

Orbit Modeling Issues

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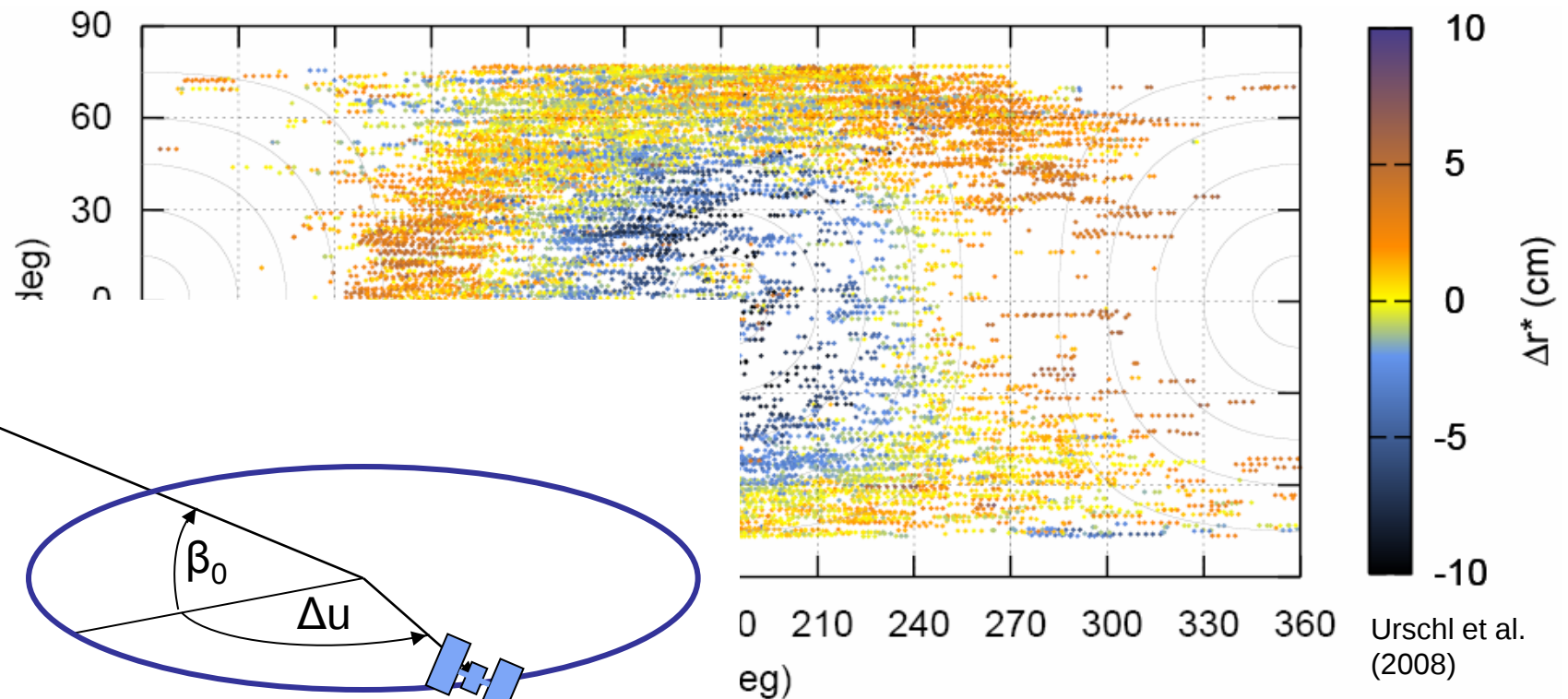
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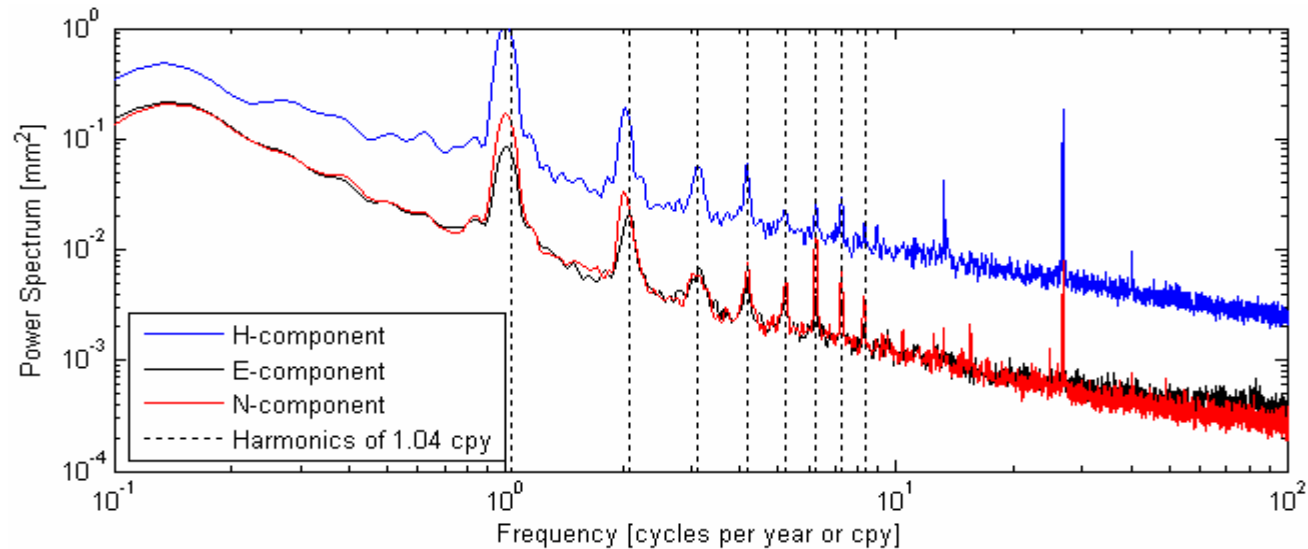
Unified Analysis Workshop

