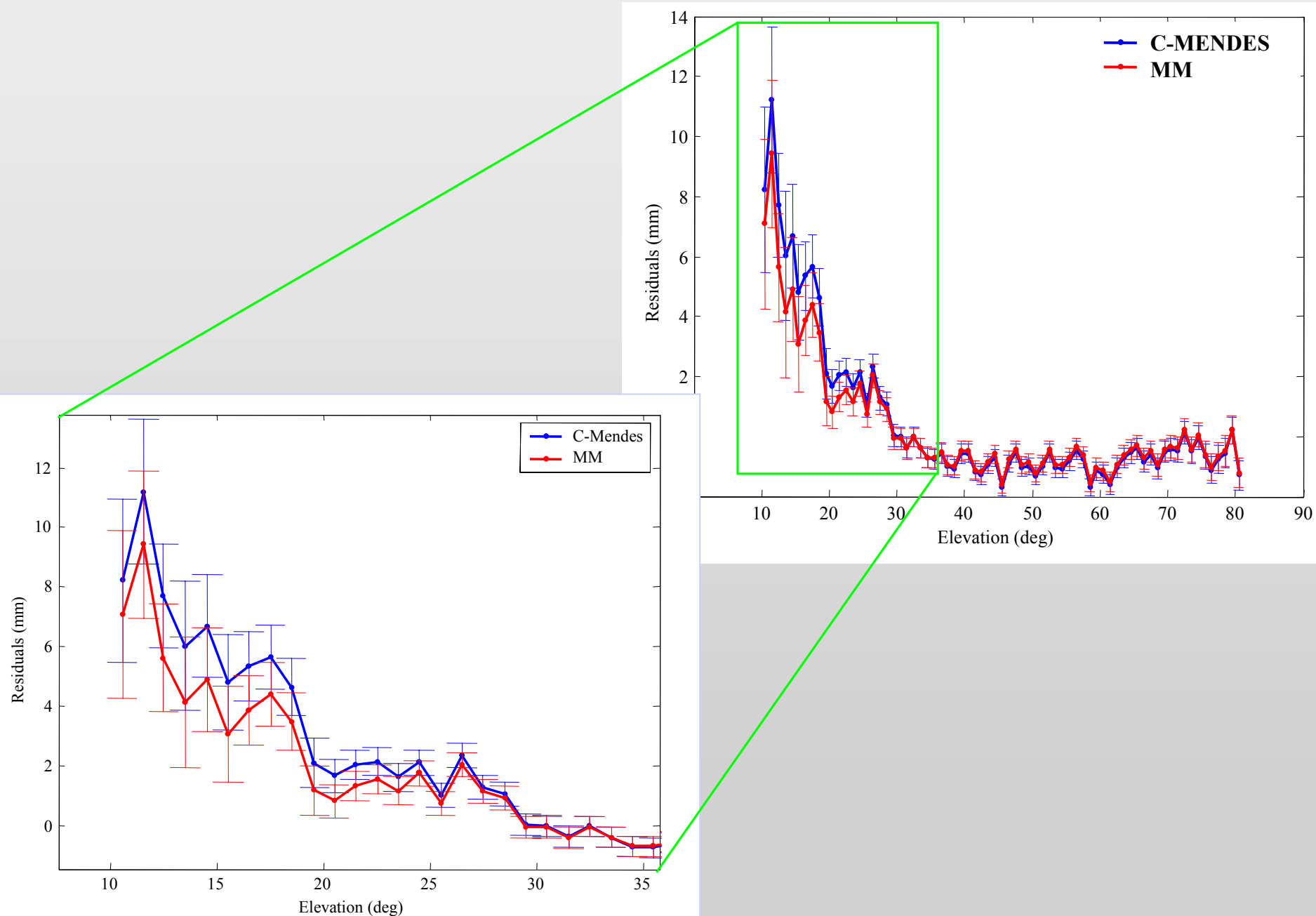
## Differences of bin standard deviations



