The contributions to the WG COL by CODE:

1. GNSS solution

2. SLR solution

Extensions to the WG COL:

Combined GNSS-SLR solution

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GNSS contribution

→ GPS + GLONASS

→ **Daily** SINEX files: codYYDDDpd01.**n3**.Z

→ submitted 12. November 2011

→ Parameters:

- Station coordinates
- Polar motion: daily
- UT / LOD: daily
- Nutation: daily
- Troposphere zenith delays: 2-hourly
- Troposphere gradients: daily
- Geocenter coordinates
- Satellite antenna offsets

Piece-wise-linar polygon

⇒ 2 „offsets“ are given

⇒ drifts are implicitly contained

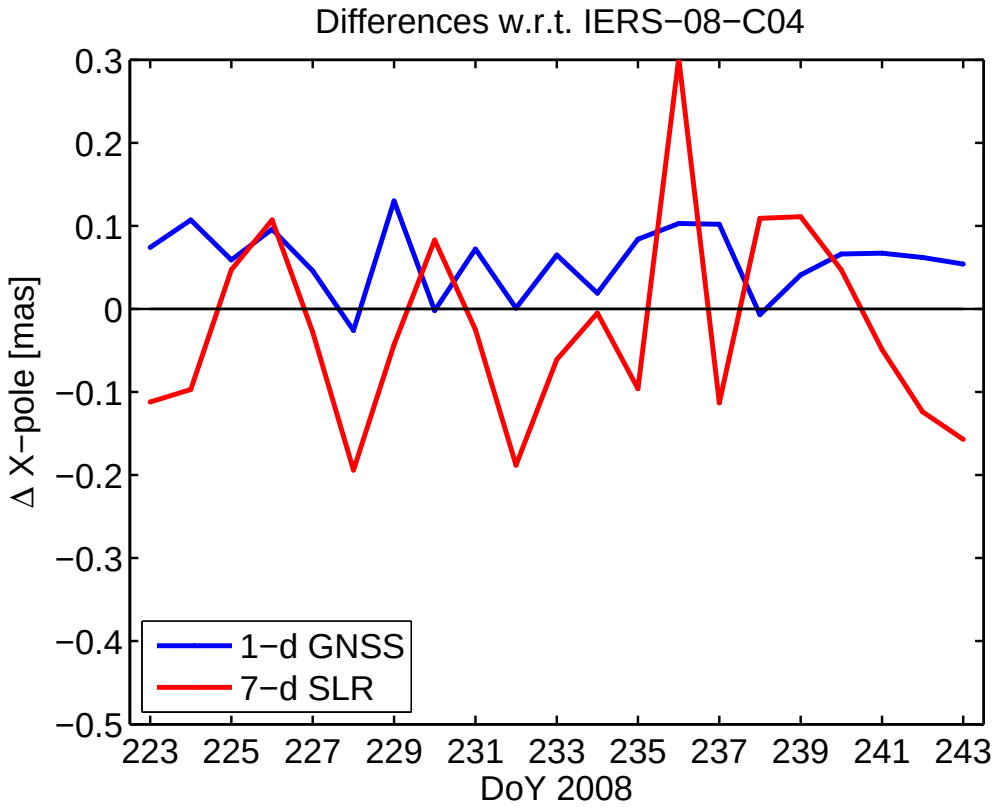
SLR contribution

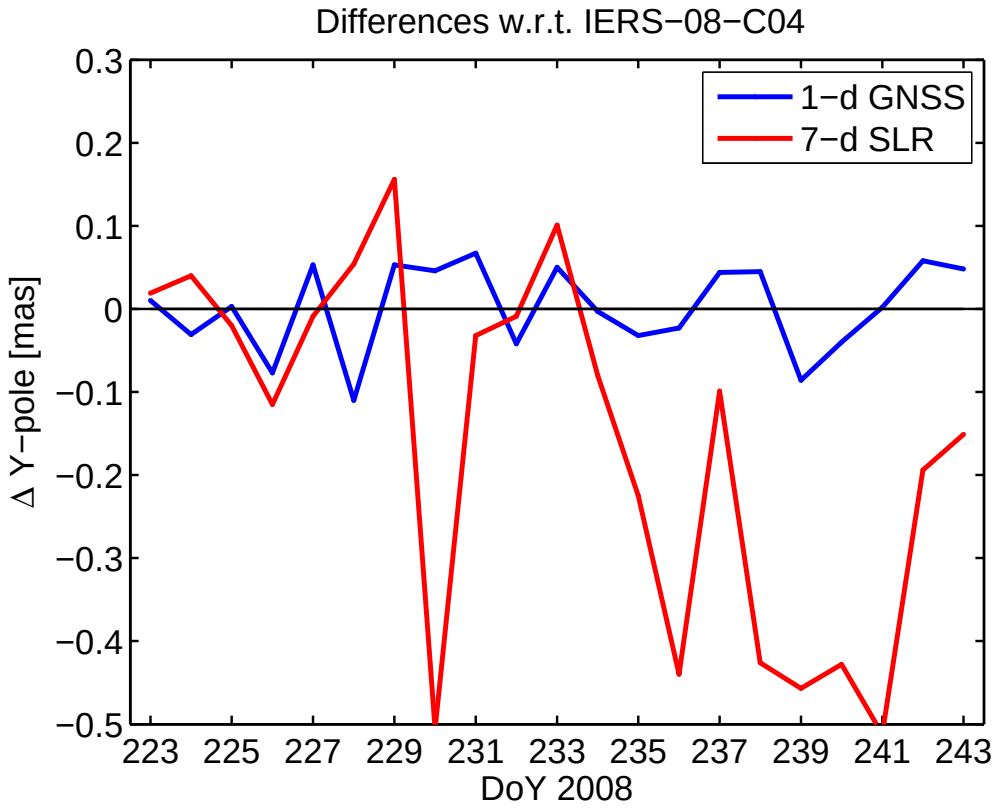
→ Lageos 1+2
→ **Weekly** SINEX files: codYYDDDlw01.**n3**.Z
→ submitted 4. October 2011