Zürich, September 16-17, 2011

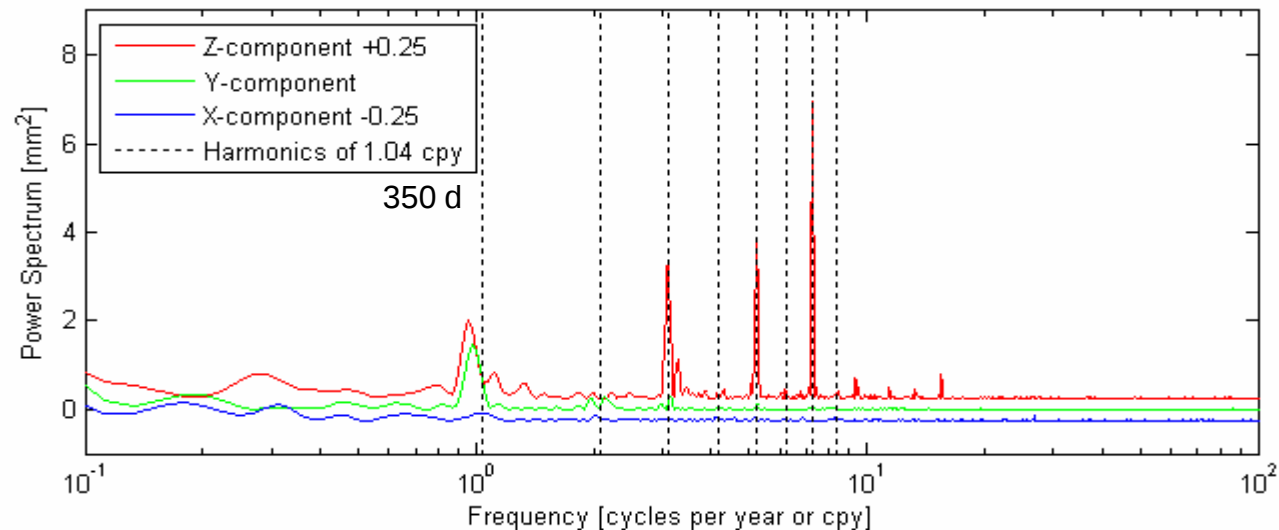
- SLR residuals to GPS satellites in sun-fixed reference frame
- Pattern depends on radiation pressure model