# Orbit residuals for C-MENDES and MENDES ( $\lambda=423$ nm)

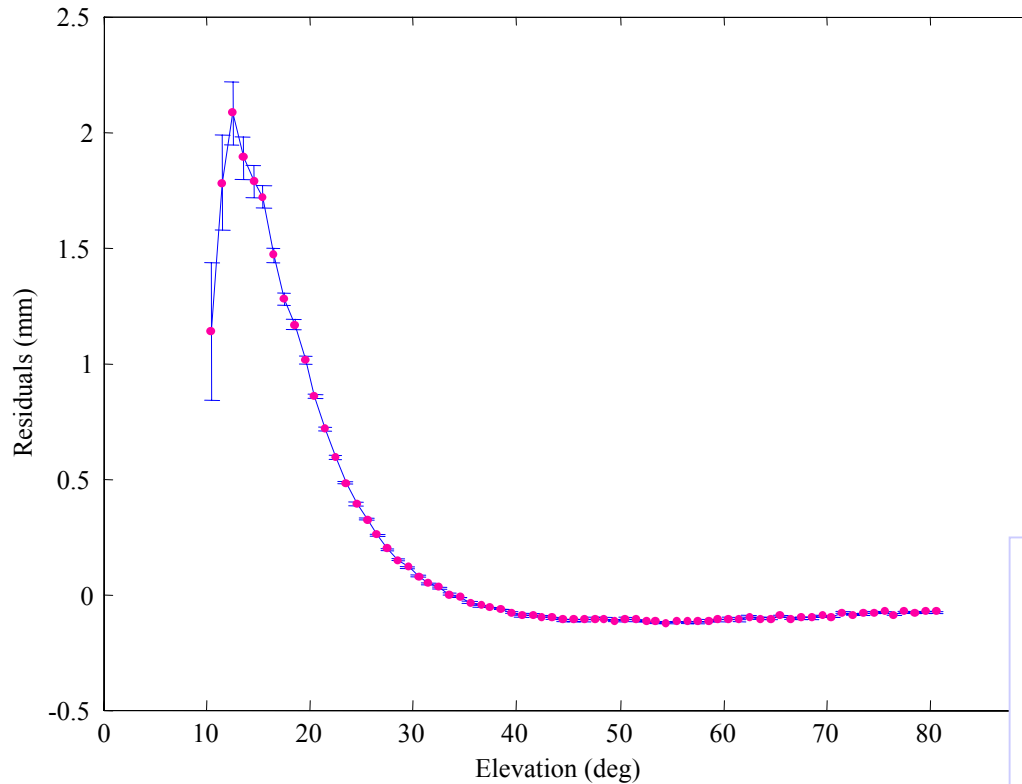


# Orbit residuals for C-MENDES and MM ( $\lambda=532$ nm)

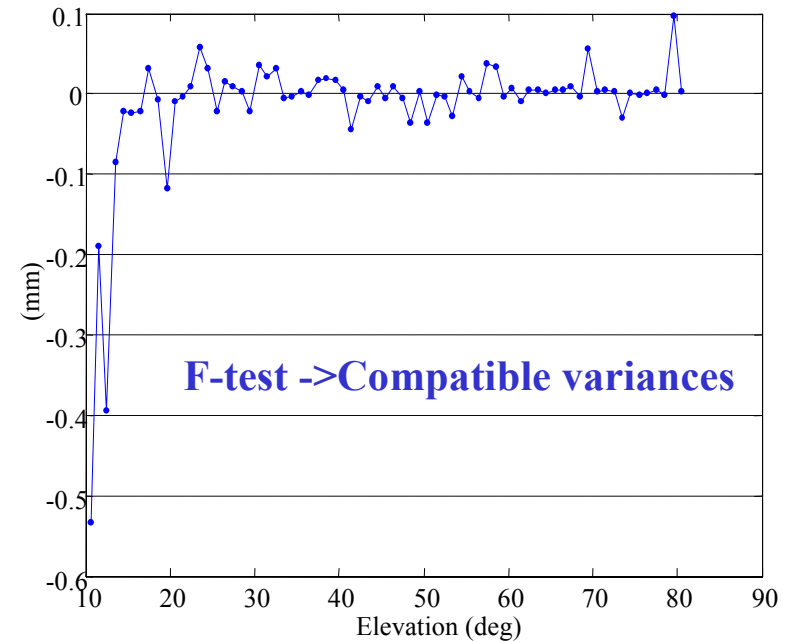


