

IGS Status (short and incomplete!)

Tim Springer

UAW 2009, San Francisco, CA, USA

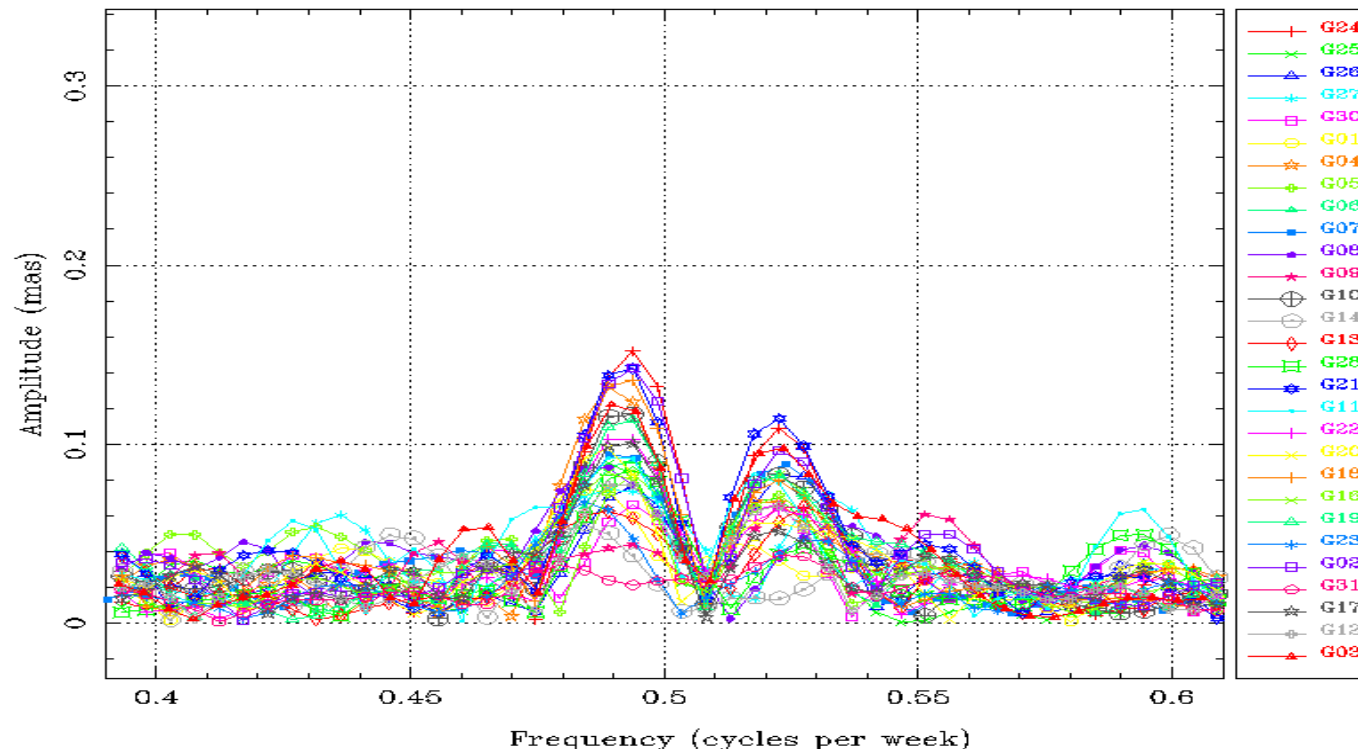
11/12/2009

- Processing Strategy
 - Good overview in presentation from Jim Ray
 - AC summaries (not always up to date)
 - Not all ACs on the latest IERS2003 standard!
 - Some of the IERS2003 standards no longer good enough?
- Products
 - Final, Rapid, and Ultra-rapid since many years
 - New: Real time clocks
 - No daily SINEX solutions (from Rapids or Ultra)

- ~14 day period in several products
- Orbit Model Issues
 - Difference in AC orbit scale at 0.5 ppb level
 - Discrepancy between GNSS orbits and SLR observations
 - Others: SRP, Albedo, IR, Thermal, Antenna thrust
- Satellite Attitude model, in particular during eclipse
- Satellite Antenna PCO and PCV
- Receiver Antenna issues (PCO, PCV, and Multipath)
 - especially for GNSS processing
- Presence of UT in „free“ NEQs causing problems

