

The contribution by AIUB / BKG:

1. GNSS and SLR solution

**2. ERP parameterization of SLR
solution**

GNSS contribution

- GPS + GLONASS
- **Daily** SINEX files: codYYDDDpd01.n1.Z
- Parameters:
 - Station coordinates
 - Polar motion (offset + drift): daily
 - UT / LOD: daily
 - Nutation: daily
 - Troposphere zenith delays: 2-hourly
 - Troposphere gradients: daily
 - Geocenter coordinates
- Parameterization of EOPs: **piece-wise linear polygon**

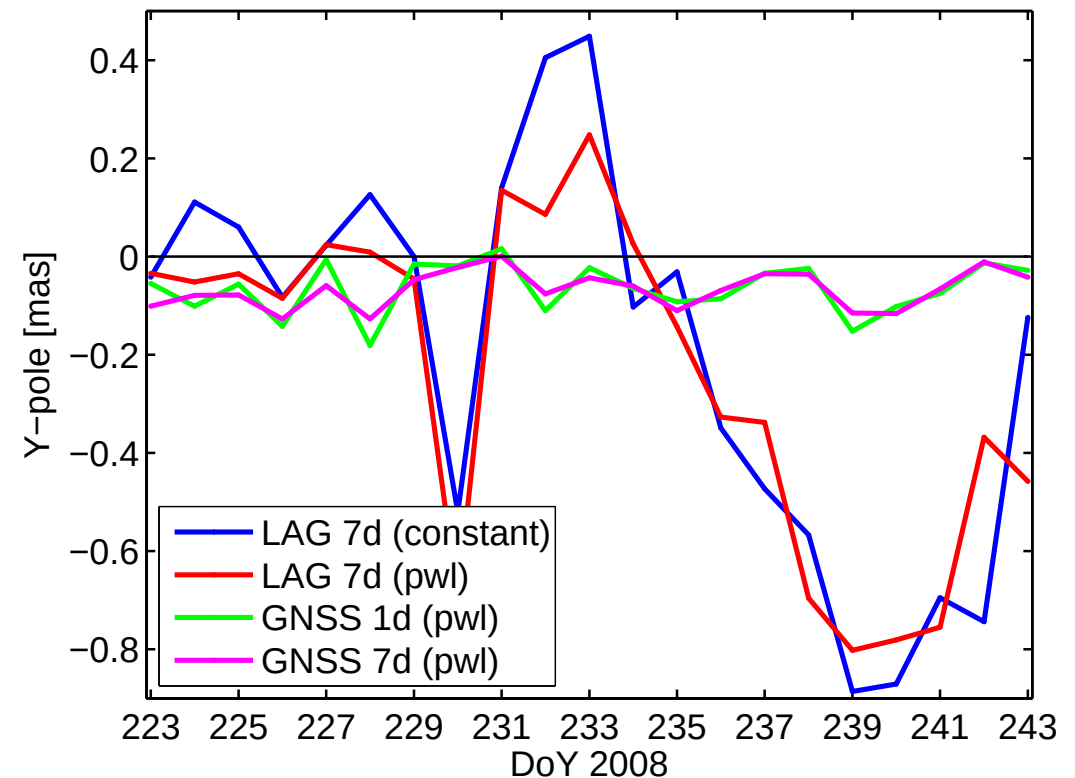
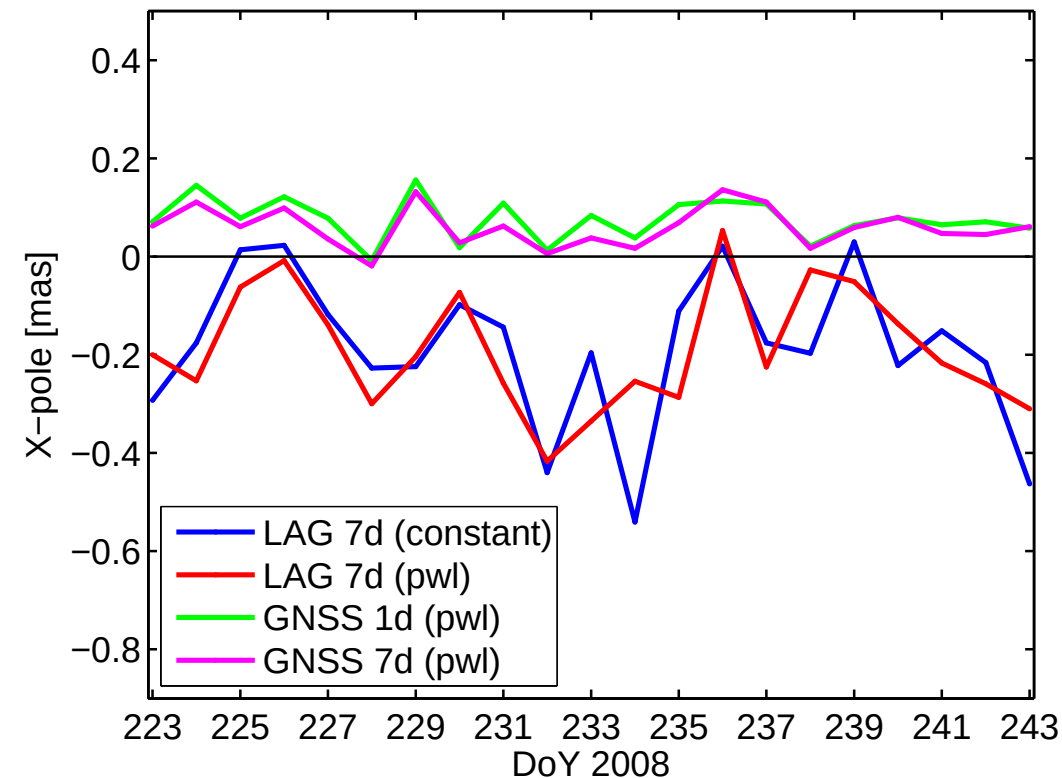
SLR contribution

