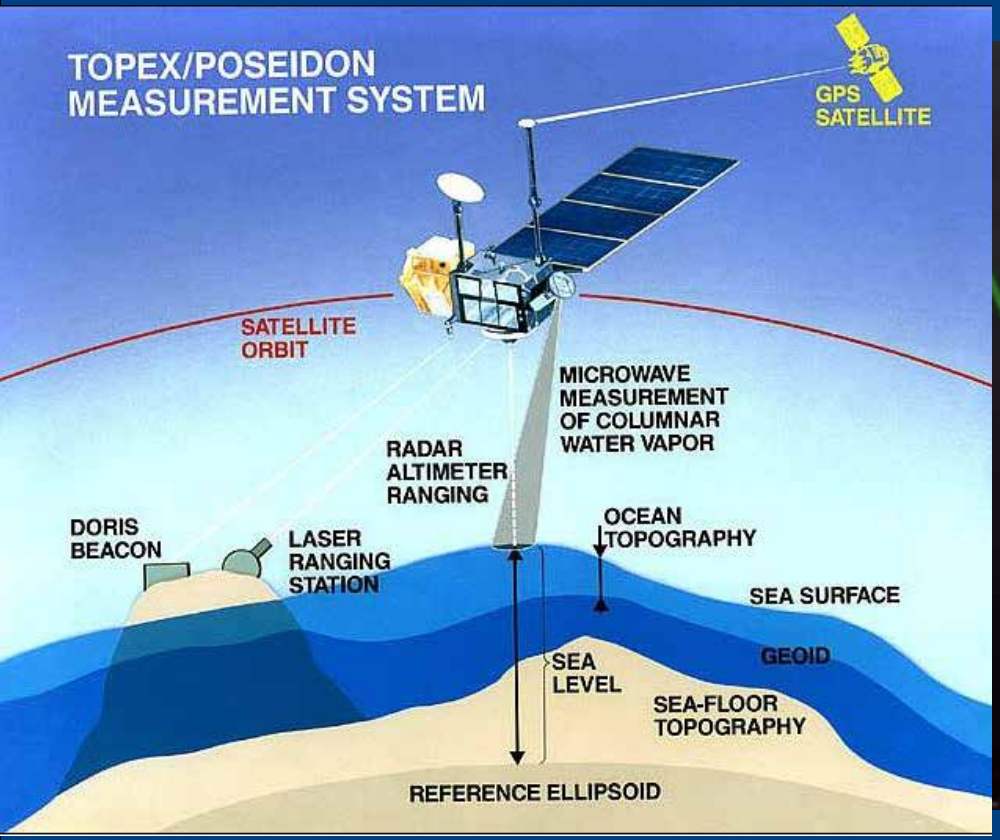
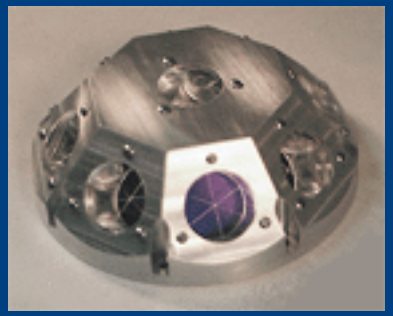
Analysis of SLR station biases



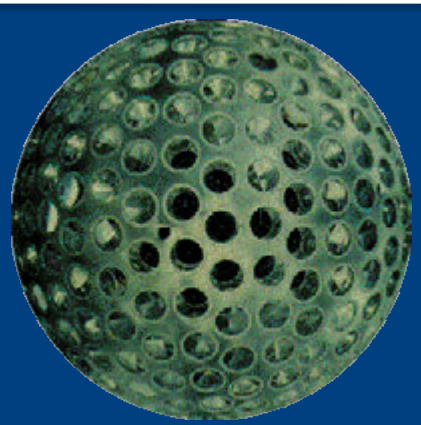
S.L. Bruinsma, F. Reinquin, A. Couhert
CNES, Toulouse, France

The laser geodetic satellites

Stella, Starlette
Ø=24cm, 60CCR, 48kg



(on altimeter mission)



LAGEOS I/II
Ø=60cm, 426CCR, 410kg

ü **Satellite Laser Ranging (SLR): since the 60's**

ü **Sparse network**

ü **Basic equation simple:**

$$r_{station-satellite} = \frac{1}{2} c T_{two-way} + \Delta r\ (corrections)$$

But:

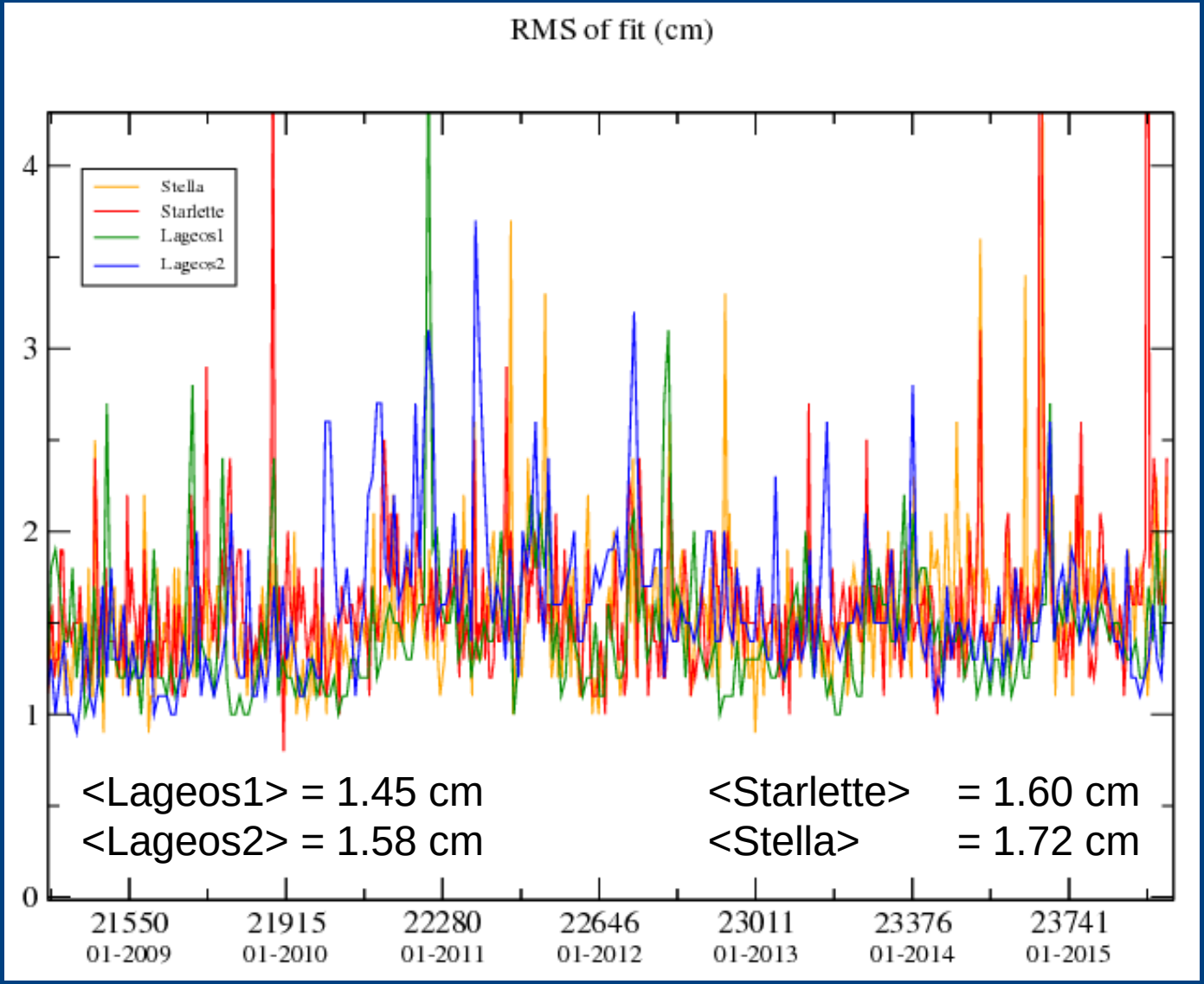
Ø ***Calibration (internal delays)***

Ø ***Time tag, return power***

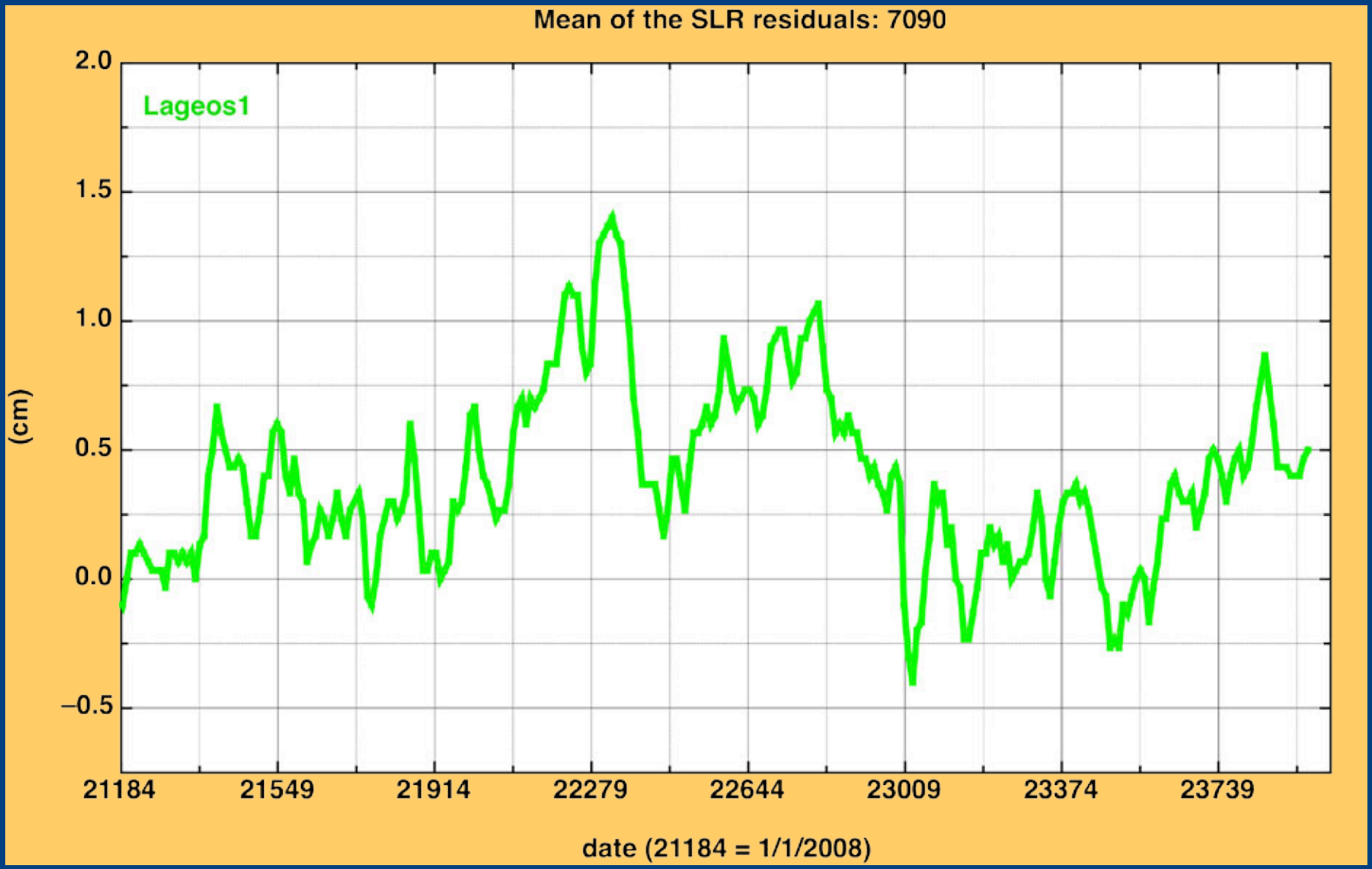
Ø ***CCR signature***

RMS-of-fit geodetic satellites

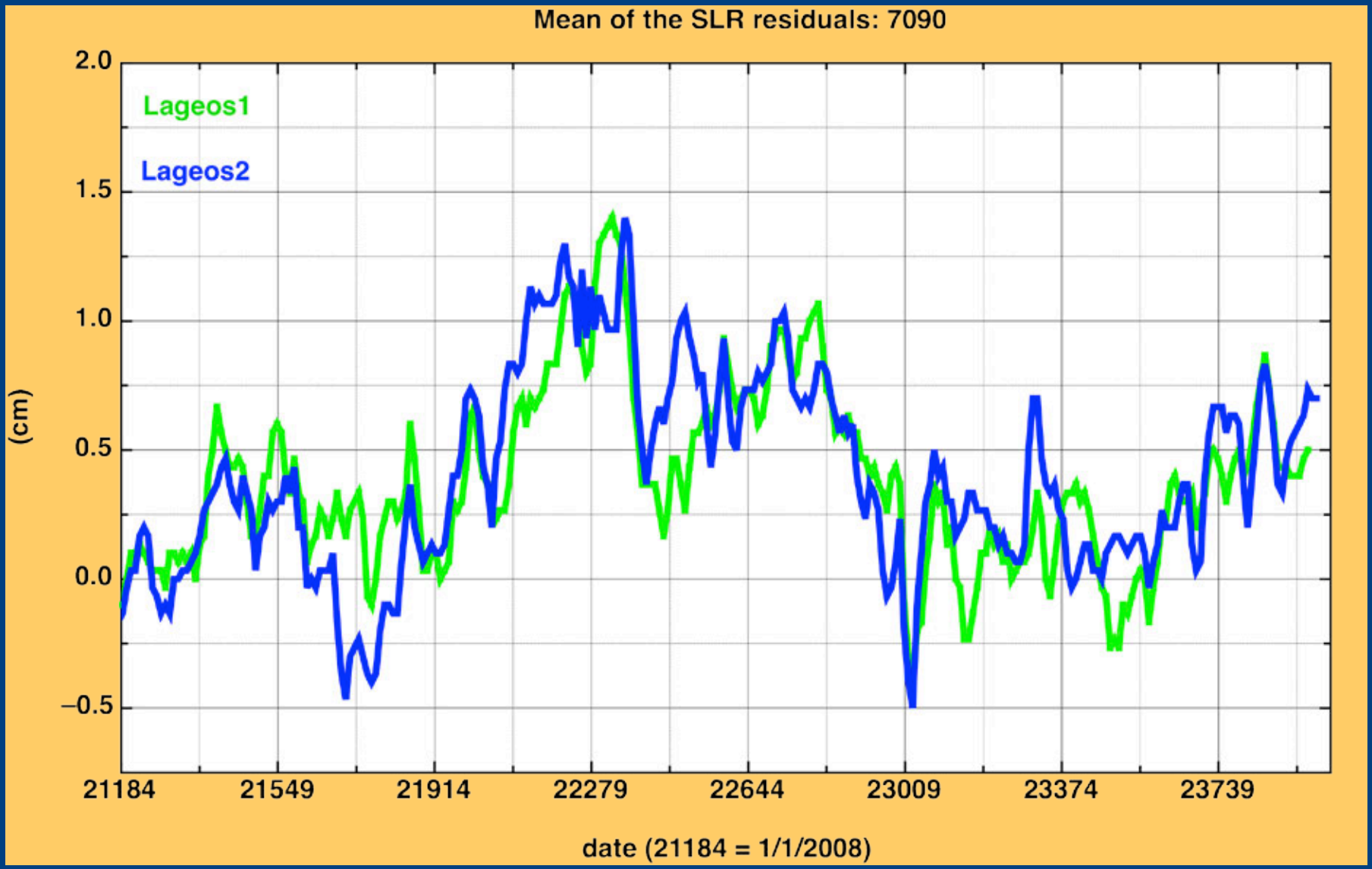
Lageos1/2: 10-day arcs Starlette/Stella: 5-day arcs