# Residual Differences C-MENDES - MM ( $\lambda=532$ nm)

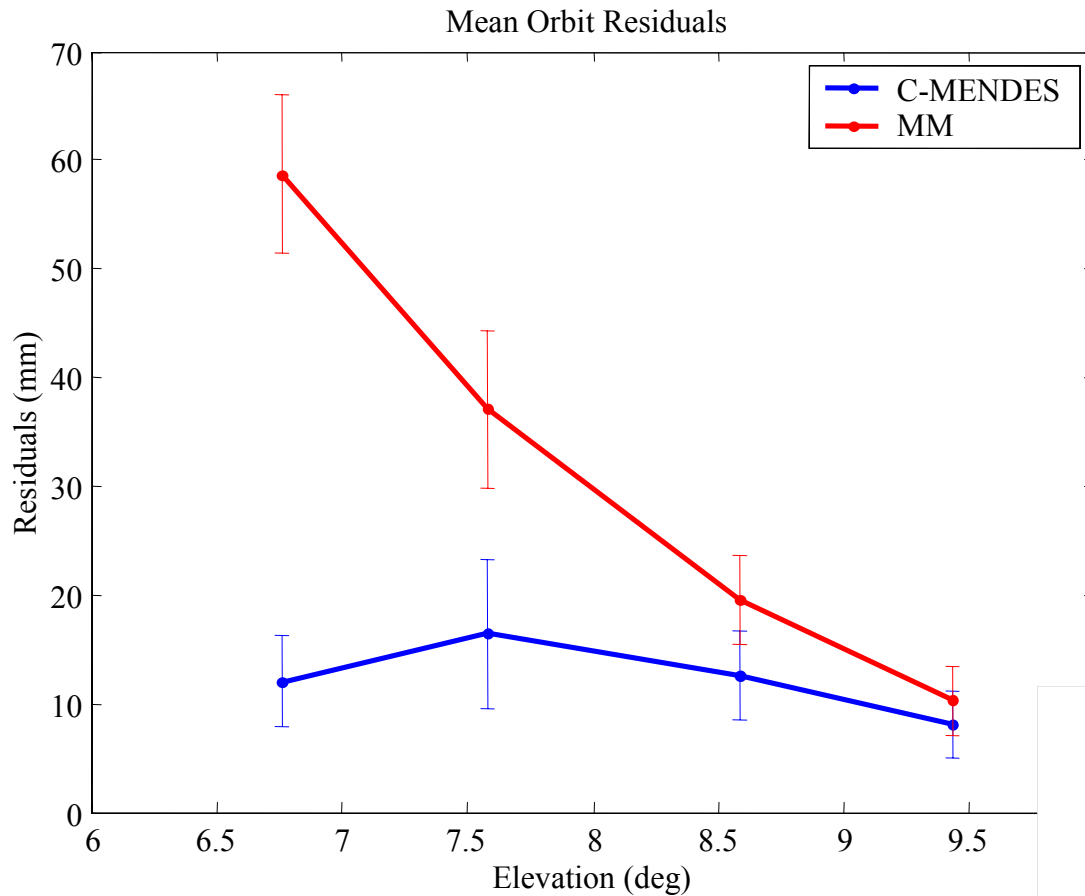
## Mean Differences



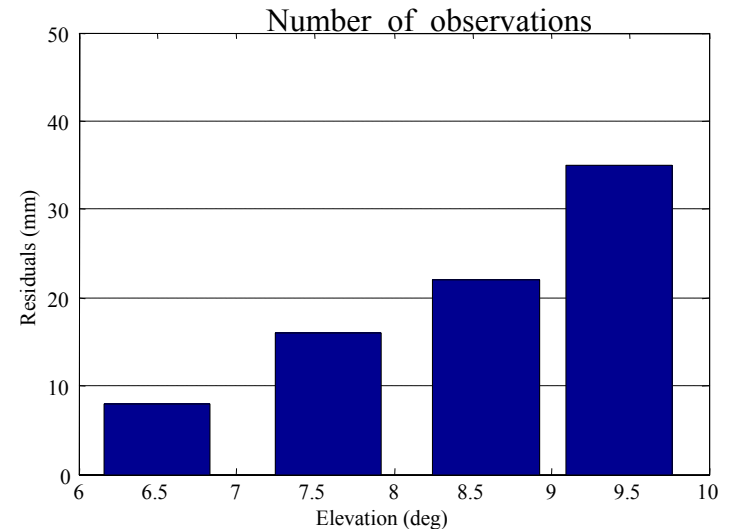
## Differences of bin standard deviations