- Lageos 1+2
- **Weekly** SINEX files: codYYDDDLw01.**n2**.Z

- Parameters:
 - Station coordinates
 - Polar motion (**constant offset**): daily
 - LOD: daily
 - Range biases for selected sites (combined Lageos1+2)

ERP parameterization for SLR: Pole

- Daily constant (offset-only)
- Daily piece-wise-linear (offset + drift + continuity at day boundaries)



WRMS x-pole

WRMS y-pole

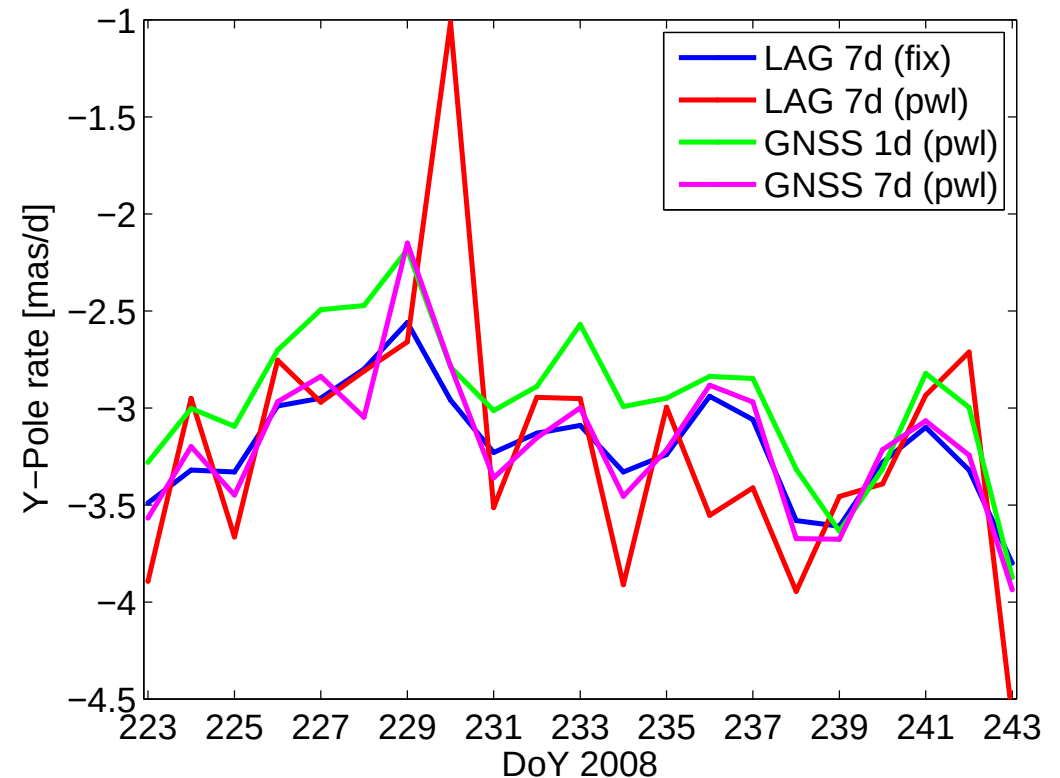
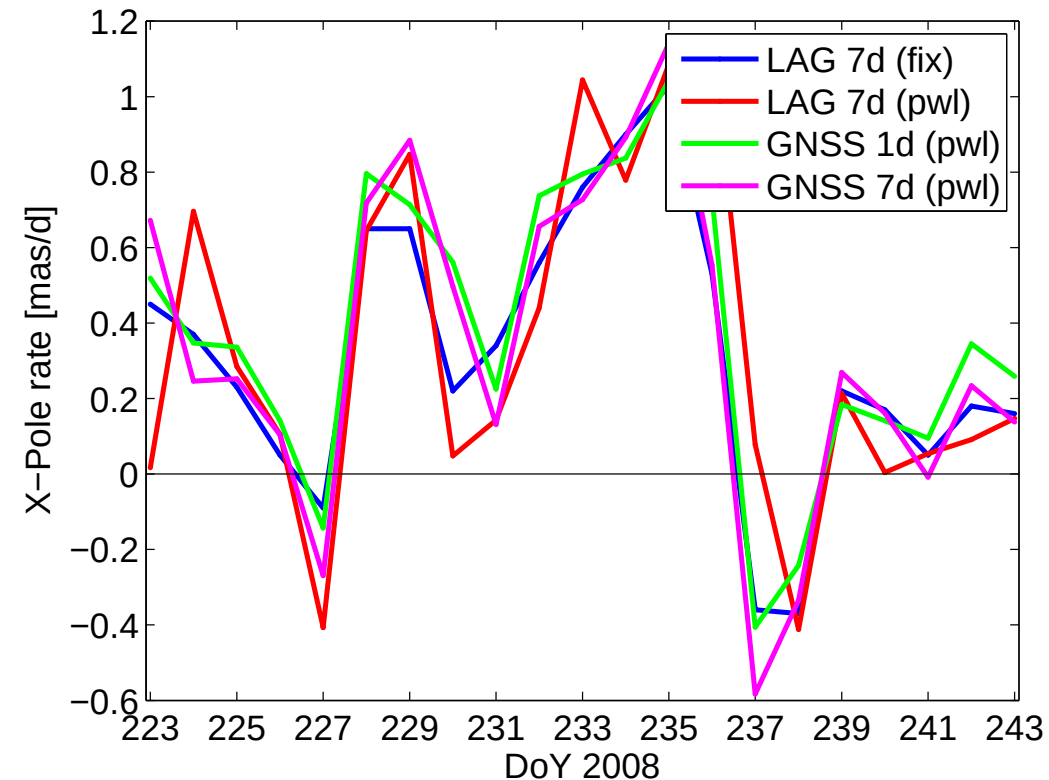
LAGEOS 7d, constant
LAGEOS 7d, pwl
GNSS 7d, pwl
GNSS 1d, pwl