→ Parameters:
- Station coordinates
- Polar motion (**offset+drift**): daily
- UT/LOD: daily
- Range biases for selected sites

Piece-wise-linar offset+drift
⇒ Offsets given at 00:00 UTC
⇒ Drifts given at 12:00 UTC

ERP from GNSS and SLR





1-d GNSS	61.5	± 40.1	µas
7-d SLR	-26.1	± 115.2	µas

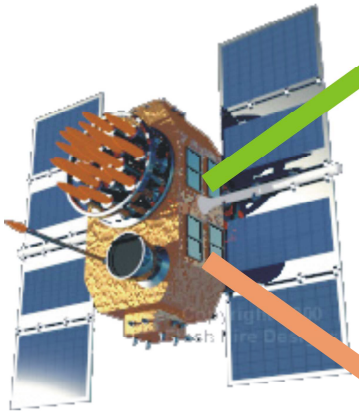
1-d GNSS	1.5	± 51.2	µas
7-d SLR	-138.8	± 208.3	µas

SLR observations to GNSS

2 GPS + 3 GLONASS satellites
Number of stations per day: **4 – 9**
#Observation / Station / Satellite / Day: **1 - 47**
⇒ Resulting **number of observations per day** very small: **48 - 191**

⇒ SLR-only solution not possible!
⇒ Only **combined solution with GNSS** possible
⇒ Only **weekly** solution reasonable
⇒ But still very weak estimates for coordinates of SLR stations!