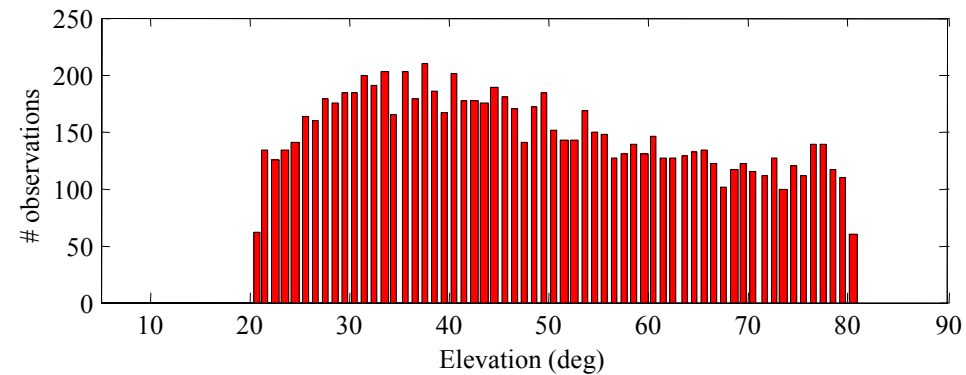
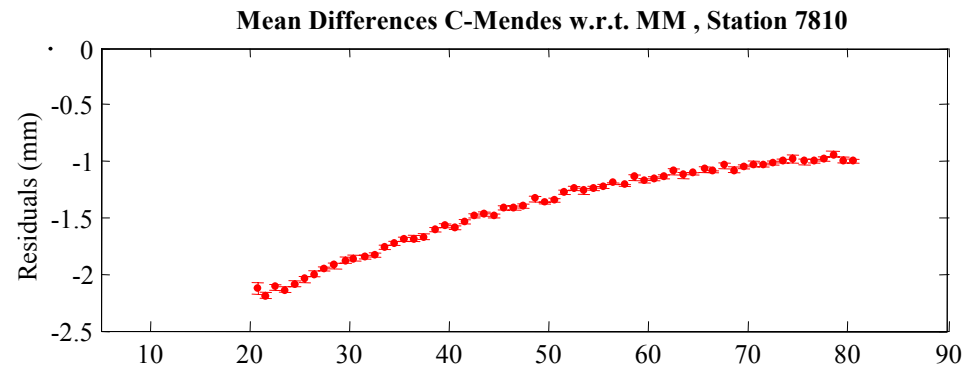
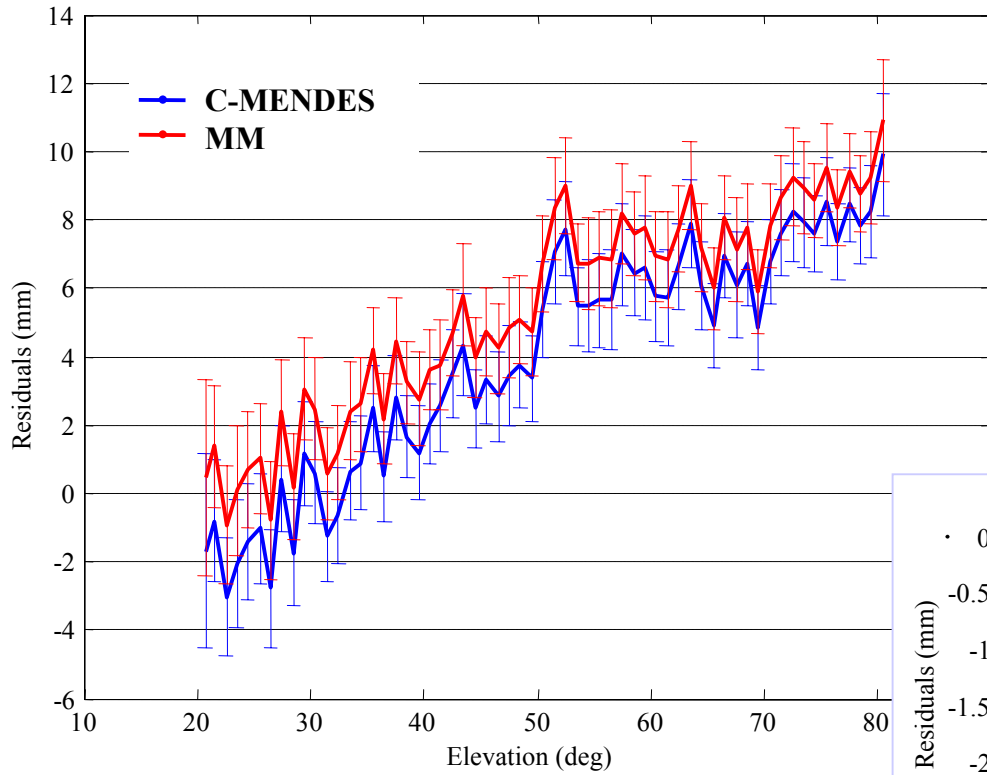
# Orbit residuals for C-MENDES and MM ( $\lambda=532$ nm)



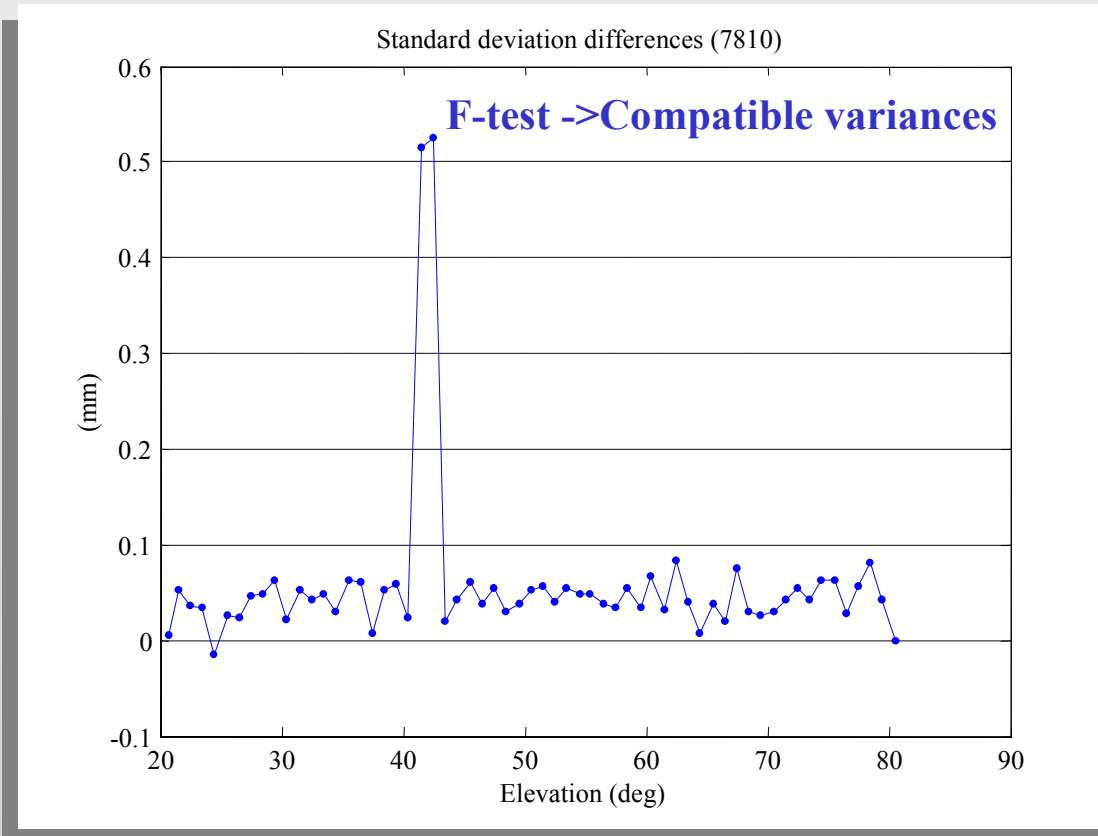
**Available data from:**  
**GRAZ (7839)**  
**GRASSE (7845)**