148.4 μ as
119.6 μ as
39.9 μ as
41.3 μ as

289.9 μ as
250.0 μ as
35.8 μ as
51.5 μ as

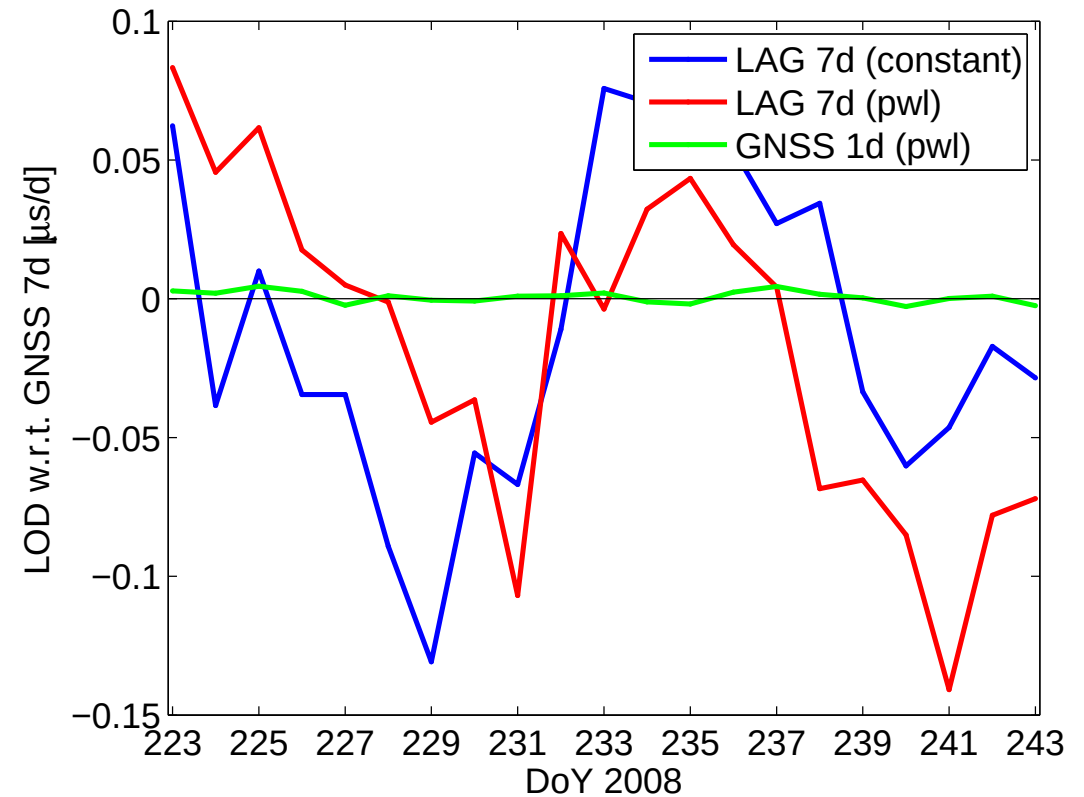