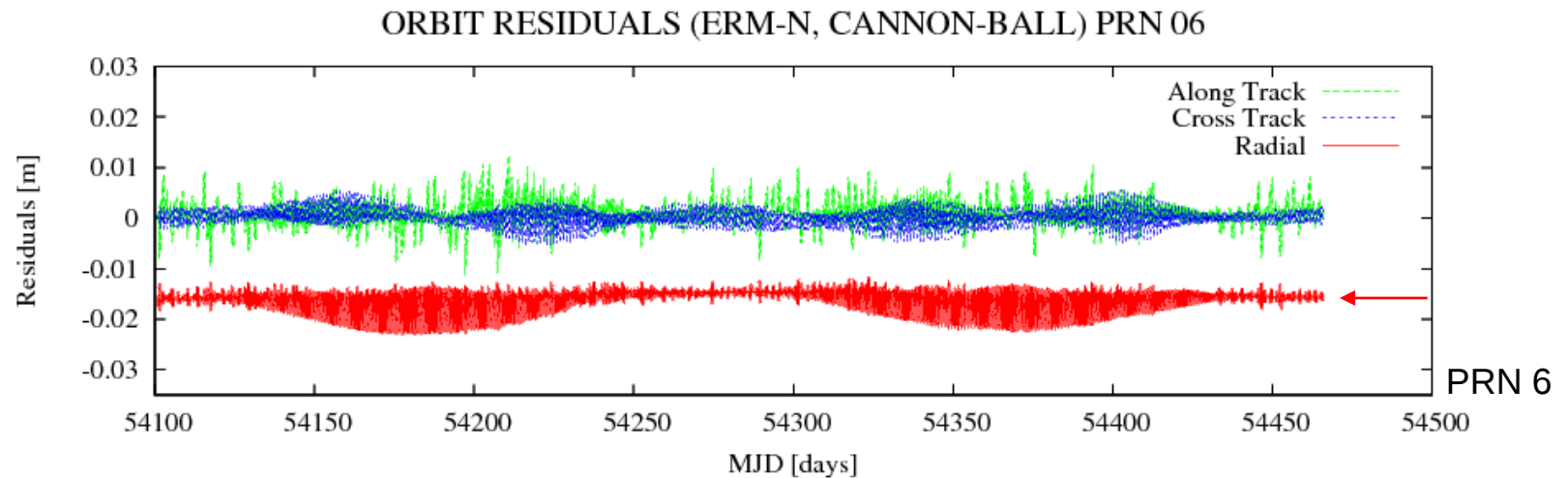
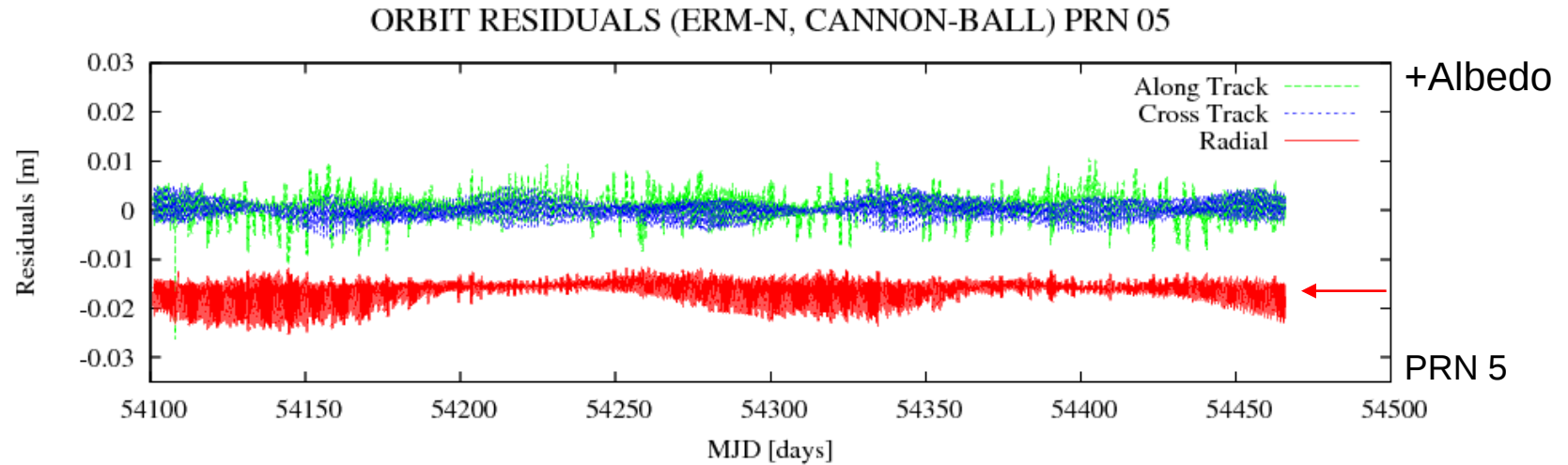


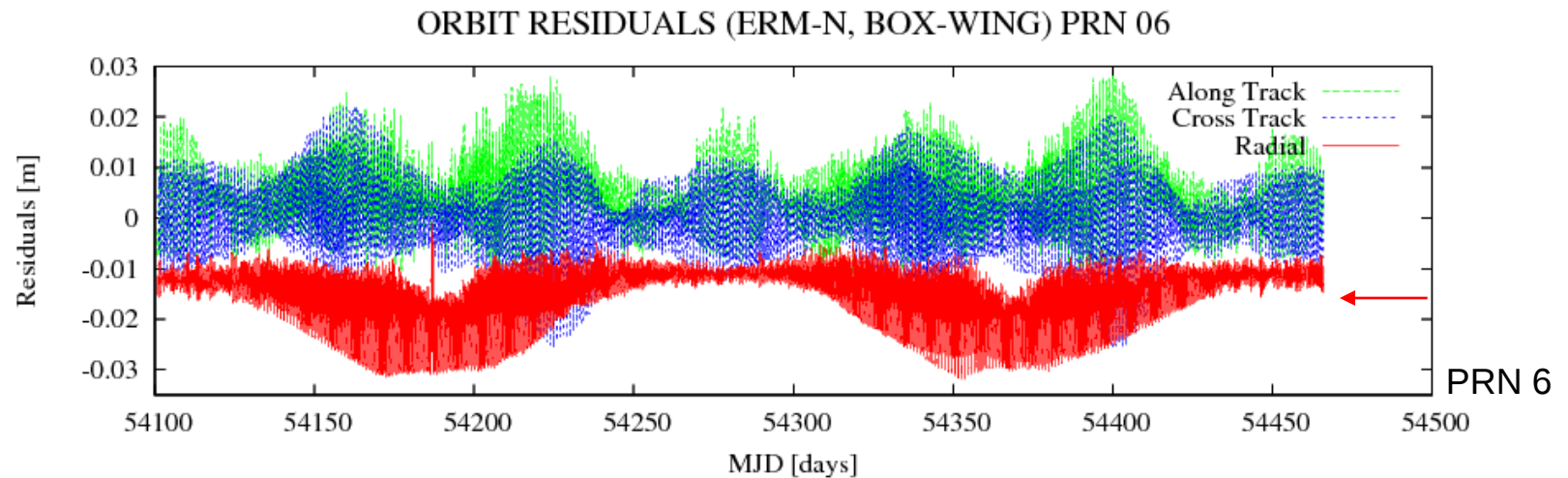
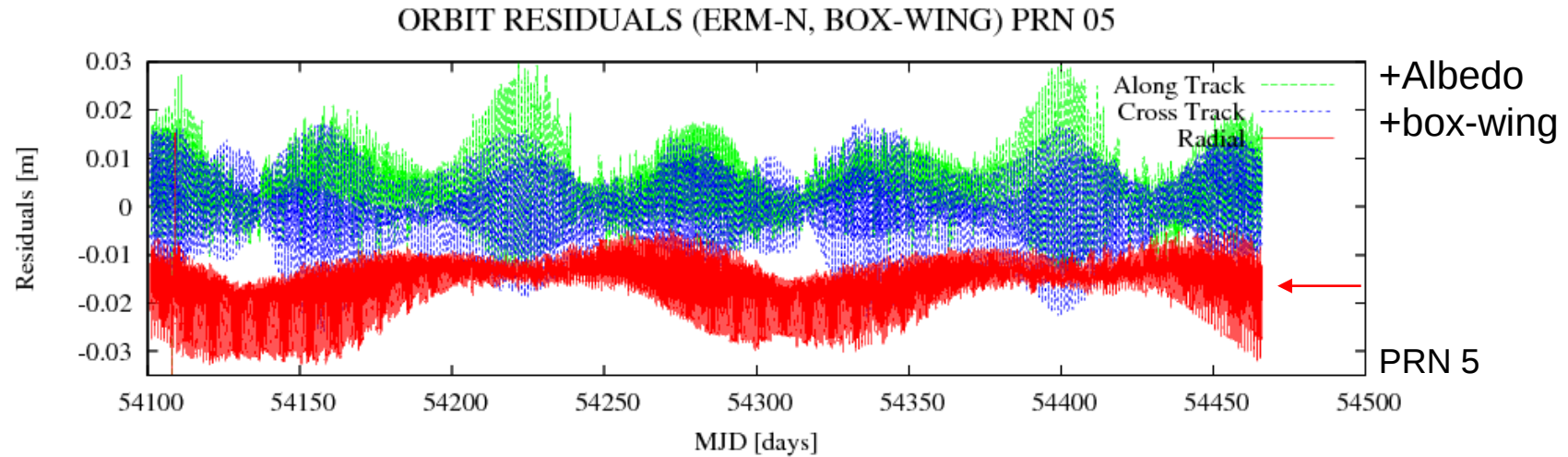
- Station coordinates