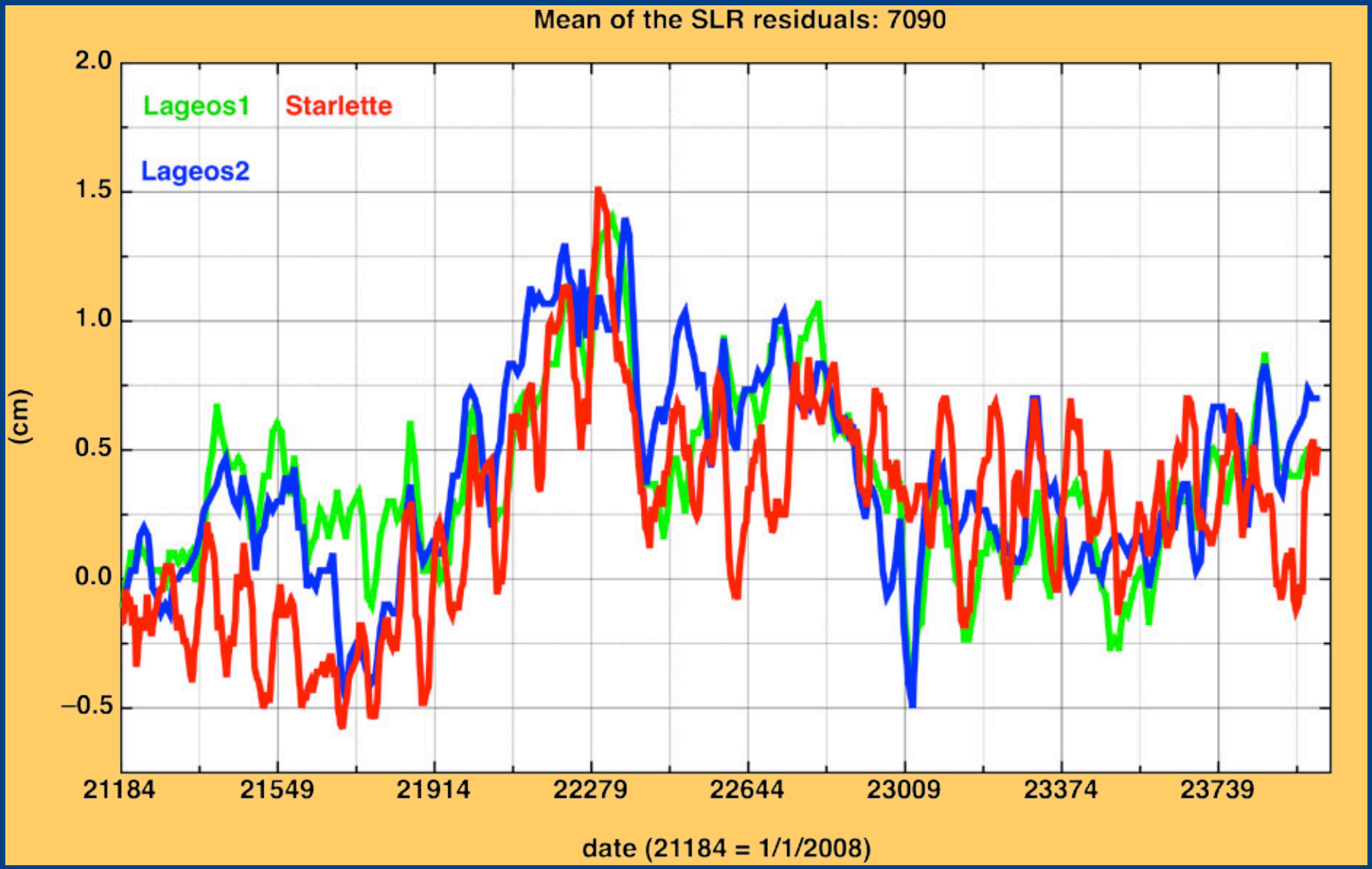
Mean of SLR residuals – station bias



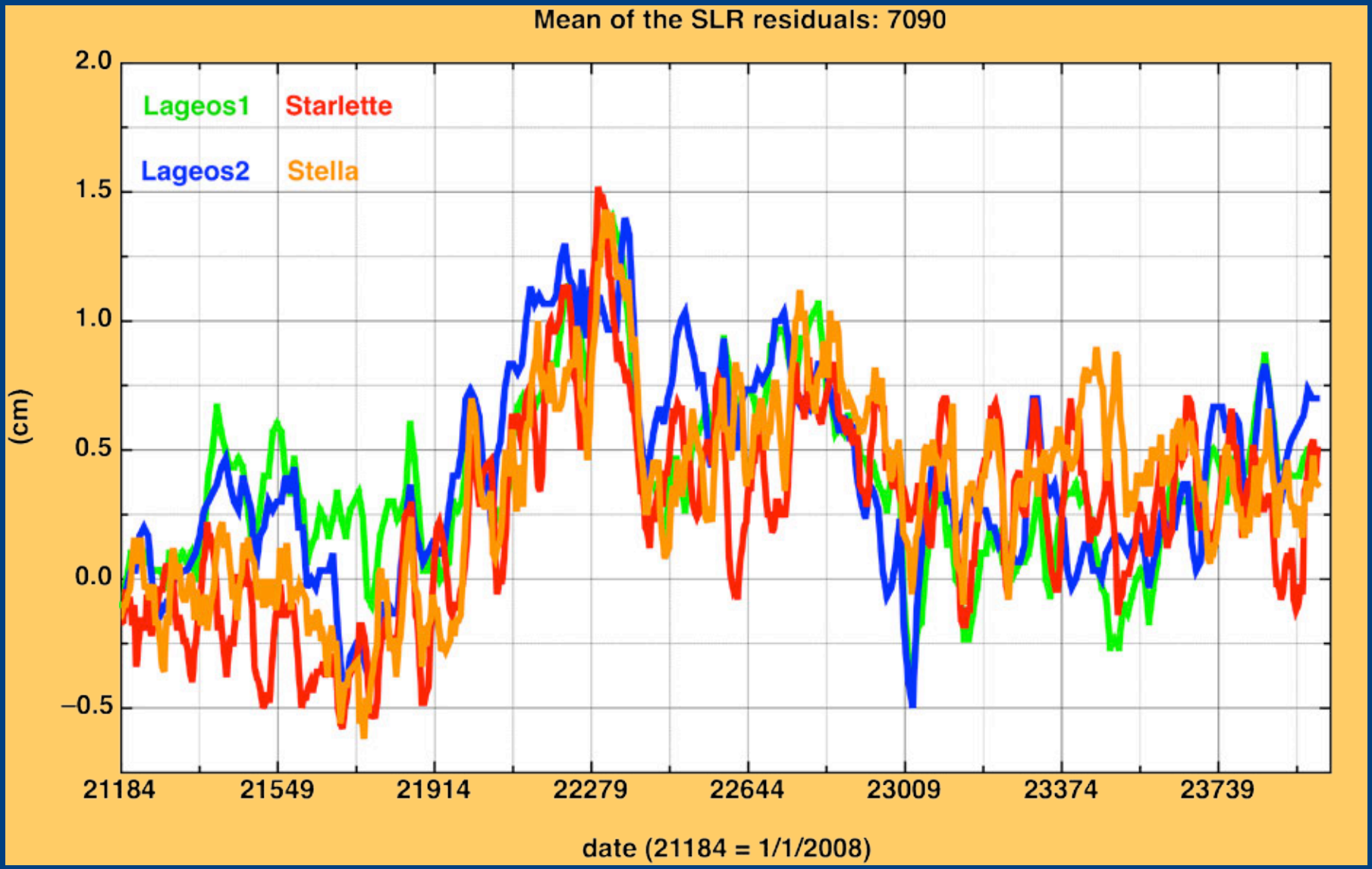
Mean of SLR residuals – station bias



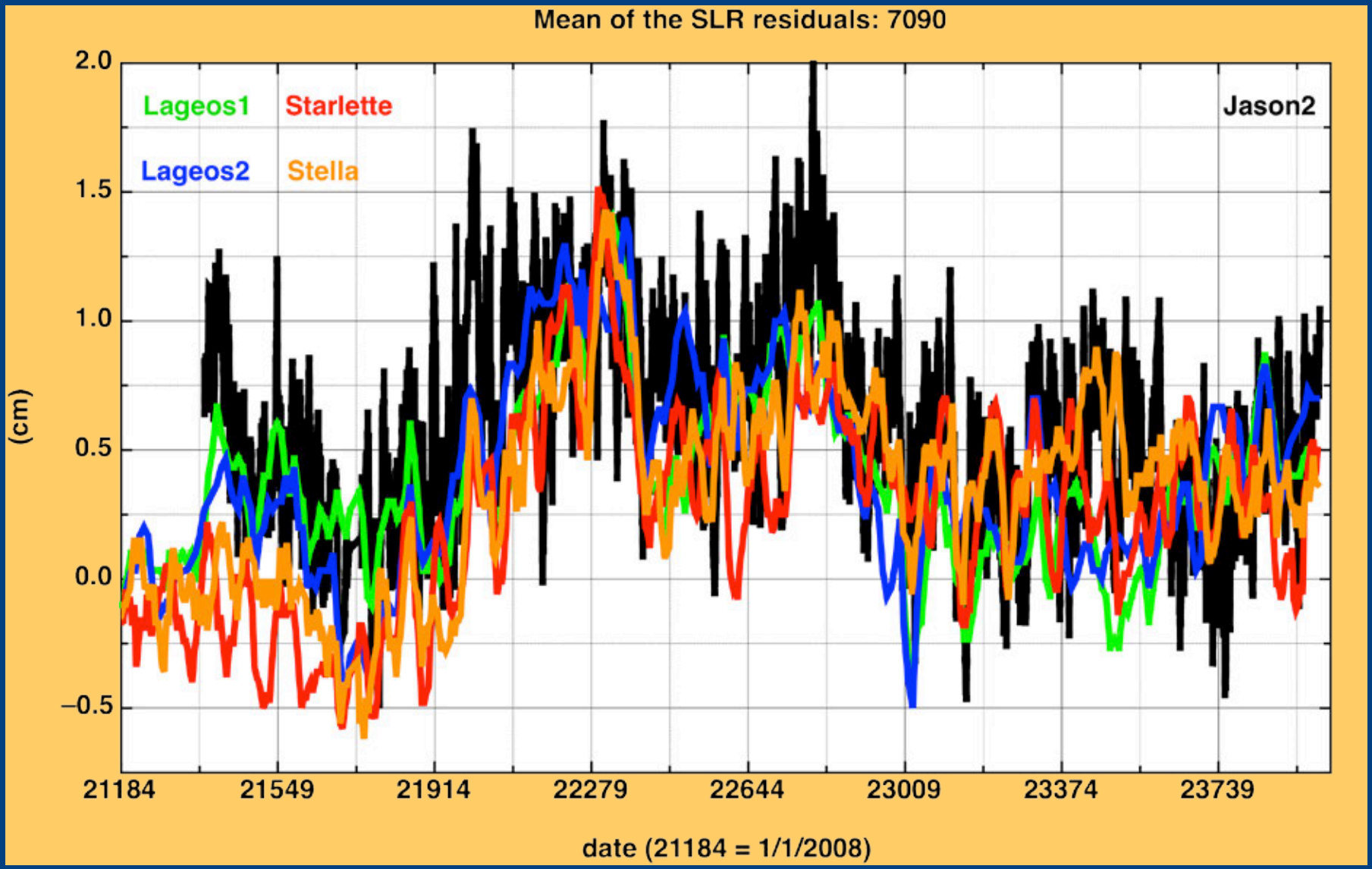
Mean of SLR residuals – station bias



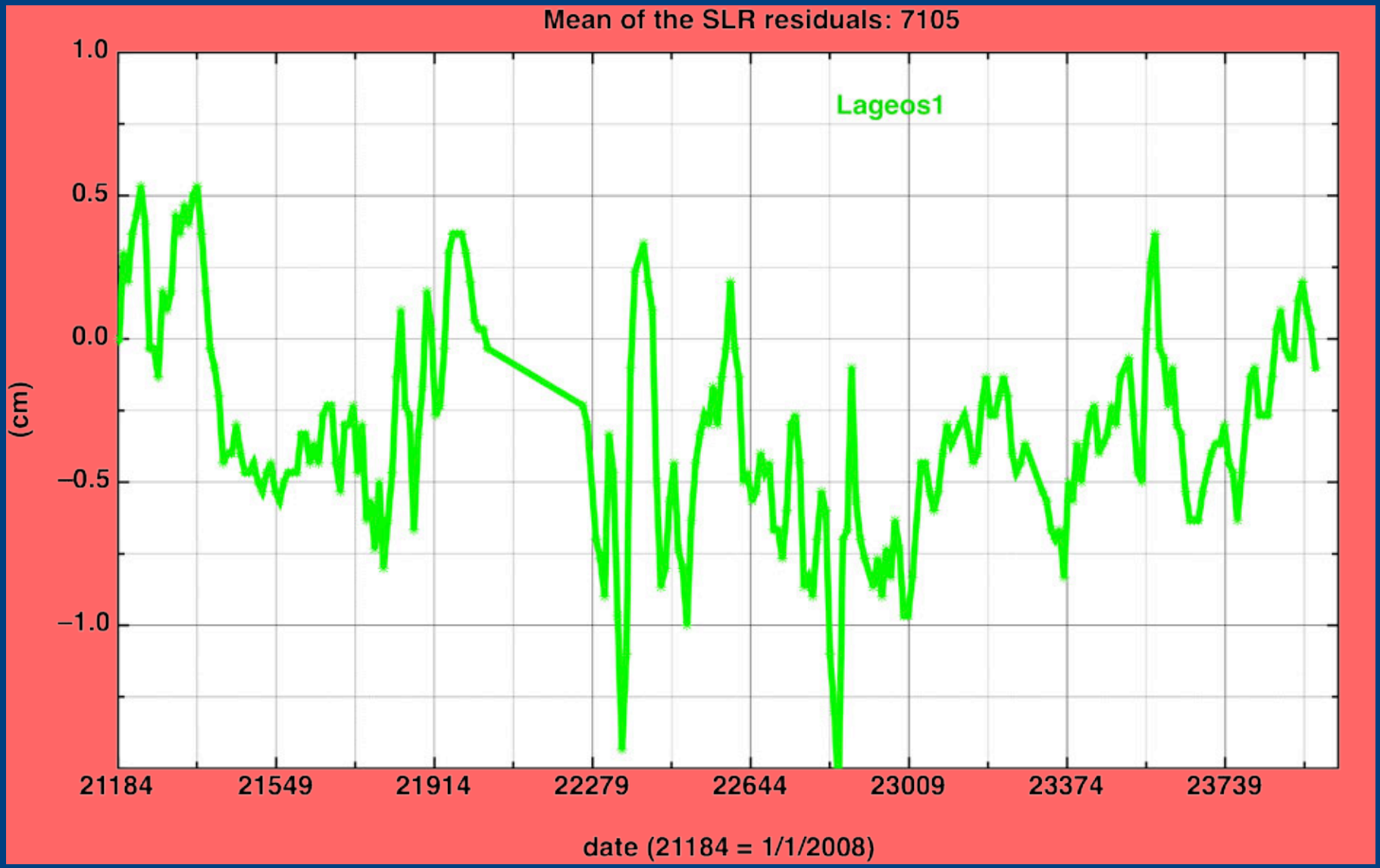
Mean of SLR residuals – station bias