# Orbit residuals for C-MENDES and MM ( $\lambda=423$ nm)



# Differences of bin standard deviations C-MENDES - MM ( $\lambda=423$ nm)

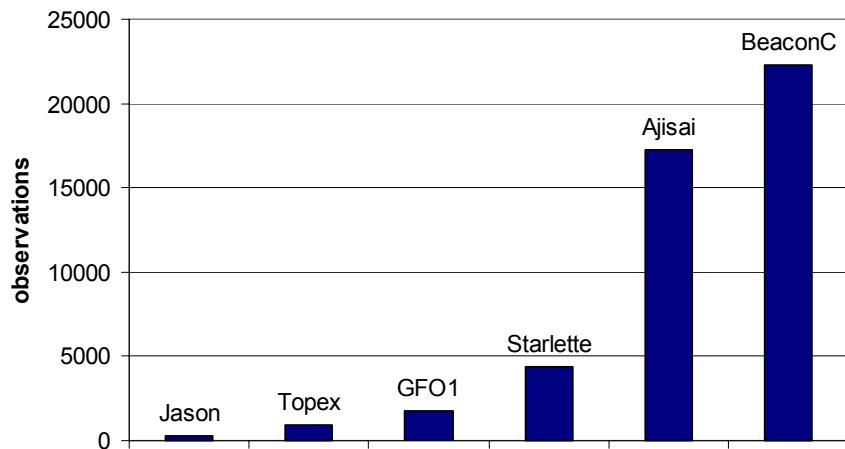
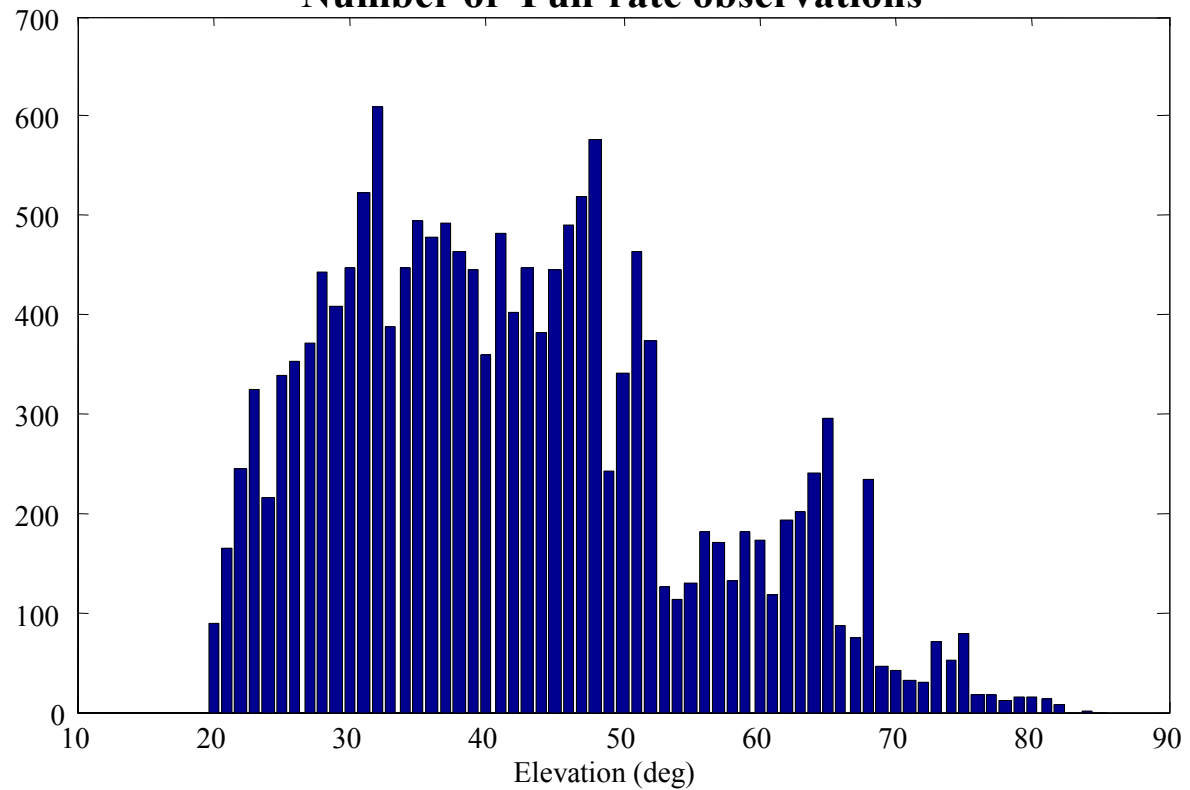