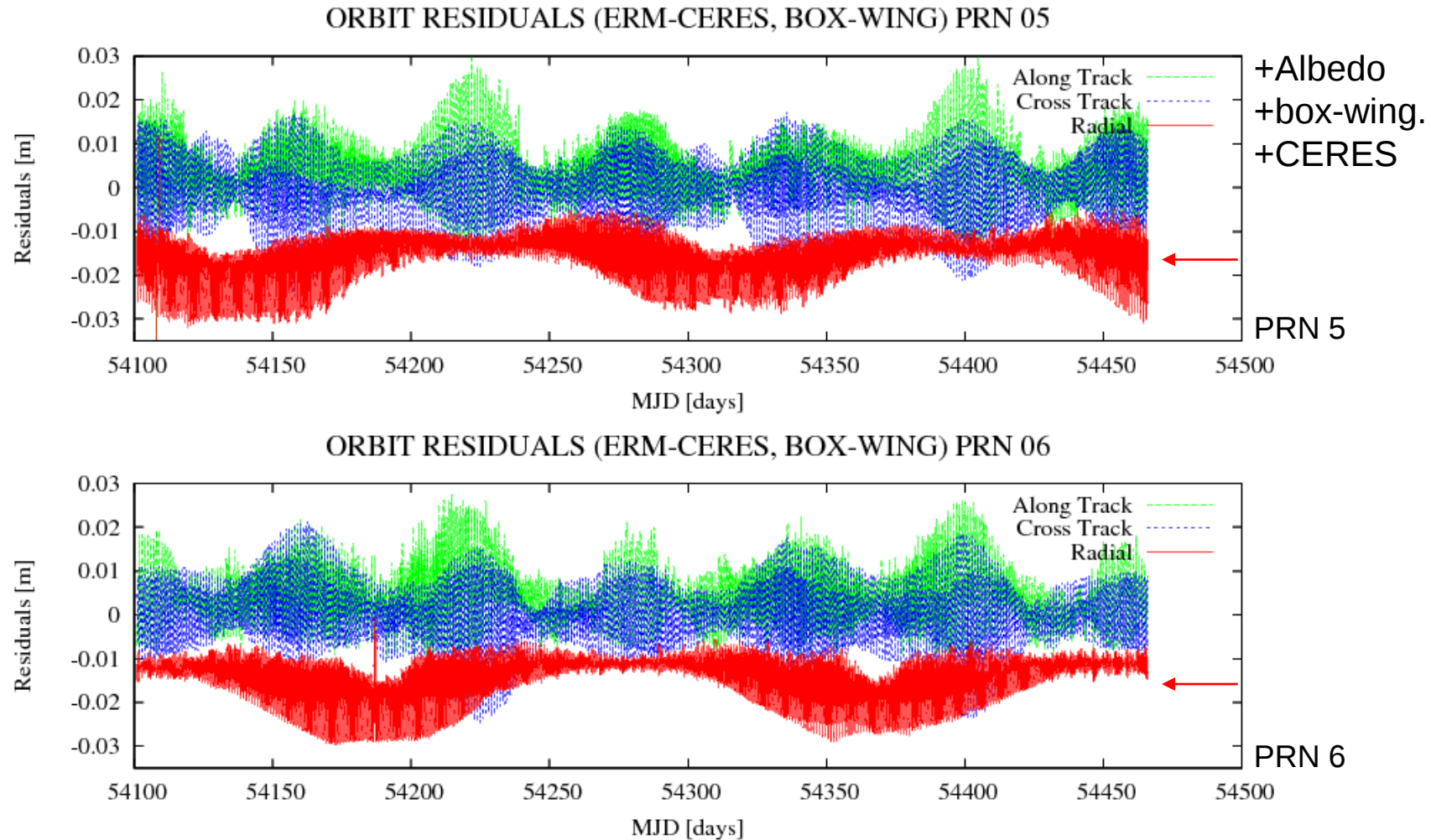


- Geocenter position

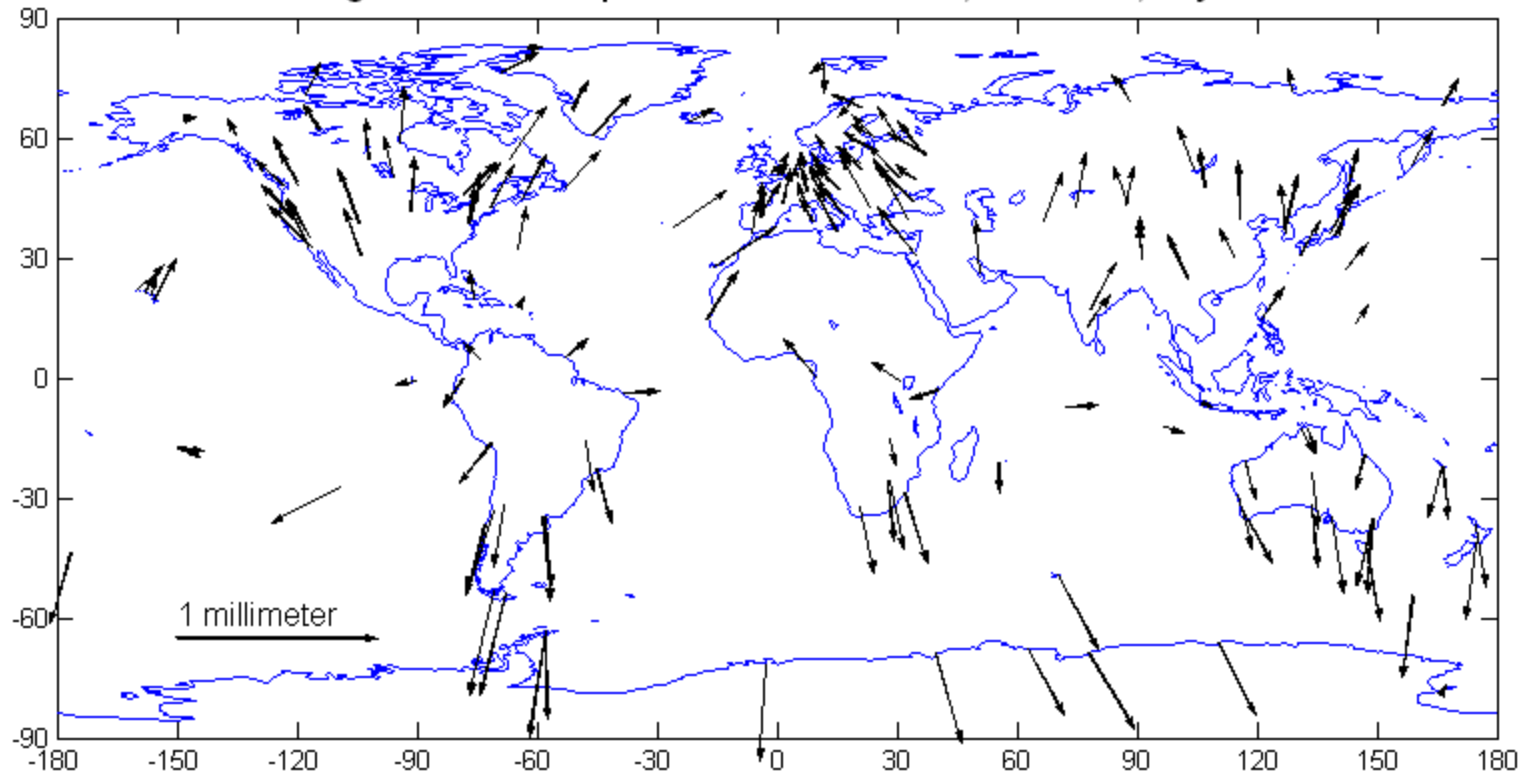