Combined GNSS-SLR analysis



Microwave observations

SLR range observations

Daily analysis

1d NEQ

7-day GNSS +SLR

SLR range observations

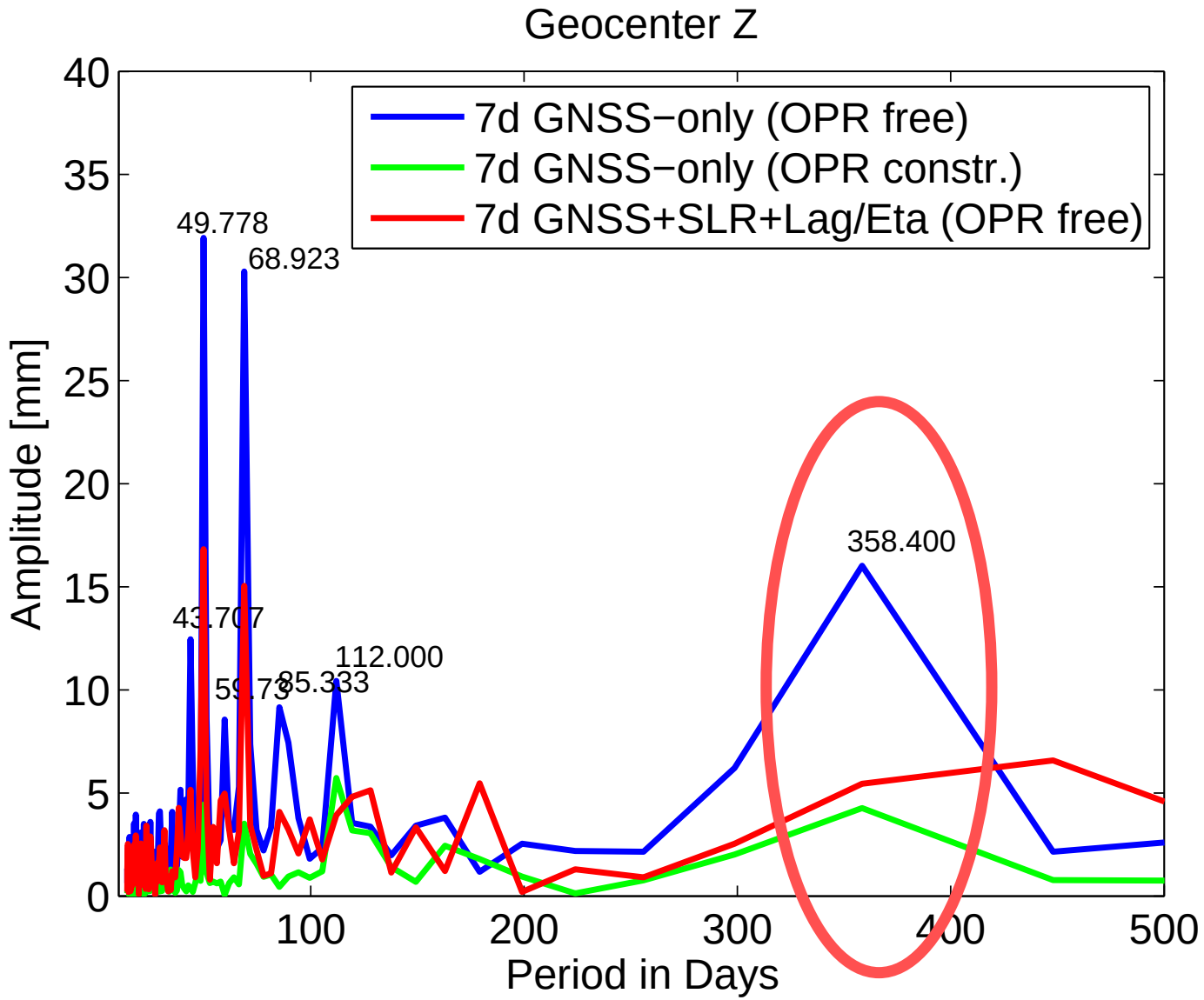
Weekly analysis

7d NEQ

7-day GNSS + SLR + LAG / ETA

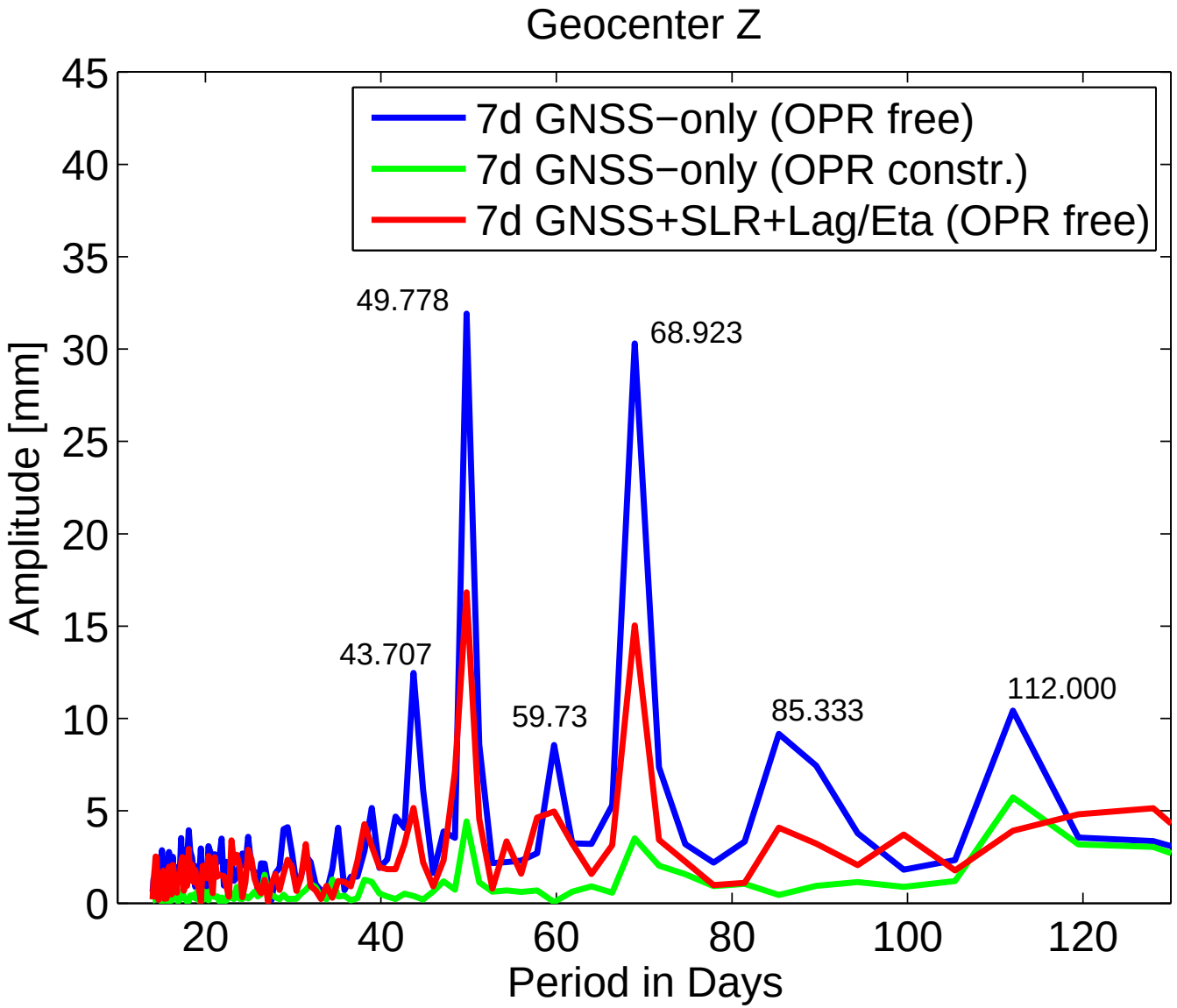
Combined GNSS-SLR analysis: Geocenter

The **amplitude vanishes** for the frequency of the **draconitic GPS year**
(similar to constraining OPR parameters in GNSS-only solution)



Combined GNSS-SLR analysis: Geocenter

The **amplitudes are reduced** for most of the **sub-frequencies** of the draconitic GPS year, but they are still present.