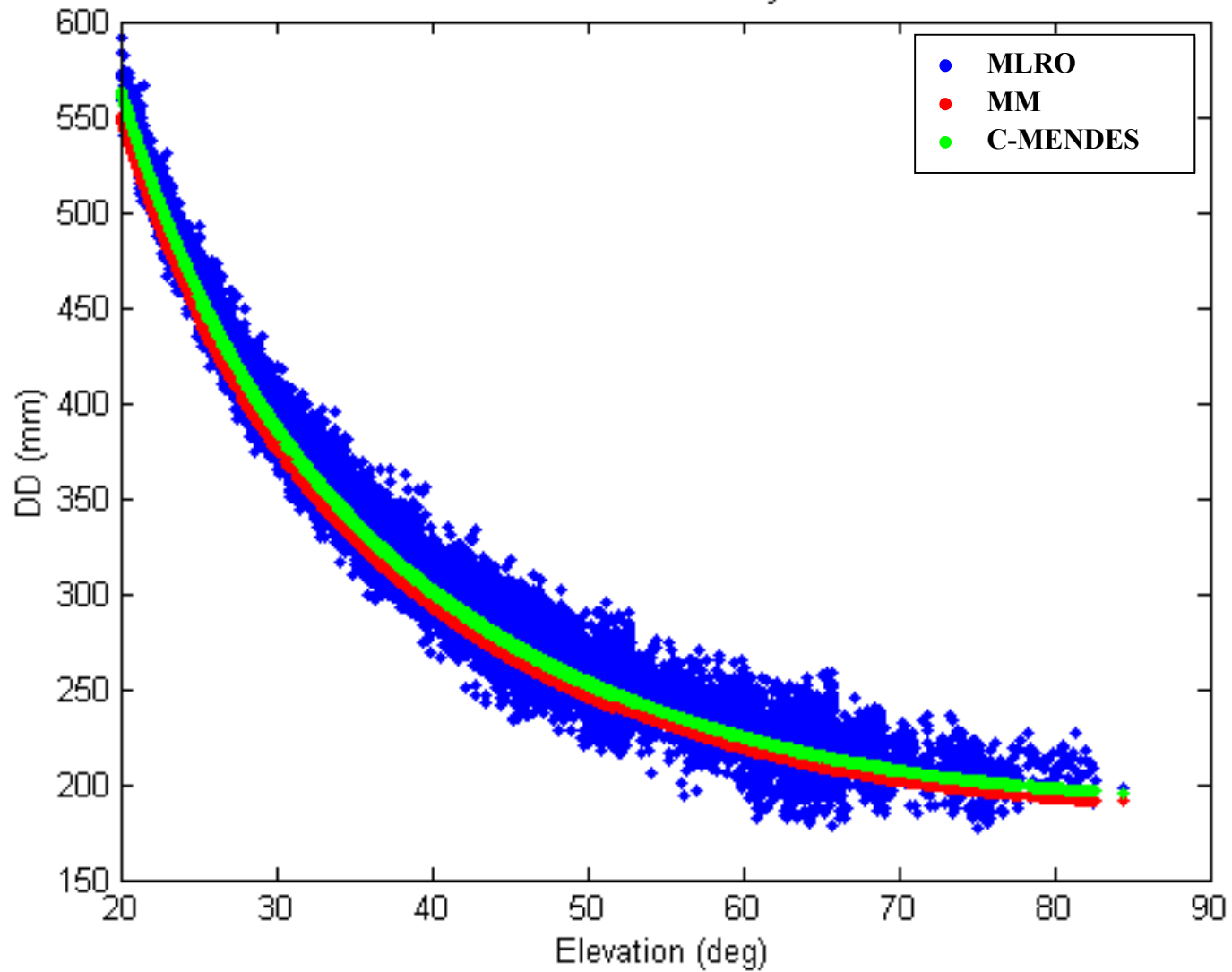
# MLRO two-color data

Green  $\lambda = 532$  nm  
UV  $\lambda = 355$  nm