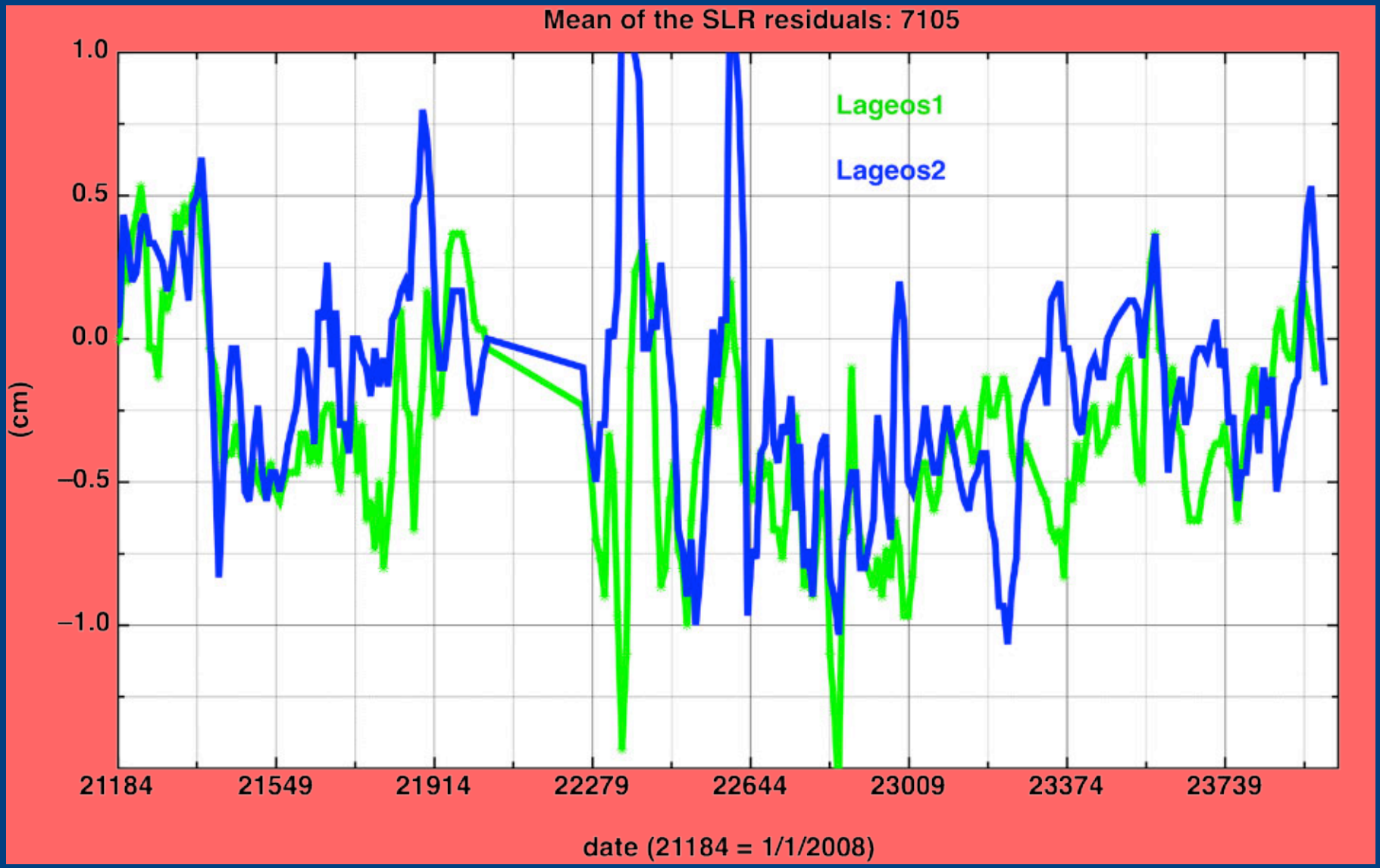
Mean of SLR residuals – station bias



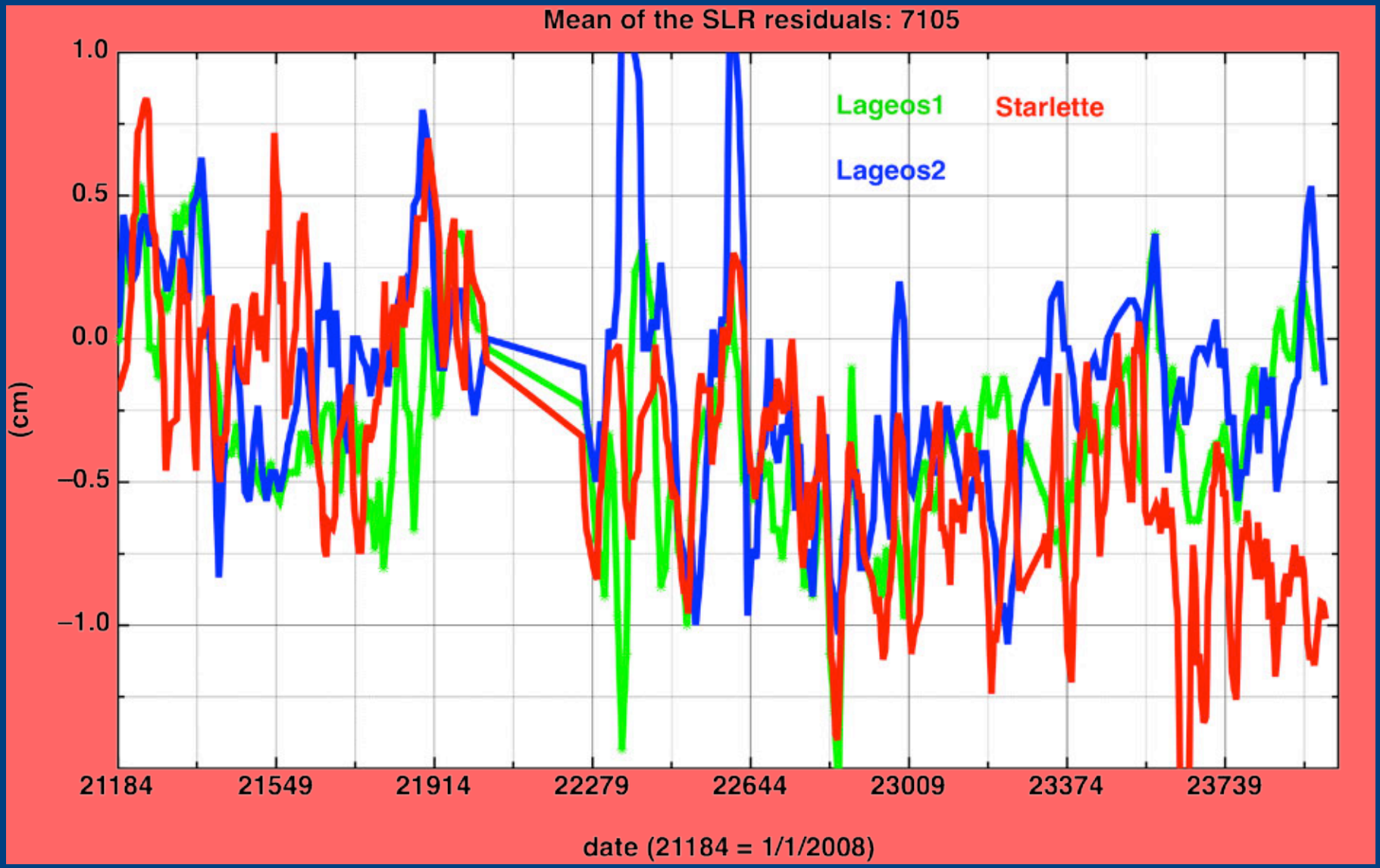
Mean of SLR residuals – station bias



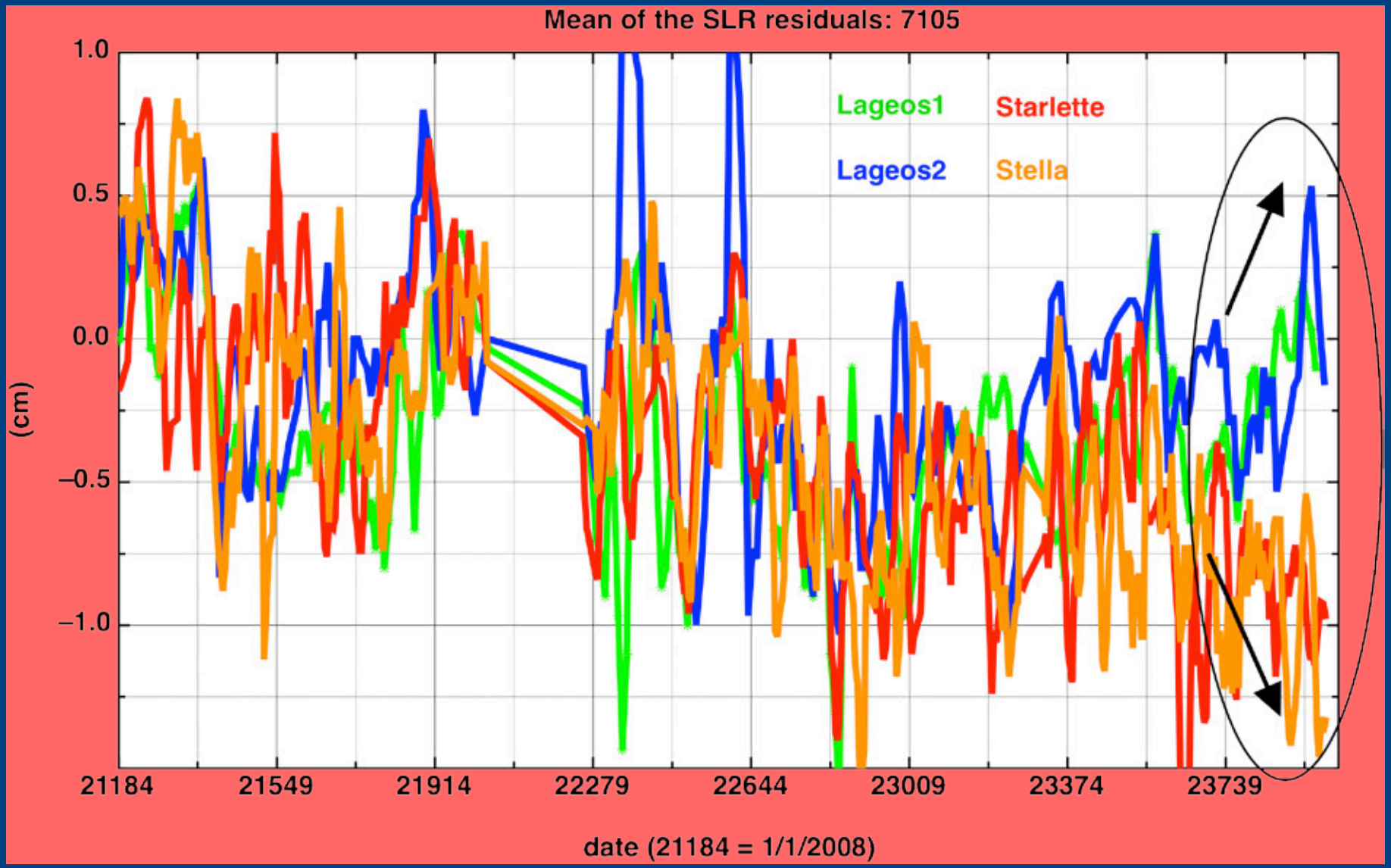
Mean of SLR residuals – station bias



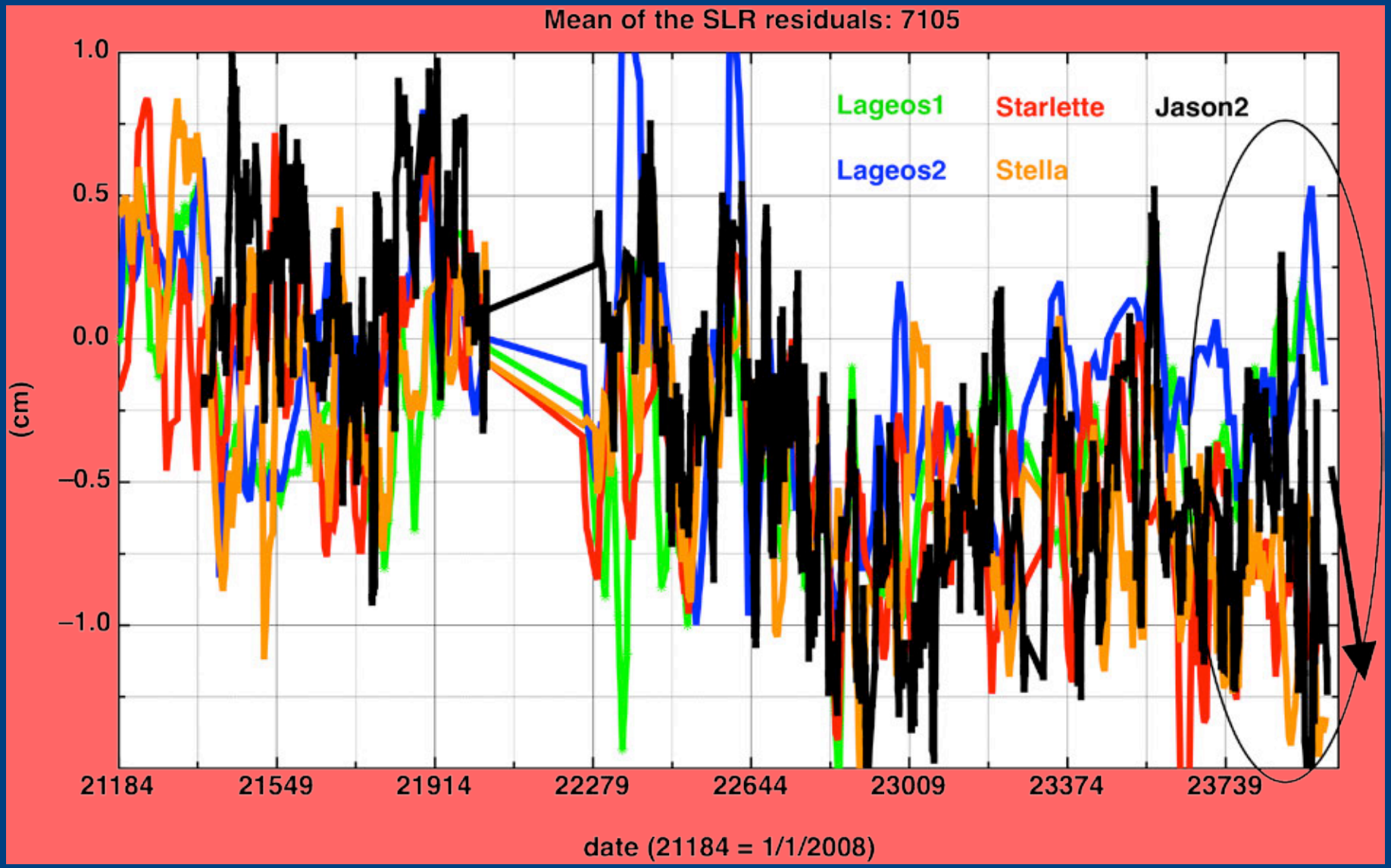
Mean of SLR residuals – station bias