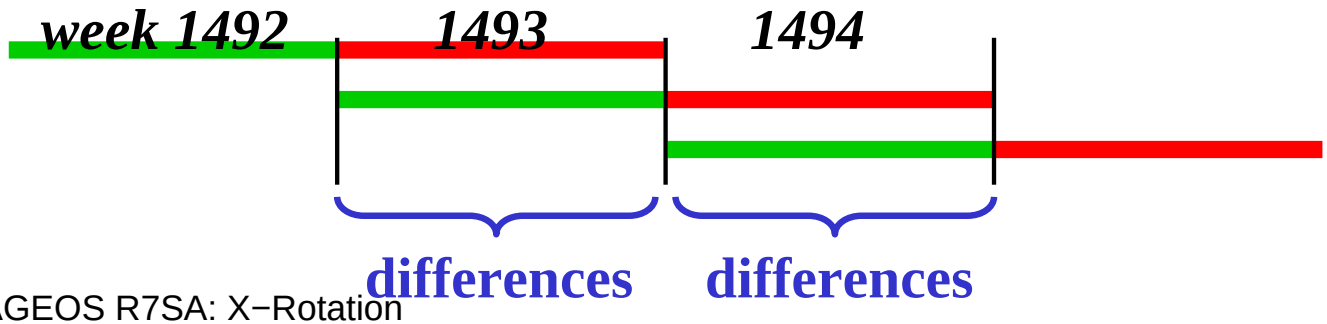


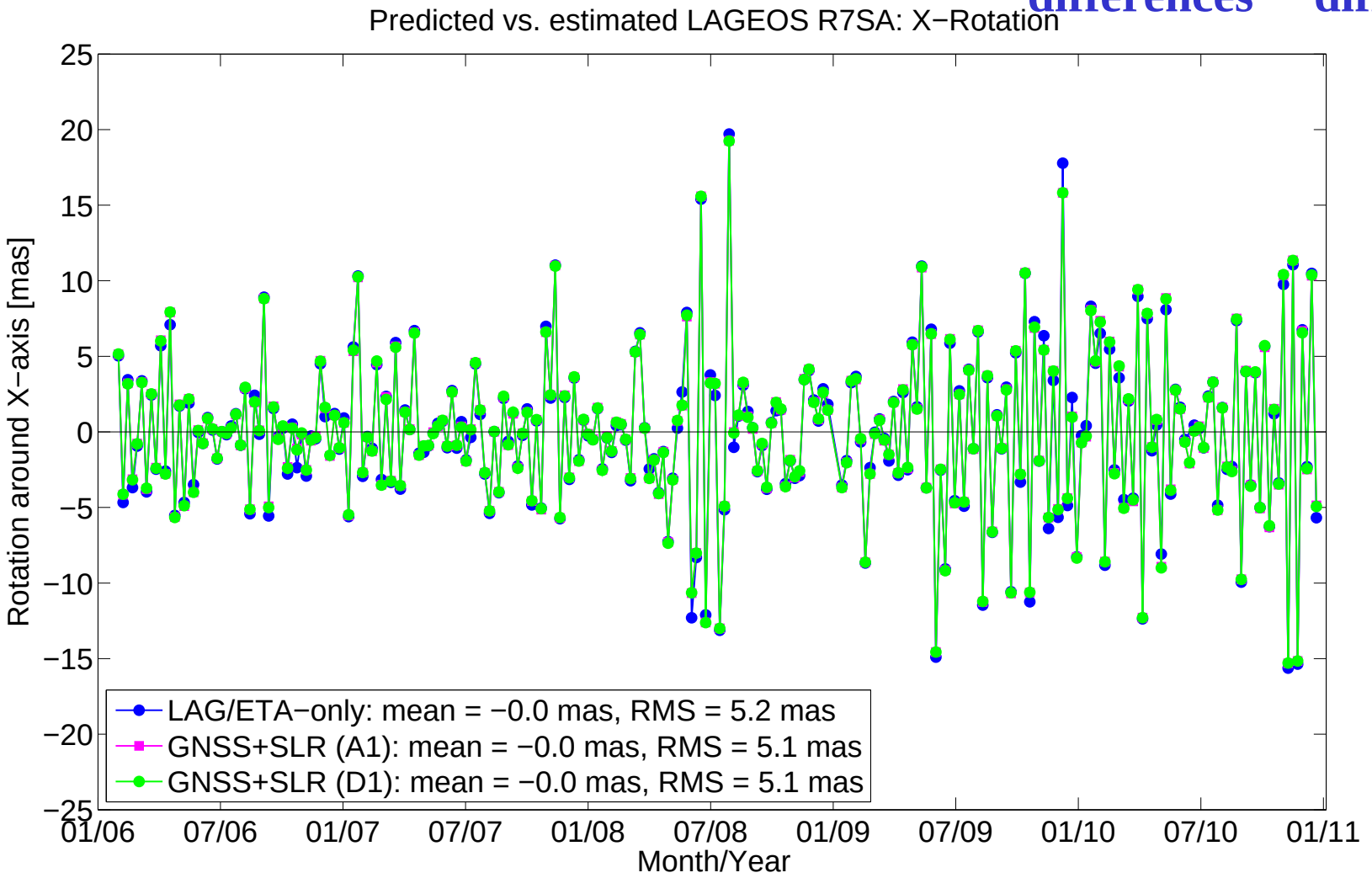
Combined GNSS-SLR analysis : LAGEOS orbit