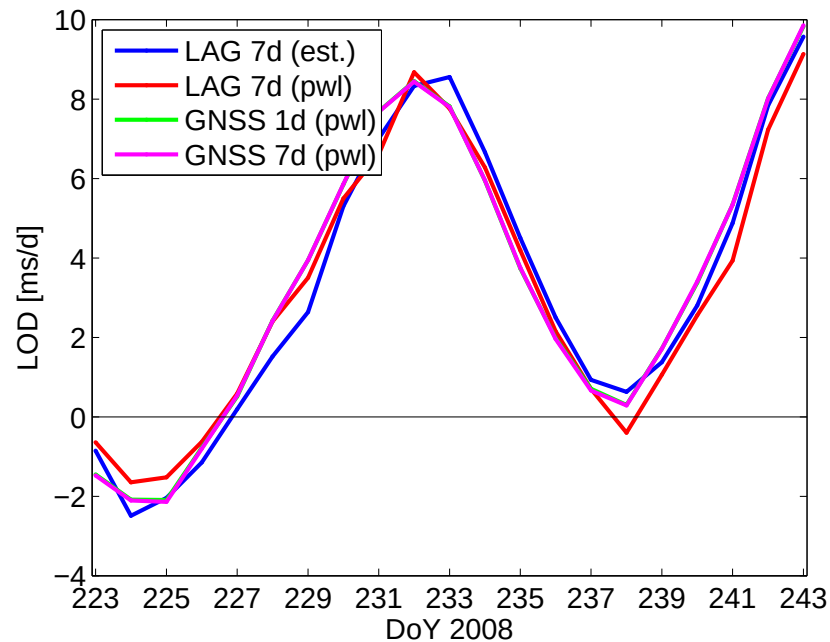
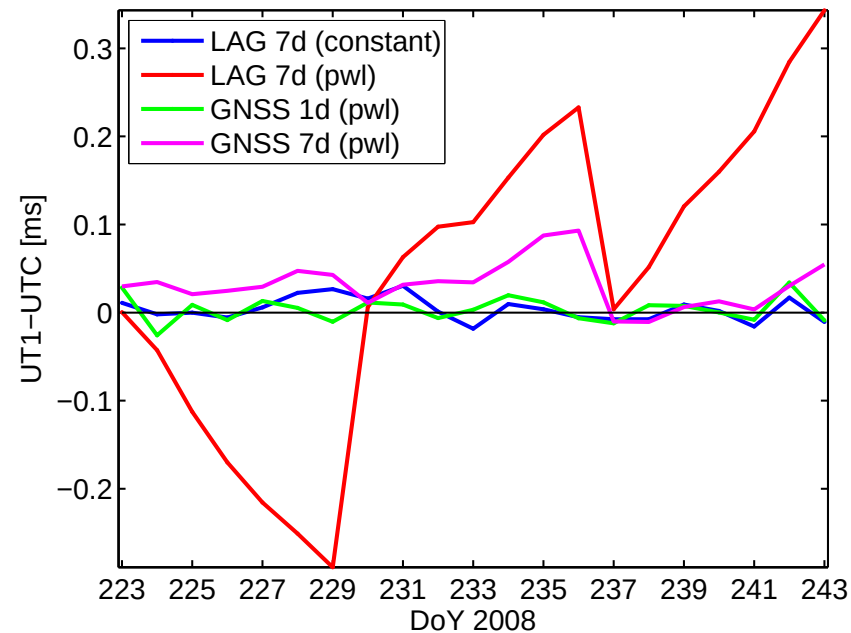
ERP parameterization for SLR: Pole rates