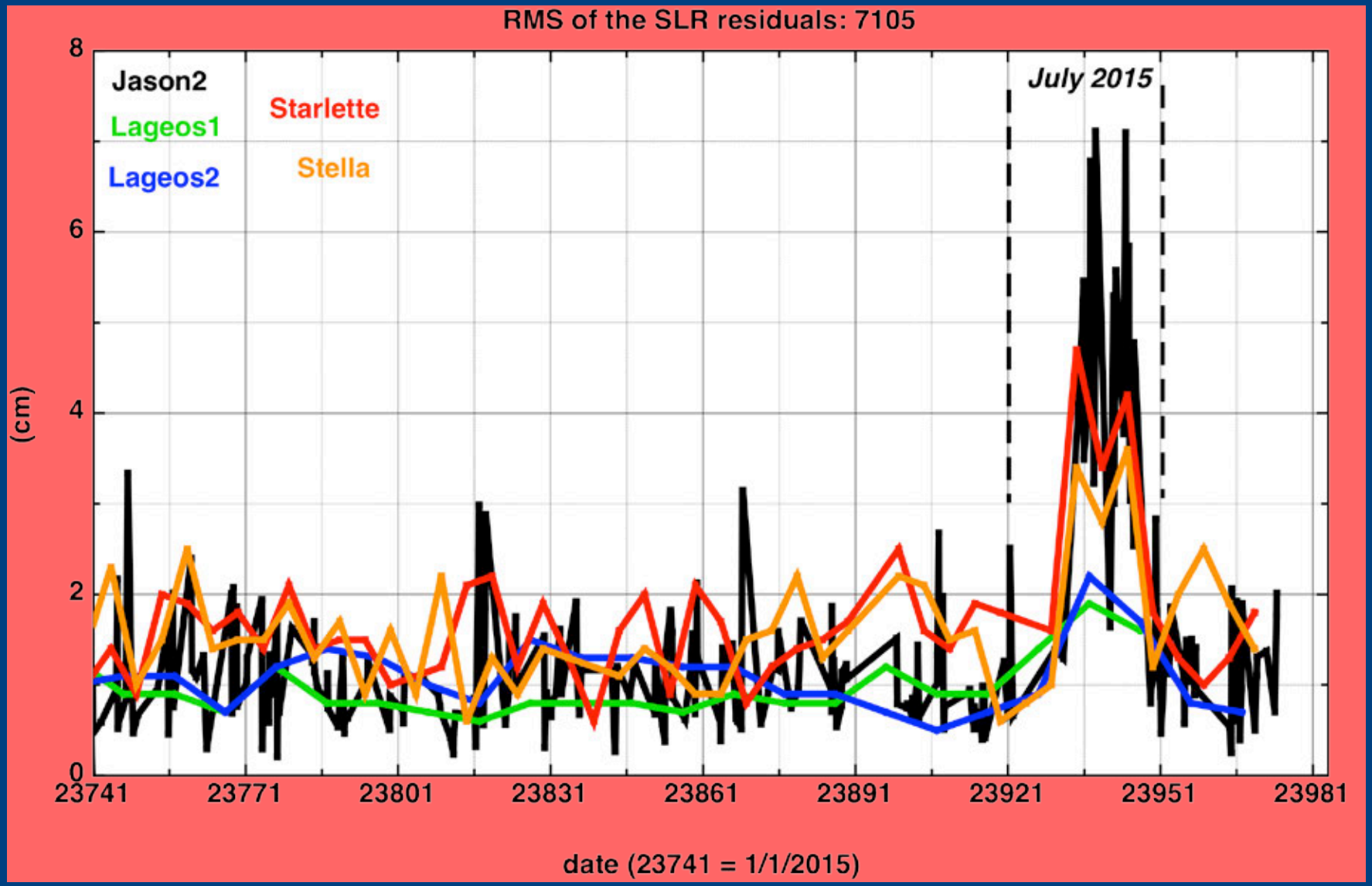
Mean of SLR residuals – station bias



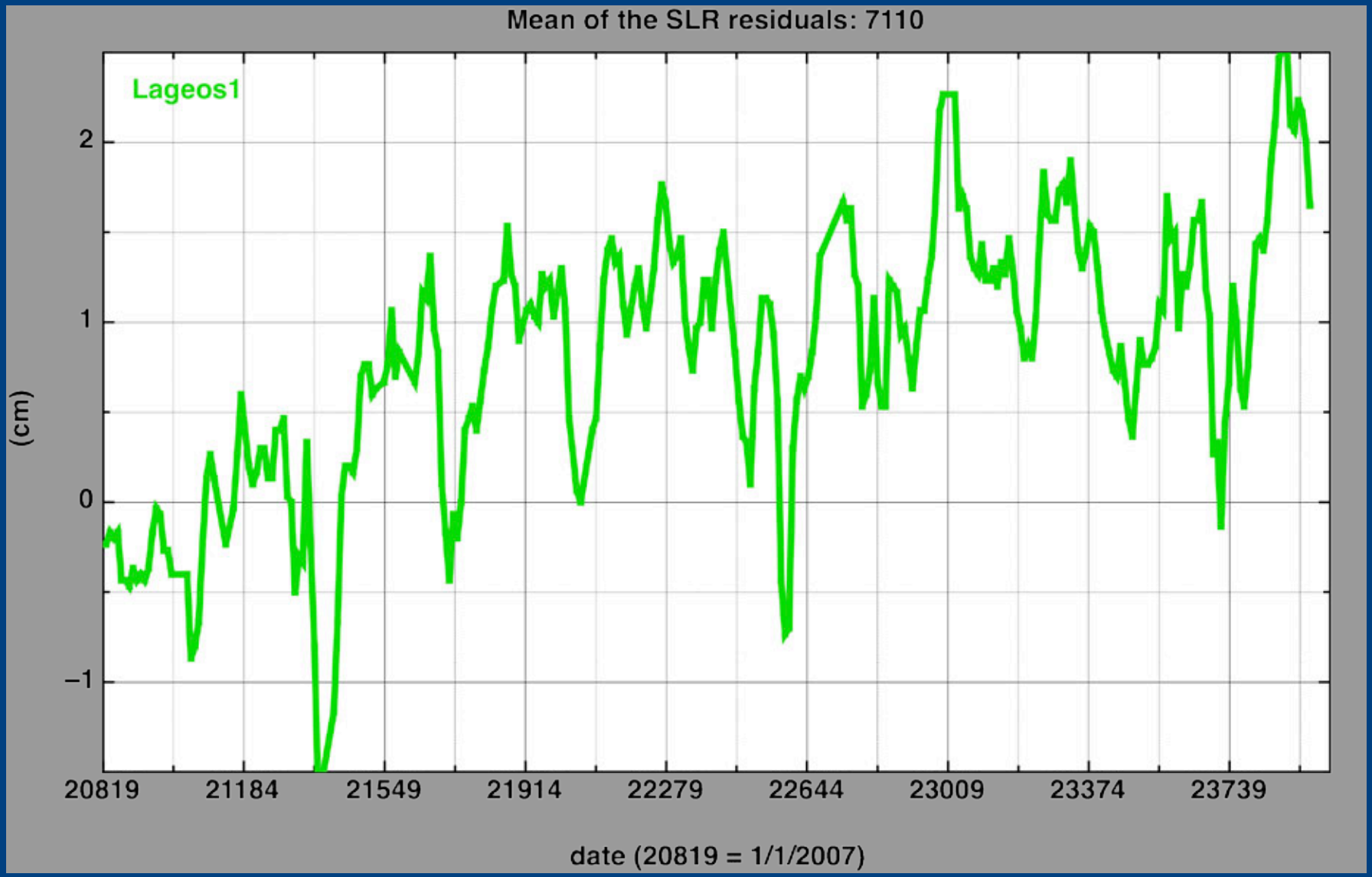
Mean of SLR residuals – station bias



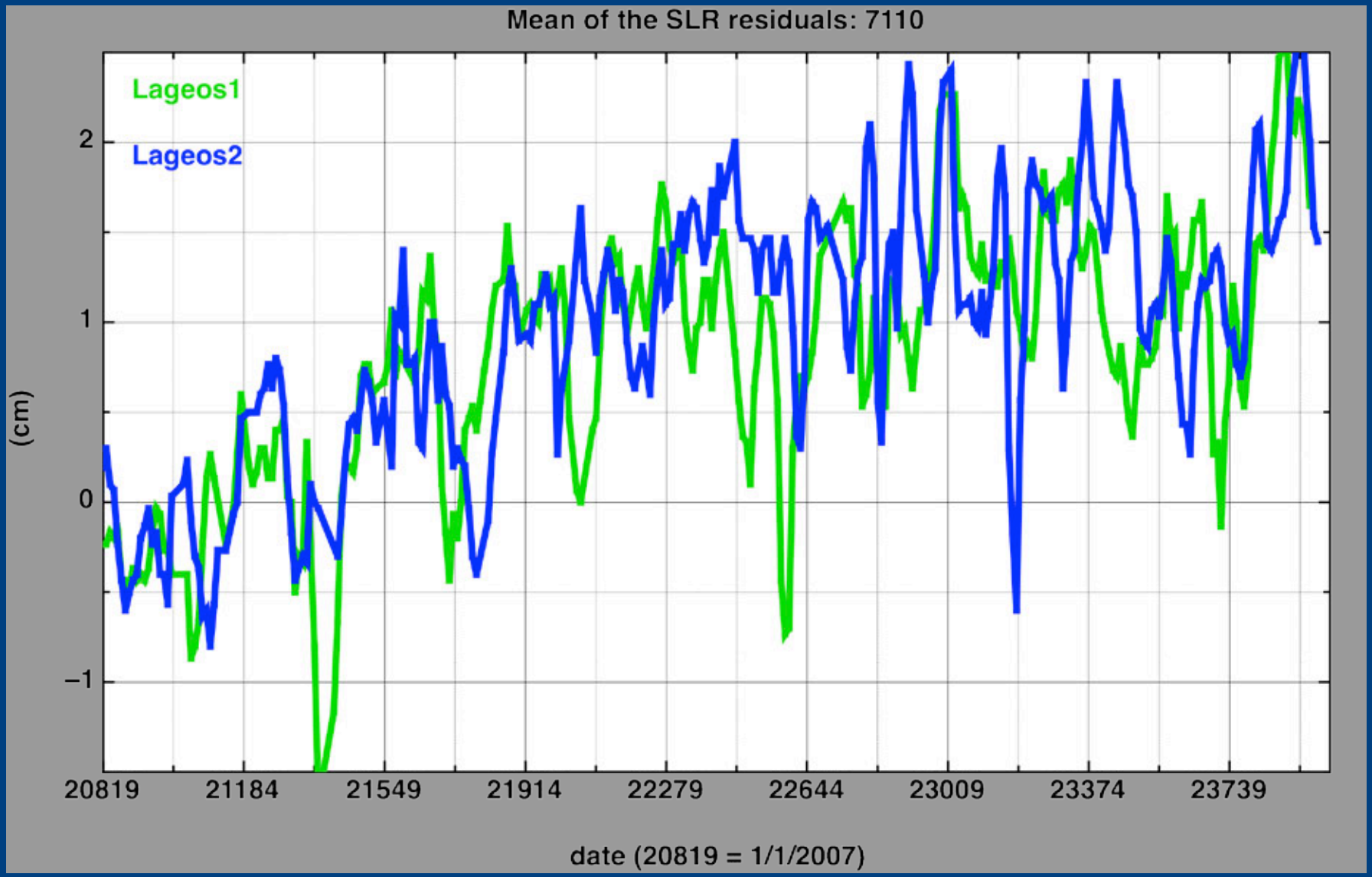
RMSof SLR residuals – station problem



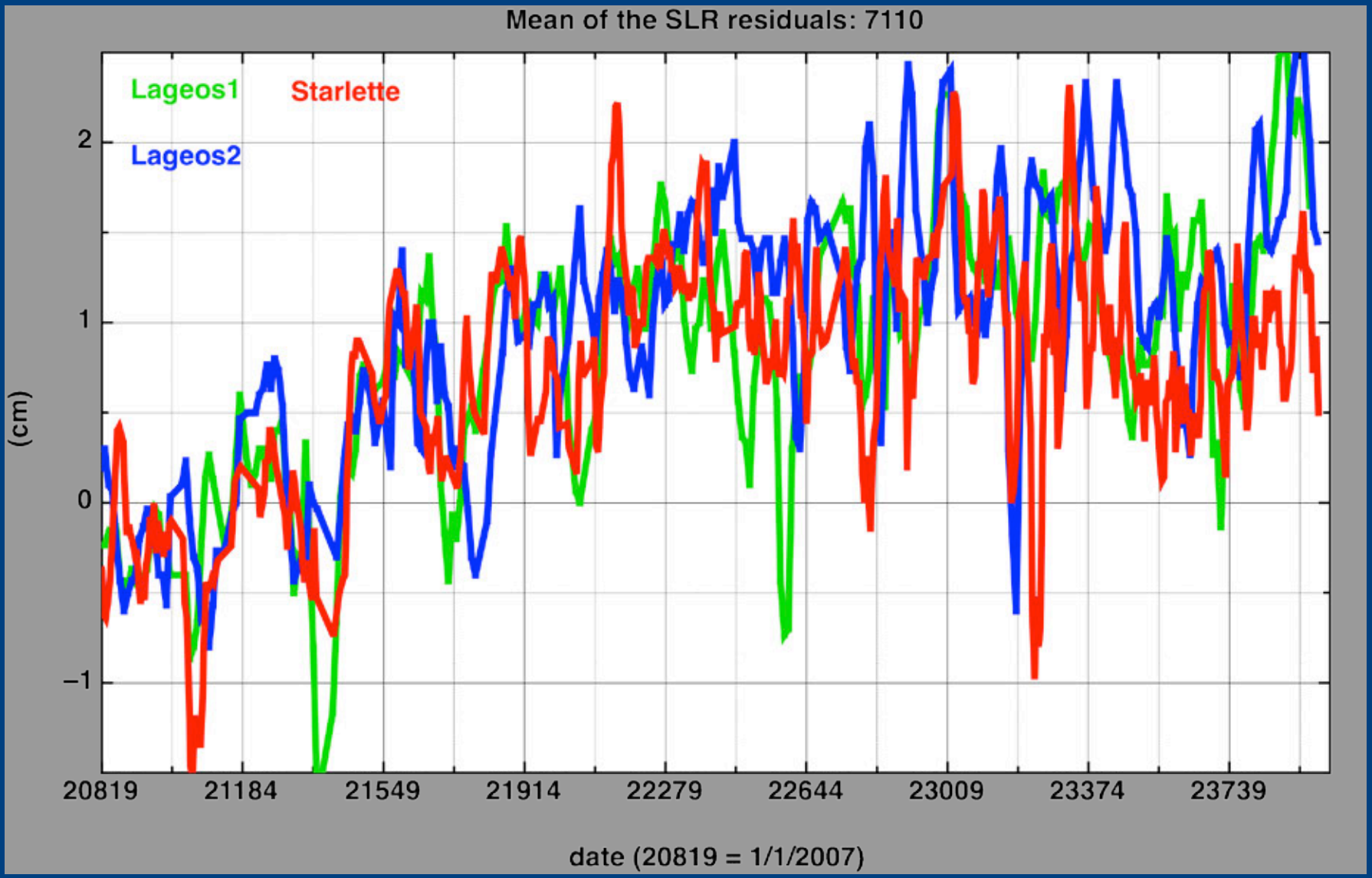