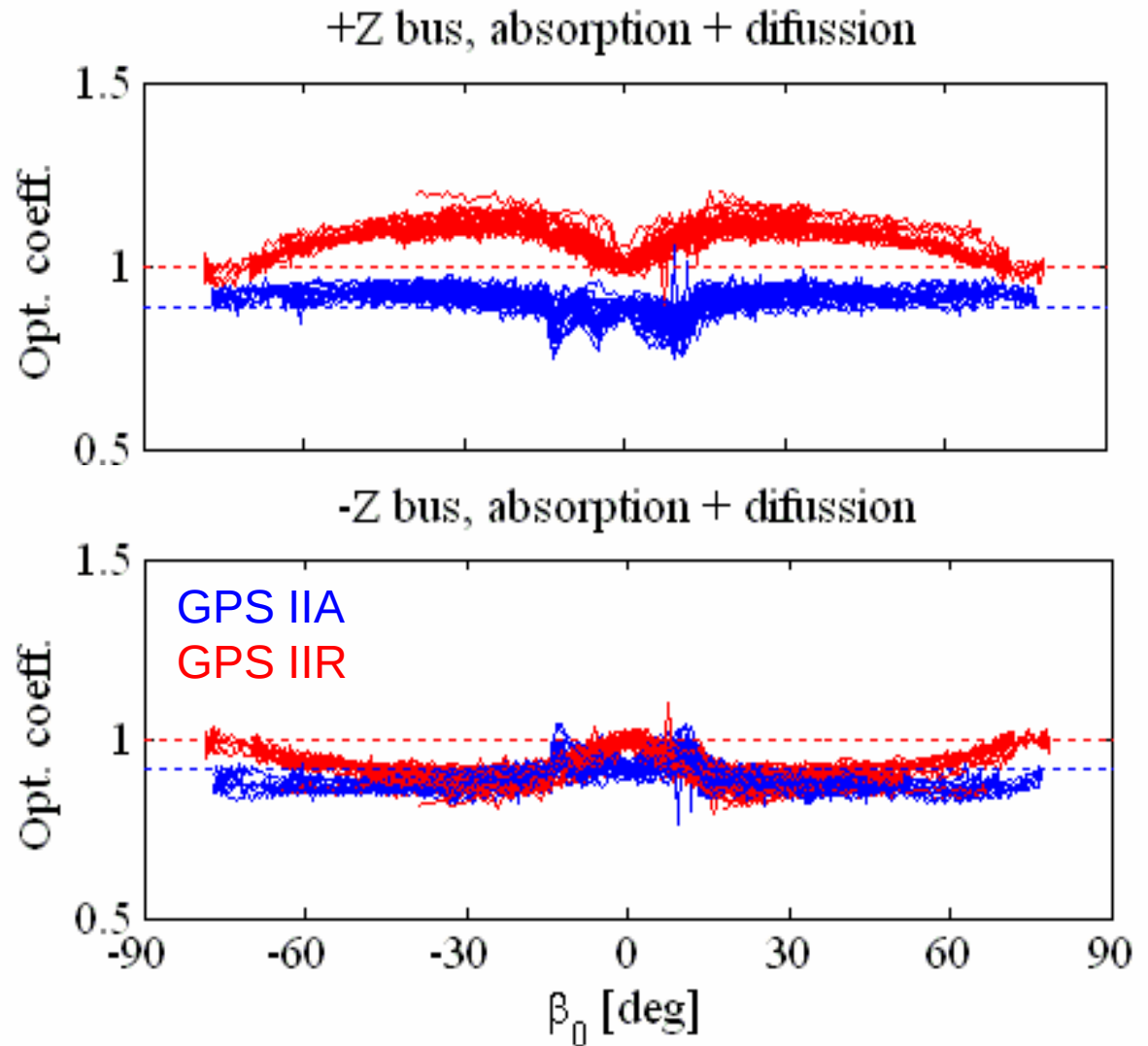




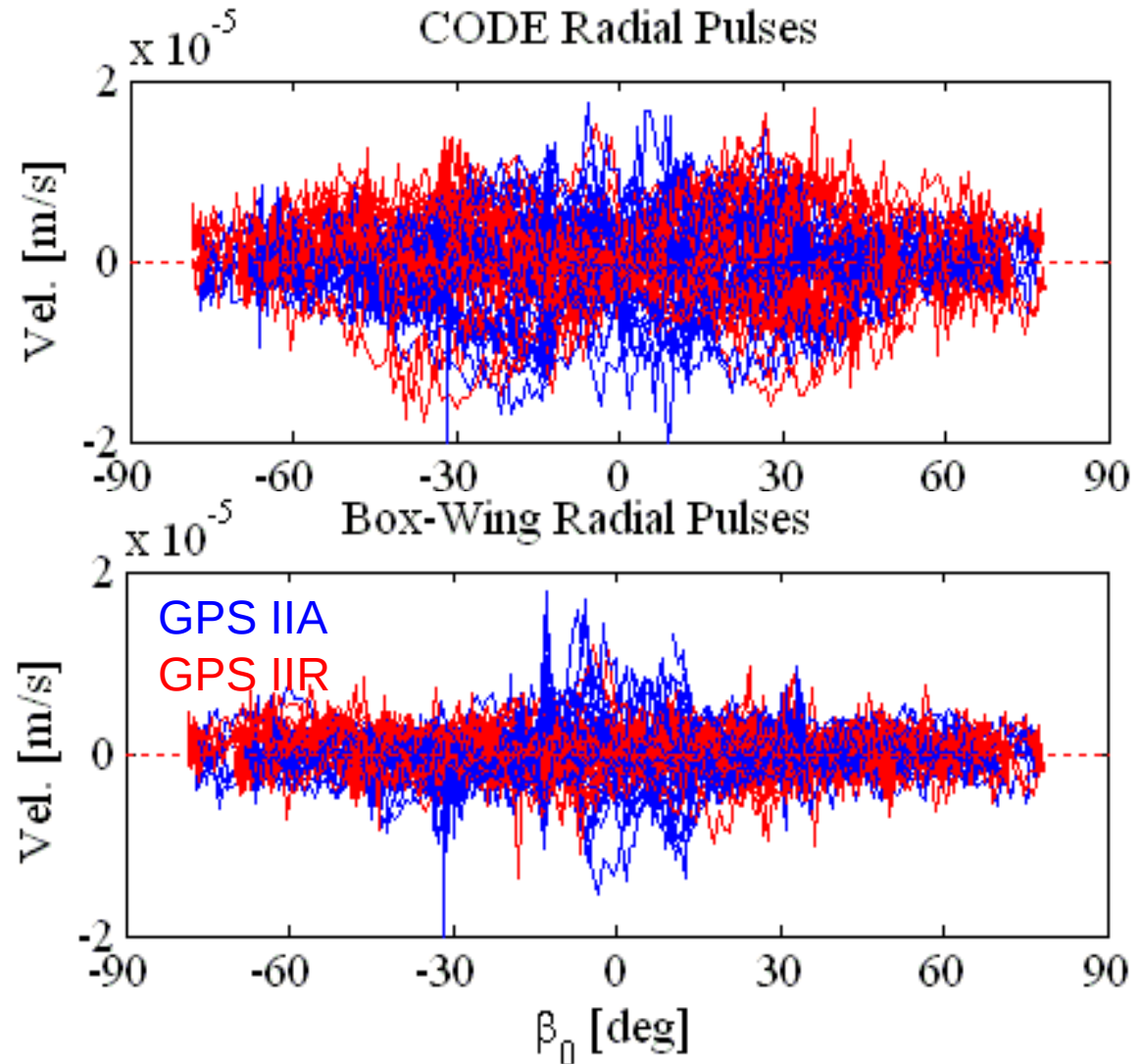
Change of North-East positions due to Albedo, Year=2007, Day=001