- No polar motion rates (fixed to IERS-C04)
- Daily piece-wise-linear (offset + drift + continuity at day boundaries)



ERP parameterization for SLR: LOD

- Only LOD estimated
- Daily piece-wise-linear (UT + LOD + continuity at day boundaries)



ERP parameterization for SLR: Helmert

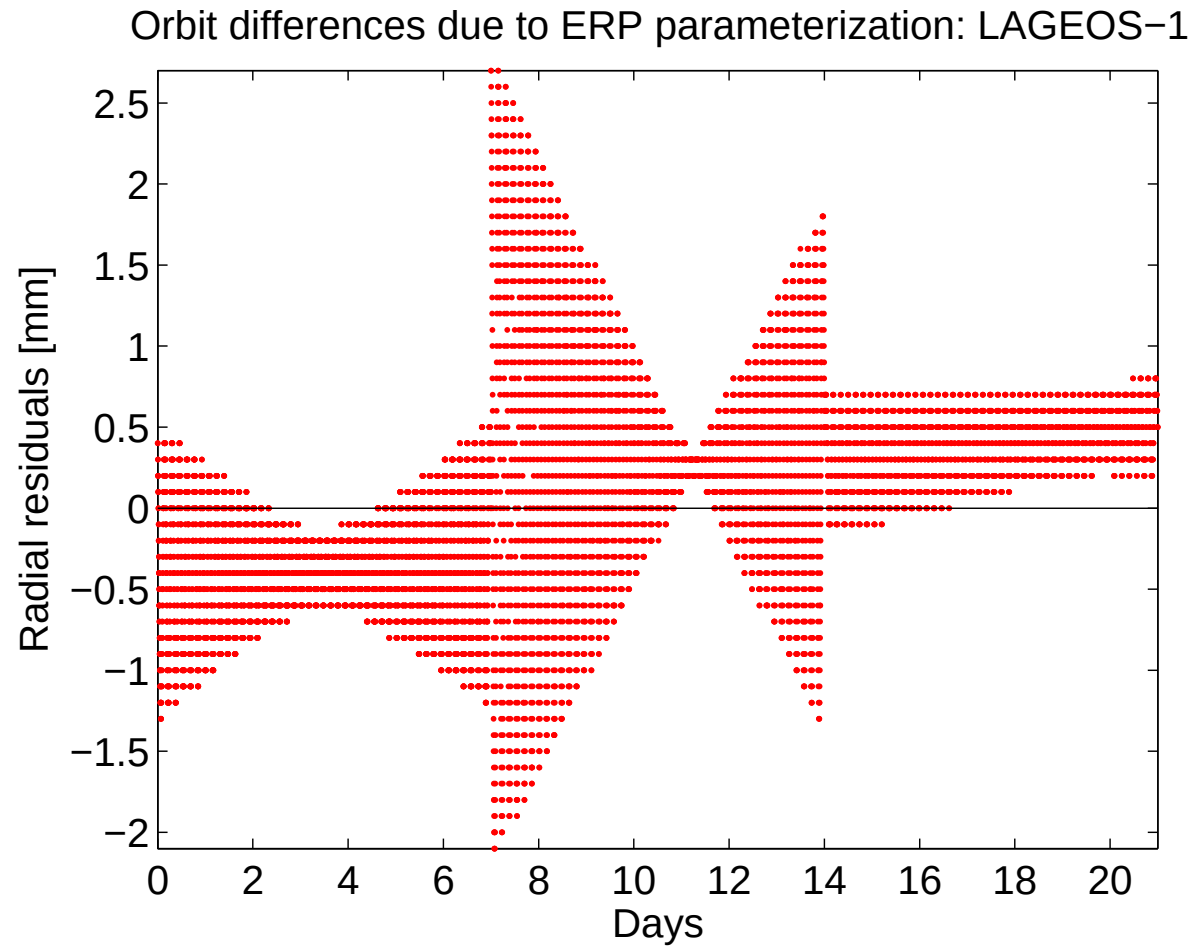
→ Helmert transformation between **ORBITS** (using LAGEOS-1 and -2)