Mean of SLR residuals – station bias



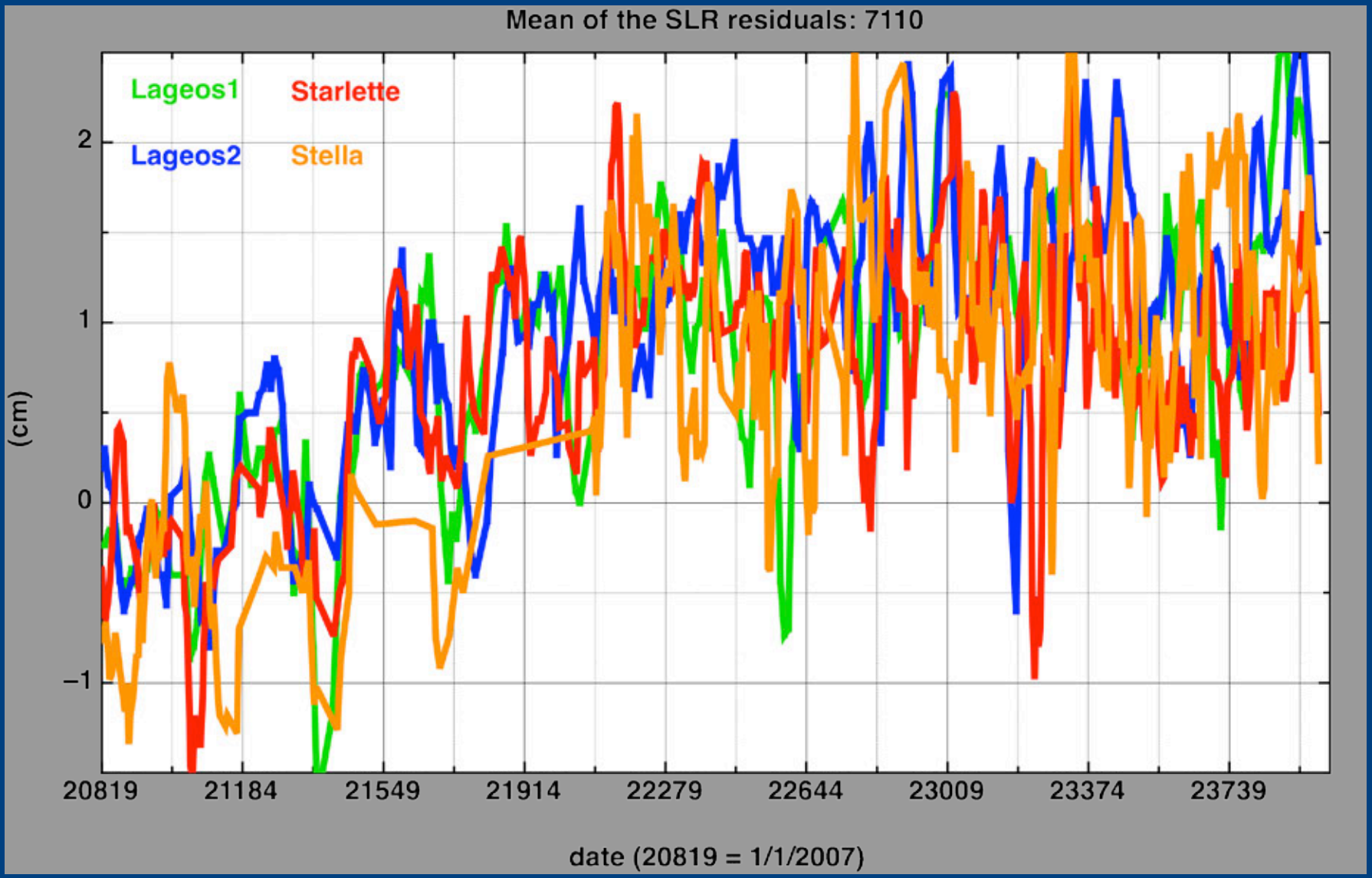
Mean of SLR residuals – station bias



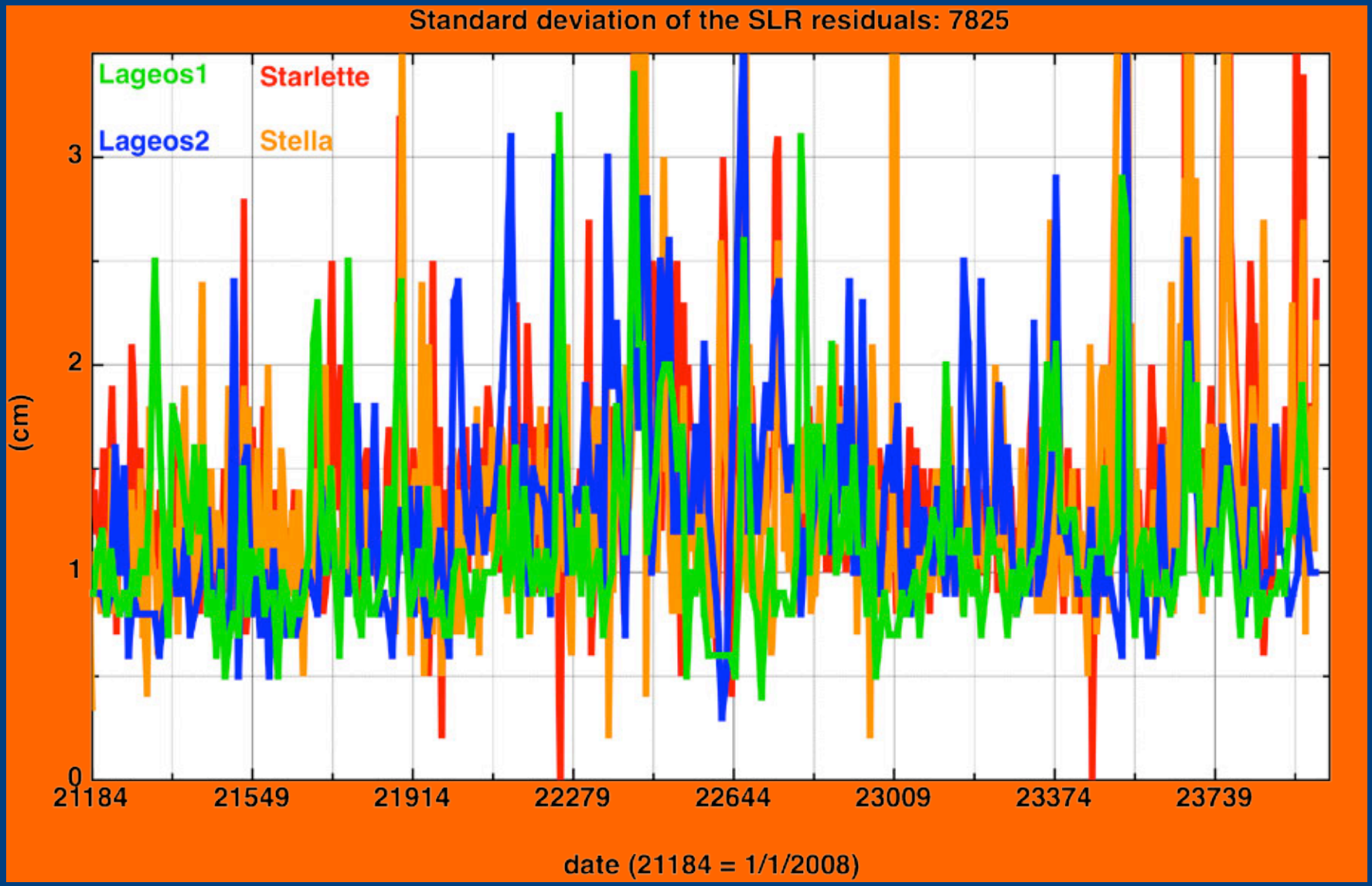
Mean of SLR residuals – station bias



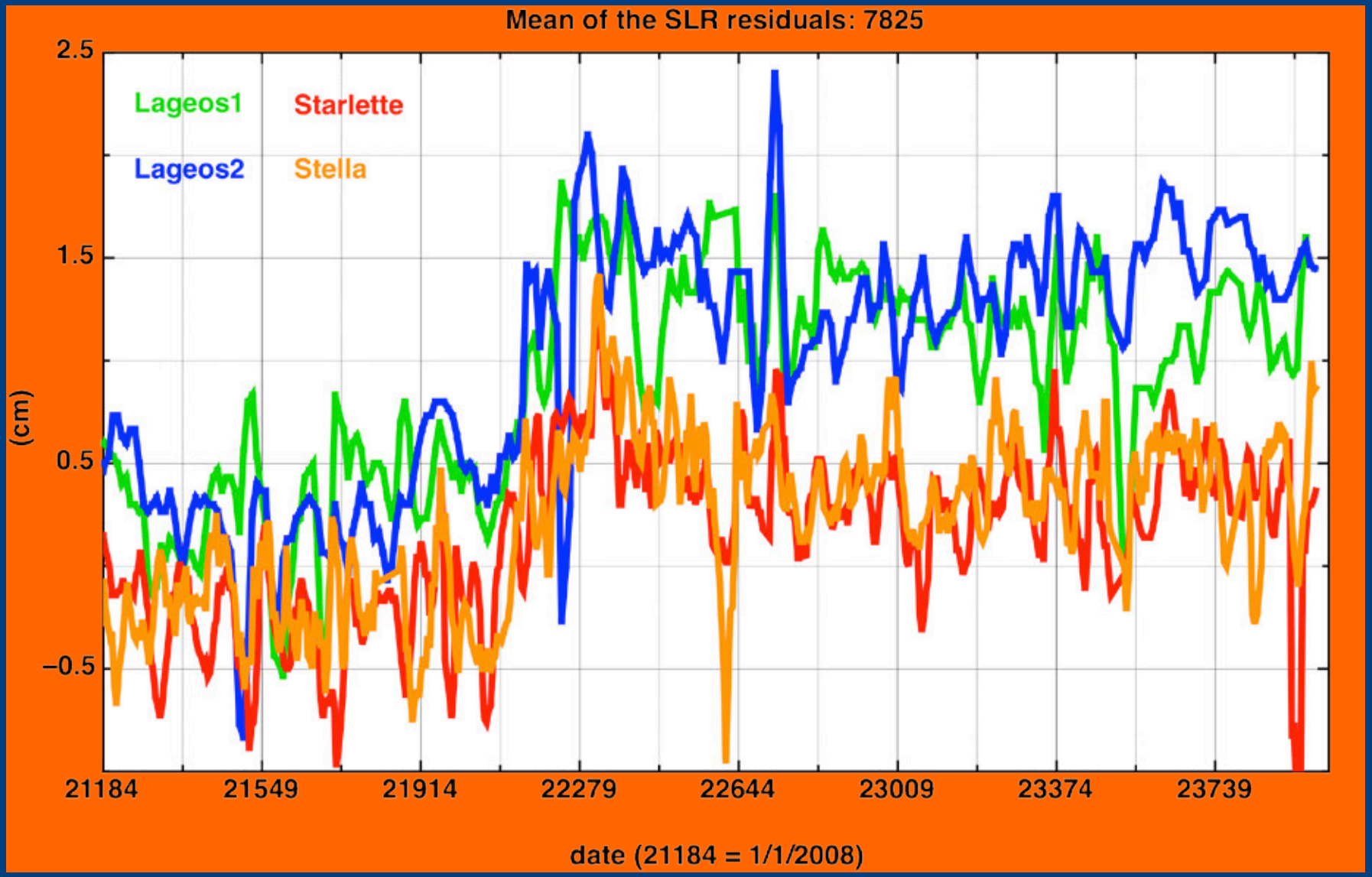
Mean of SLR residuals – station bias



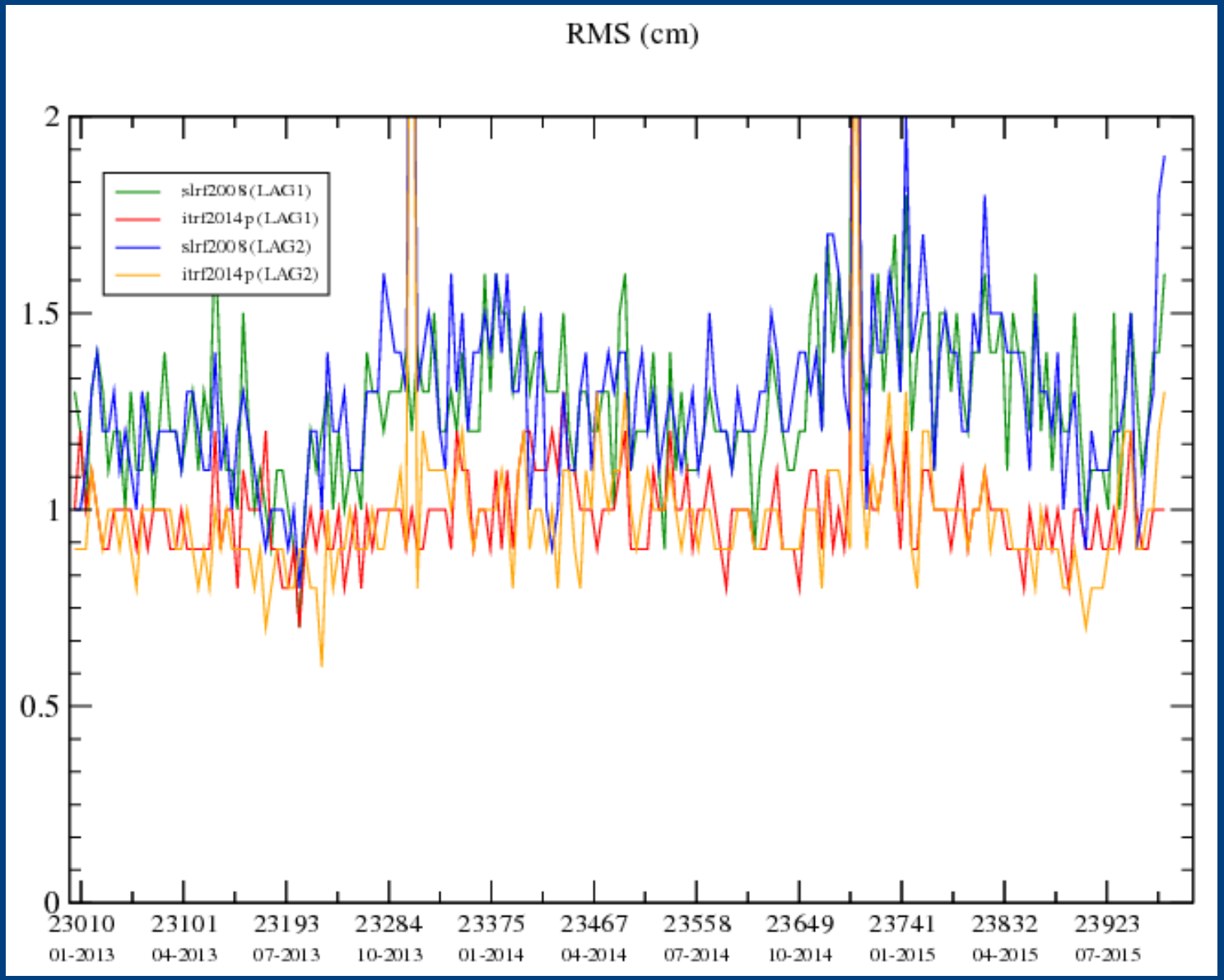
Standard deviation of SLR residuals



Mean of SLR residuals – station bias



RMS-of-fit: station coordinates ITRF2014



Summary

- ü **Bias mostly similar for high and low satellites**
- ü **Satellite altitude-dependent bias detected for some stations though**
- ü **Drifts detected for some stations**
- ü **Increased noise (7105)**
- ü **Comparison with Jason-2 SLR residuals shows overall good agreement (but different smoothing)**

- o **Calculate combined bias (4 satellites, 2xlow, 2xhigh)**
- o **Determine best smoothing window**
- o **Compute Lageos-1/2, Starlette and Stella orbits with ITRF2014 and re-do analysis per station**