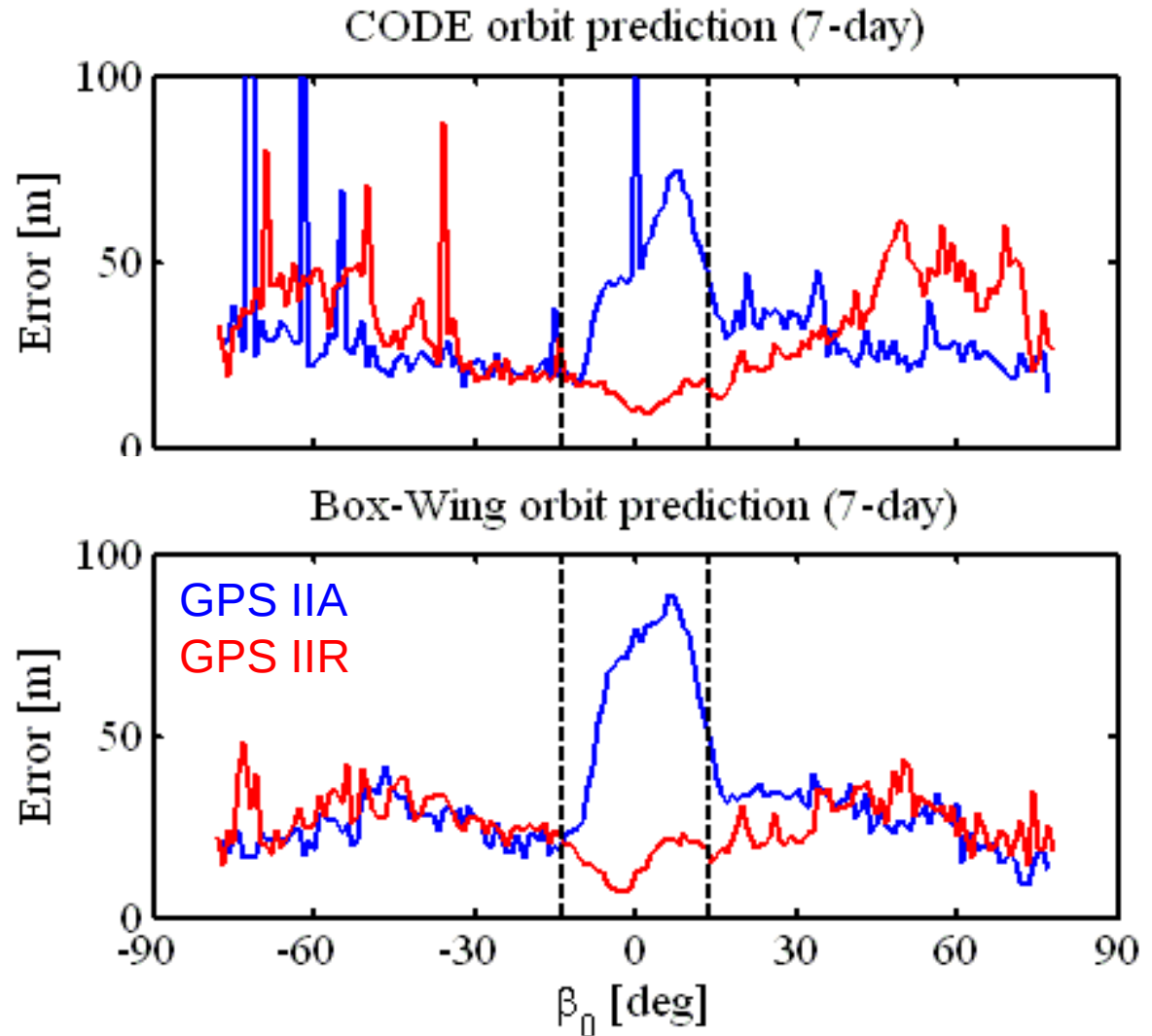
- Estimated surface optical properties
- Asymmetry between front and back side
- Potential impact on LOD estimation