<i>Translation parameters</i>				
	<i>X</i>	<i>Y</i>	<i>Z</i>	
<i>Week 1</i>	0.16	-0.18	-0.39	[mm]
<i>Week 2</i>	0.17	-0.26	-0.99	[mm]
<i>Week 3</i>	0.05	0.46	-0.52	[mm]

<i>Scale</i>	
<i>Week 1</i>	0.008 [ppb]
<i>Week 2</i>	-0.003 [ppb]
<i>Week 3</i>	-0.010 [ppb]

⇒ Differences are negligible

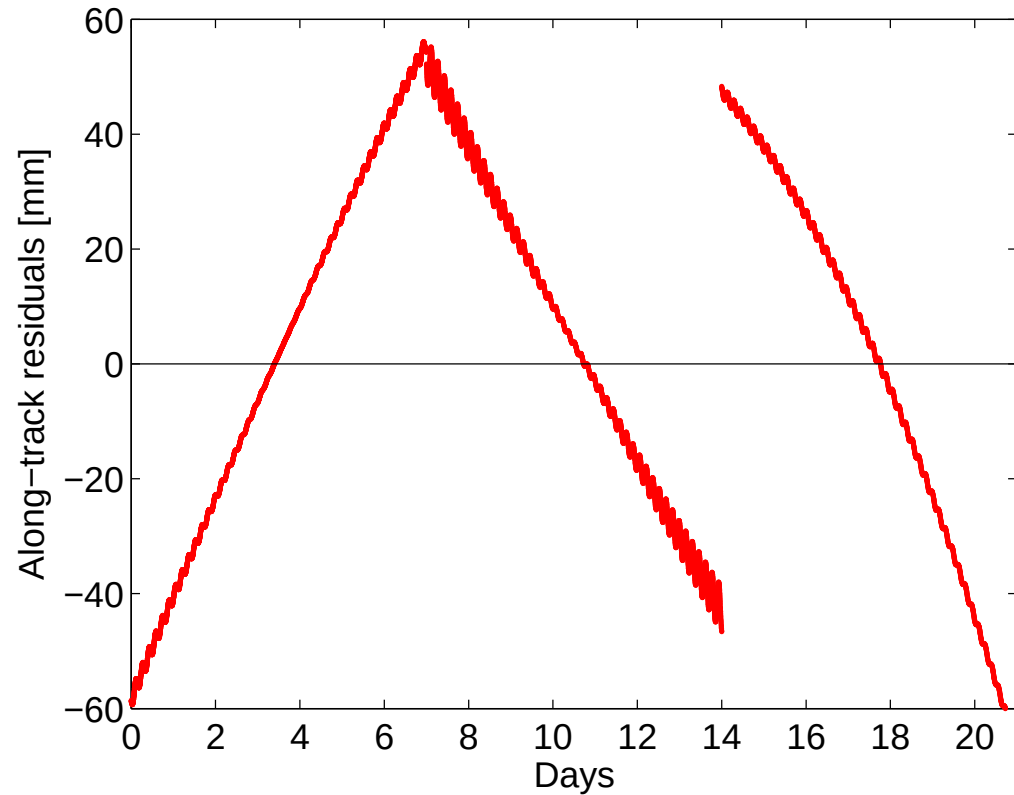
ERP parameterization for SLR: Orbit



⇒ Nearly no impact on radial direction

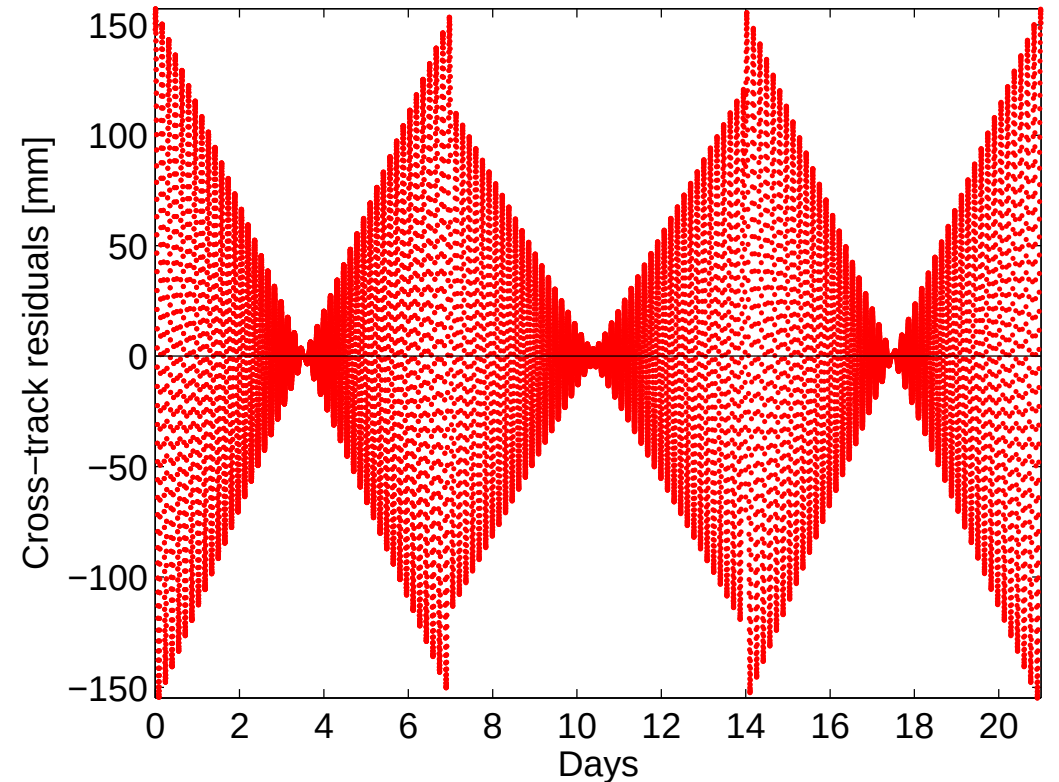
ERP parameterization for SLR: Orbit

Orbit differences due to ERP parameterization: LAGEOS-1