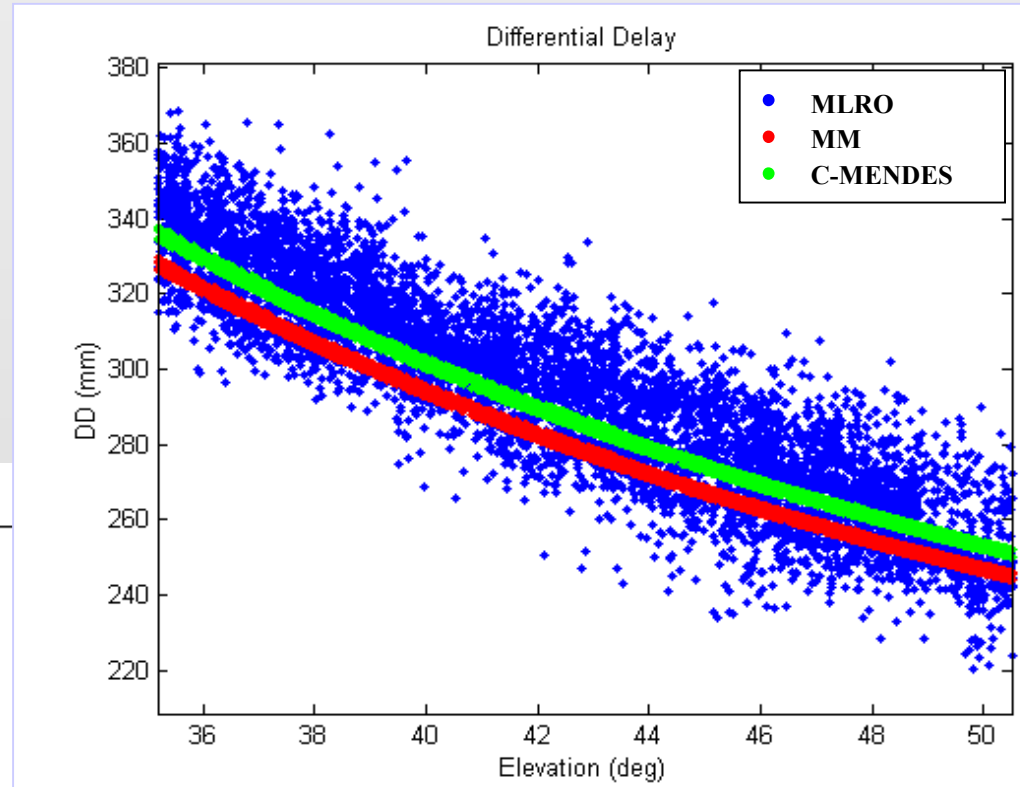
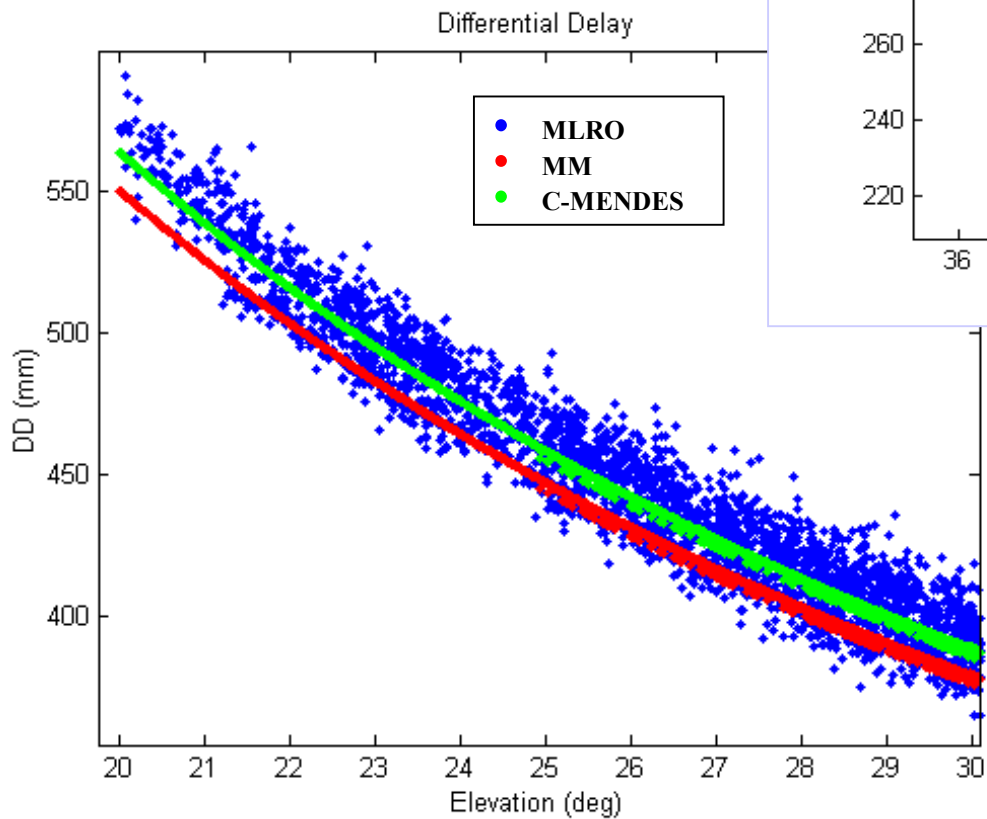
## Number of Full-rate observations