- Comparison empirical v.s. box-wing orbit model
- Stochastic pulses smaller for box-wing model
- Box-wing model is more physical



- Similar orbit prediction performance
- Attitude modeling important
(see problems during eclipsing period for Block IIA)



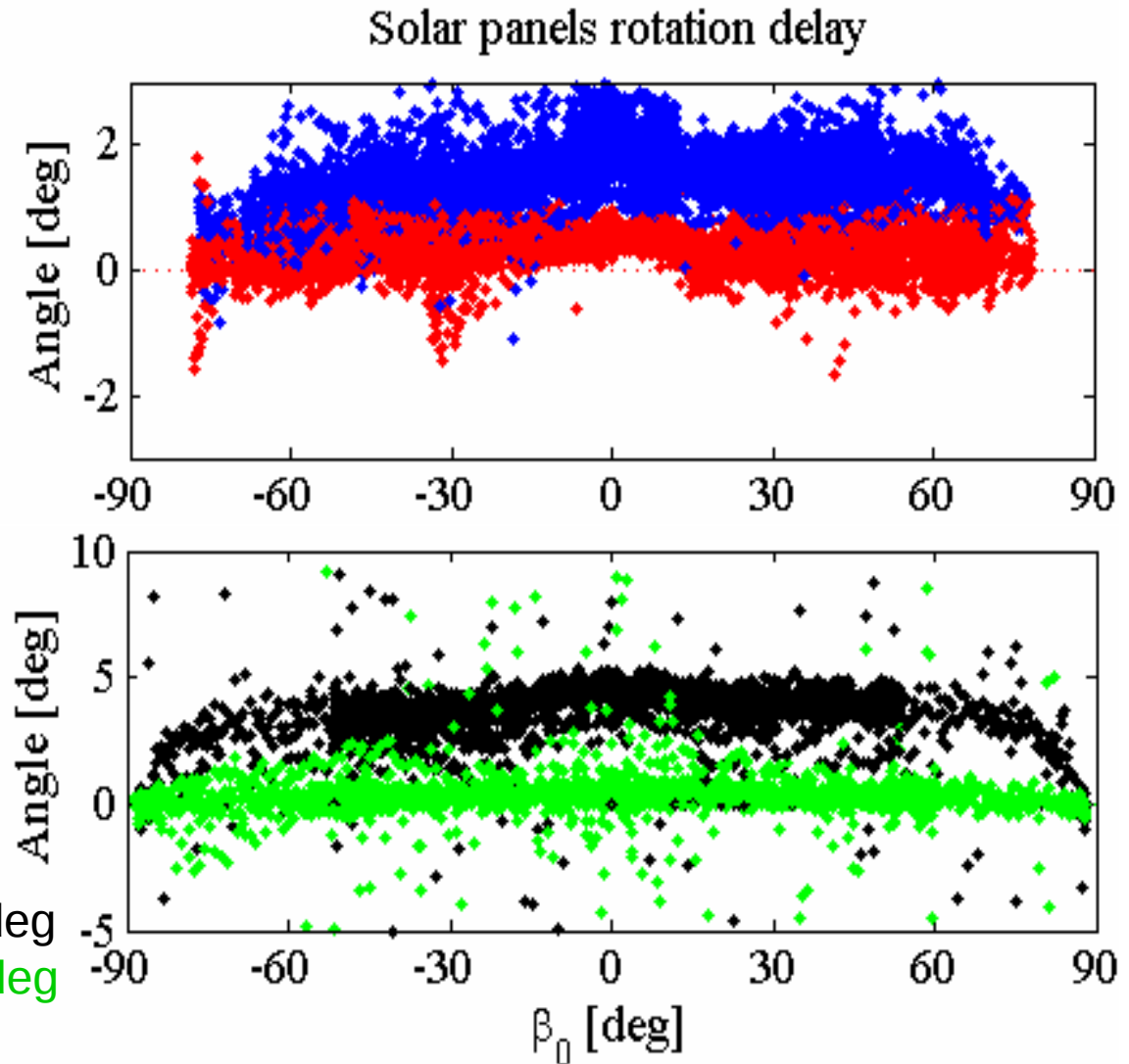
- Solar panels not perpendicular to direction to Sun
- Orientation lag

GPS IIA: 1.5 ± 0.5 deg

GPS IIR: 0.4 ± 0.4 deg

GLONASS: 3.5 ± 3.3 deg

GLONASS-M: 0.4 ± 4.3 deg



- Draconitic frequencies in geodetic time series
- **More physical orbit models are needed required**
- Earth radiation
- Solar panel lag angle
- Antenna thrust (few mm radial)
- Attitude modeling (Dilssner et al.)

- IGS Orbit Modeling WG (chair: Marek Ziebart)
- Albedo model developed (Carlos Rodriguez)
- FORTRAN routines made available (TUM and IGS ACC web pages)

- DORIS