⇒ Impact of different UT values is visible

Orbit differences due to ERP parameterization: LAGEOS-1

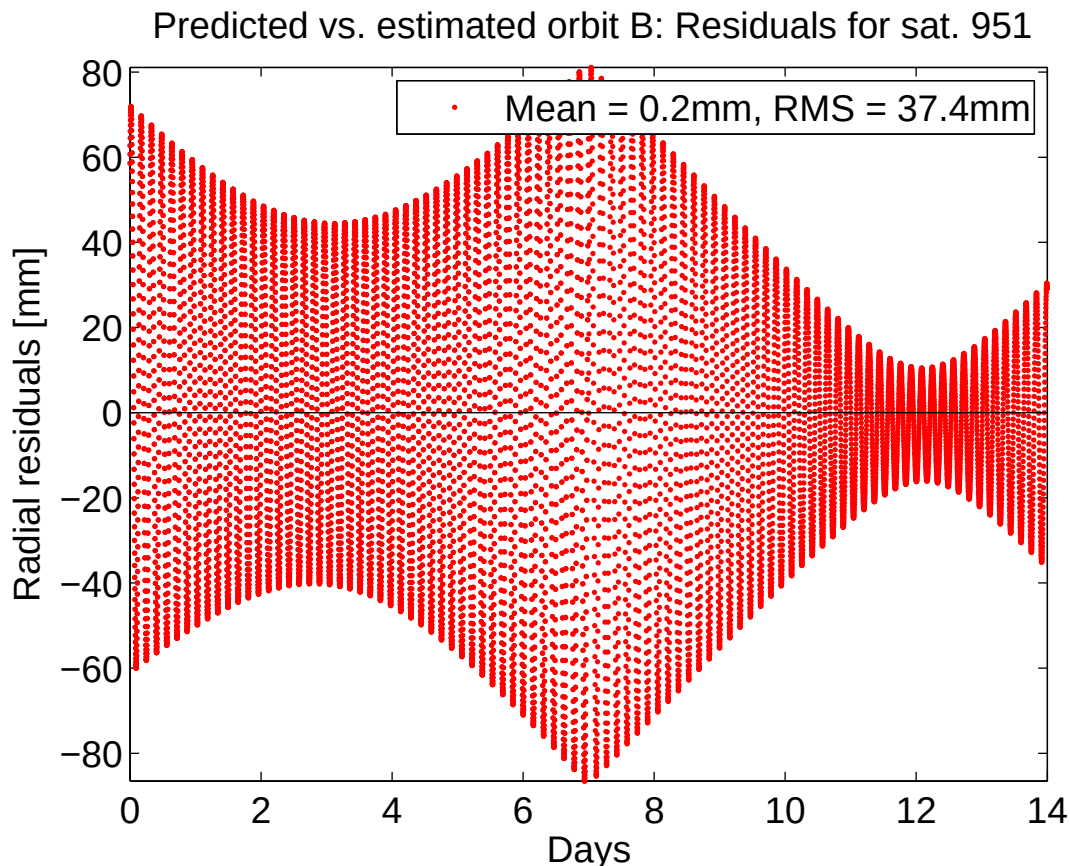
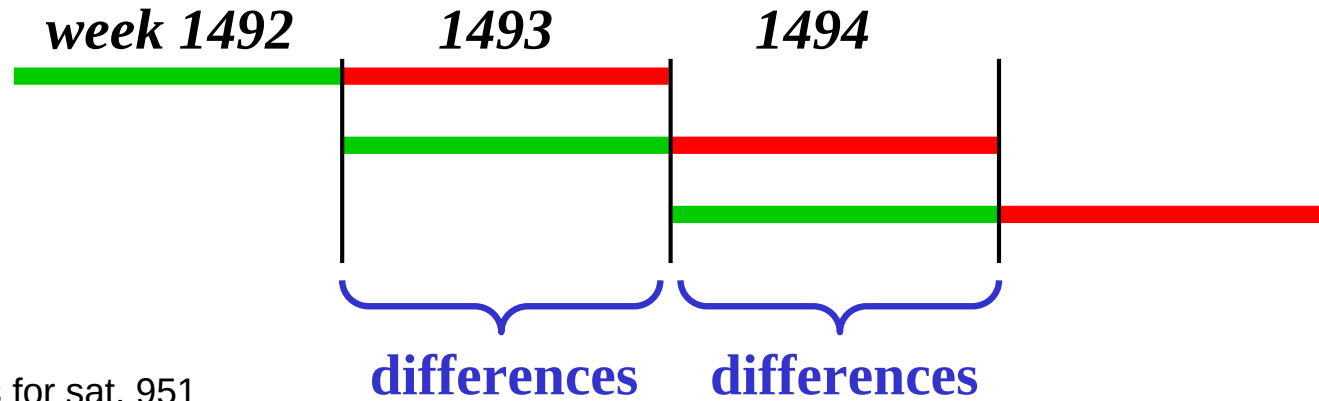


ERP parameterization for SLR: Orbit prediction

Orbit overlaps over 1 week:

Estimated orbit vs.

Prediction from previous week



RMS of residuals (2 minutes)

radial along cross

Constant: 37.9 368.8 324.3 [mm]

PWL: 37.4 360.8 328.3 [mm]

Summary

- Up to now „*standard*“ *solutions* contributed for GNSS and SLR:
 - Parameterization
 - Satellites included
- Test of extended *ERP parameterization* for SLR solutions:
 - Inclusion of polar motion rates should be okay
 - Handling of UT: GNSS approach might not be adequate for SLR
- Solutions using SLR data to GNSS satellites are computed and tested internally and will be submitted to WG COL
- New submissions:
 - „standard“ GNSS solution ($\approx$ IGS contribution): *new models*
 - „standard“ SLR-only solution ($\approx$ ILRS contribution): *+ETALON*
 - *GNSS (microwave) + SLR data to GNSS satellites*
 - *GNSS (microwave) + SLR data to GNSS satellites + LAGEOS*