Orbit overlaps over 1 week:

Estimated orbit vs.

Prediction from previous week





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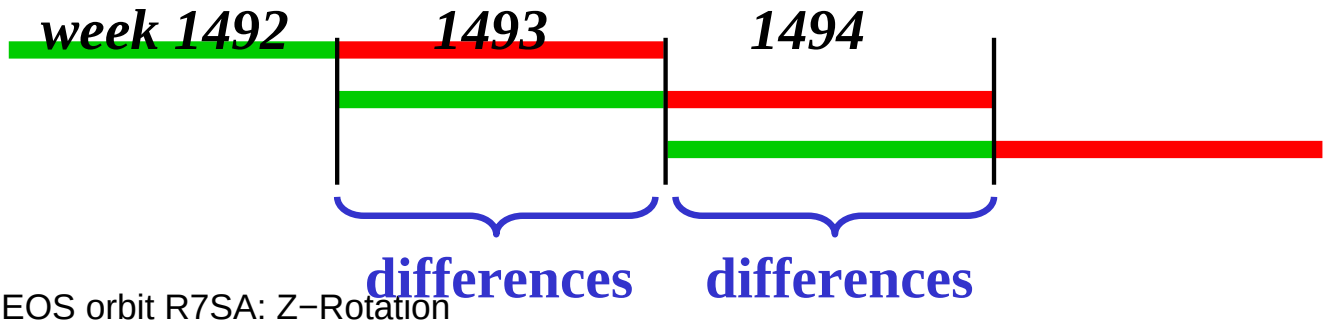