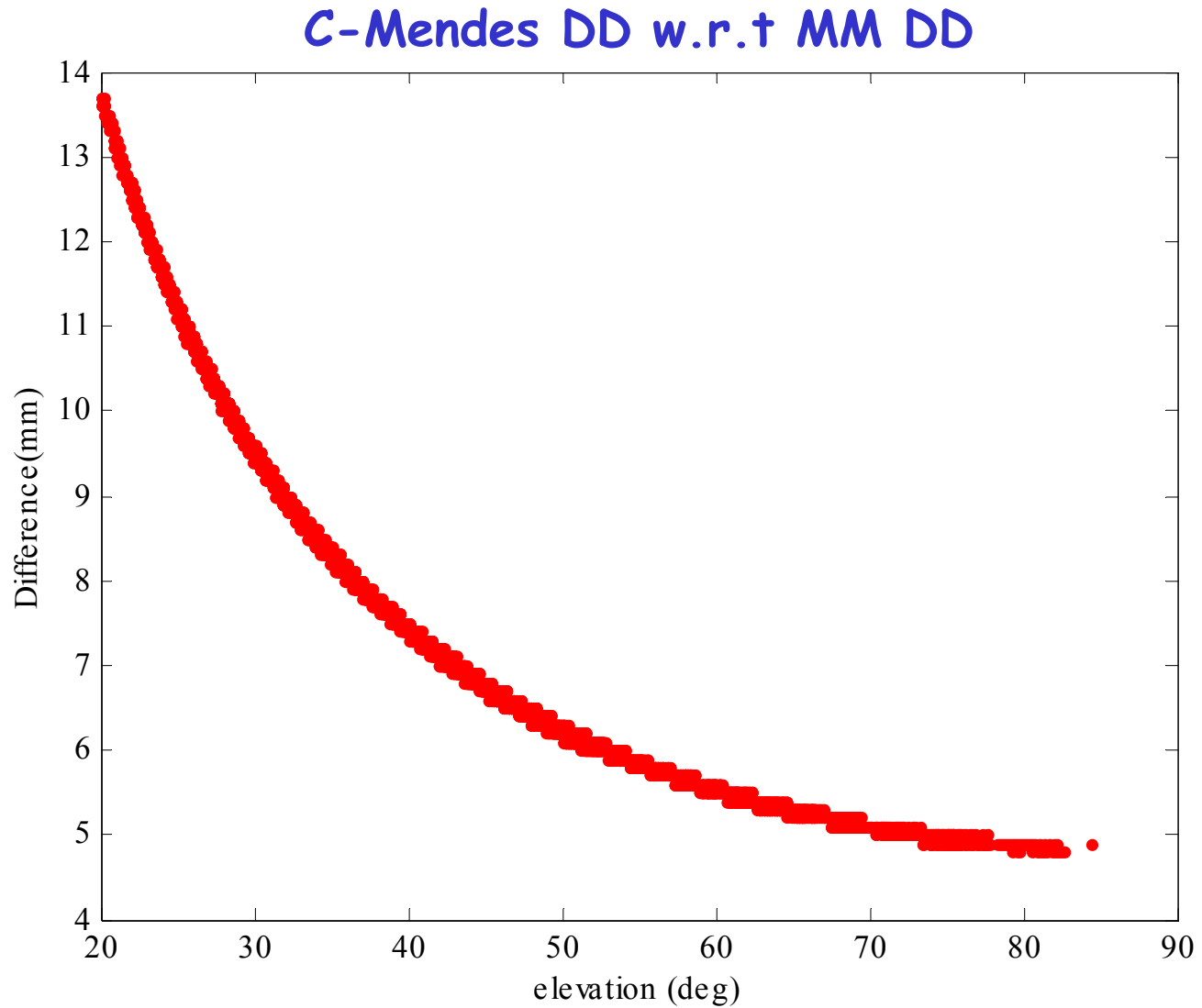
# Differential Delay UV-Green



# Differential Delay UV-Green (zoom)



# Modeled Differential Delay (DD) UV-Green



# Difference of modeled DD w.r.t MLRO observed DD