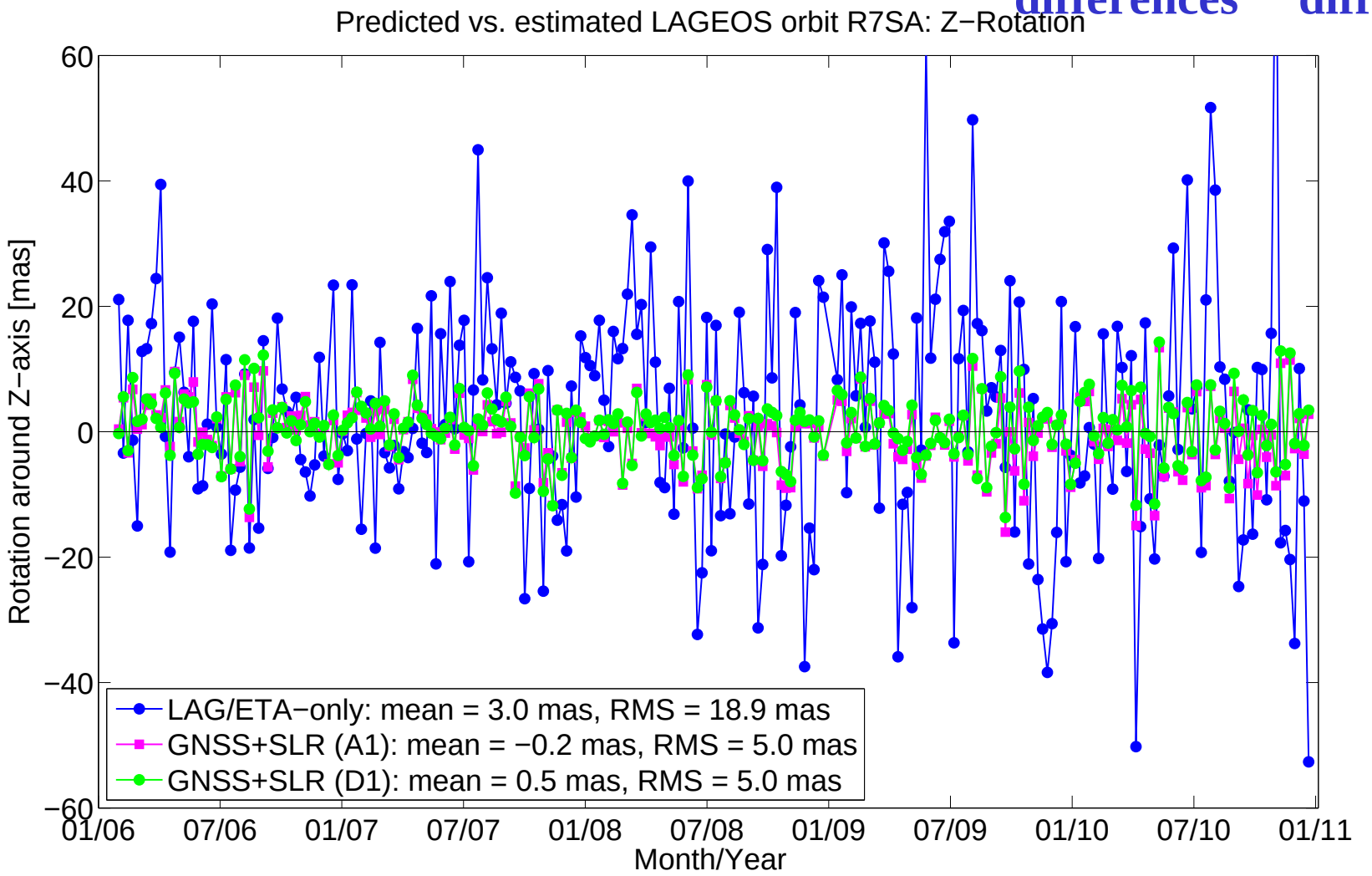

Summary

→ Up to now ***„standard“ solutions*** contributed for GNSS and SLR:

- Parameterization
- Satellites included
- Technique-wise solutions

→ ***Combined GNSS-SLR*** solutions using SLR data to GNSS satellites are computed and tested internally

- „Combination at observation level“
- Can be submitted to COL
- Attention: using only SLR@GNSS will cause problems

→ ***General comments***:

- Extension of the time span for more realiable analysis
- Combined solutions vs. Single-technique solutions