~14 day period in several products

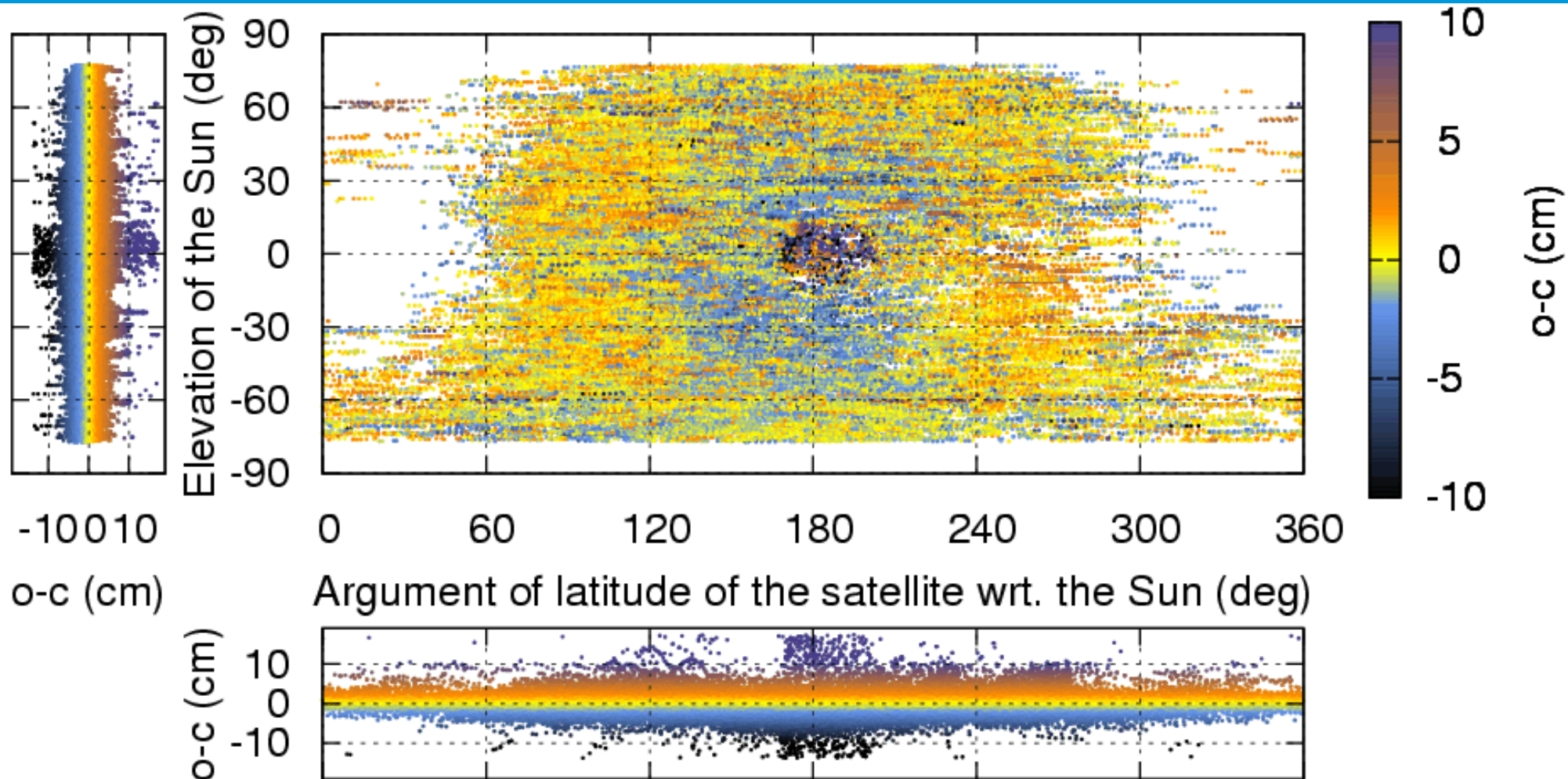
- Orbit cross-track but more clearly in Right Ascension
- Clearly visible in LOD
- Most likely cause is inaccurate subdaily EOP model
- Size of effect $0.15\text{mas} = \sim 5\text{mm (terrestrial)} / 20\text{mm orbit}$



- Difference in AC orbit scales at 0.5 ppb level
- Discrepancy between GNSS orbits and SLR observations
 - Mean bias but also clear pattern
 - Albedo + IR and Antenna thrust only partially explain
 - But show the same pattern
 - Differences in AC orbit scale due to Albedo
- Have to look at: SRP, Albedo, IR, Thermal, Antenna thrust
 - Also revisit old Geocenter Orbit Y-shift ($\sim 100\text{mm}$)
- Size of effects:
 - Orbit scale $\sim 0.5 \text{ ppb} = 13 \text{ mm}$
 - SLR residual effects $\sim 30 \text{ mm}$

SLR Validation of ESOC GPS Orbits

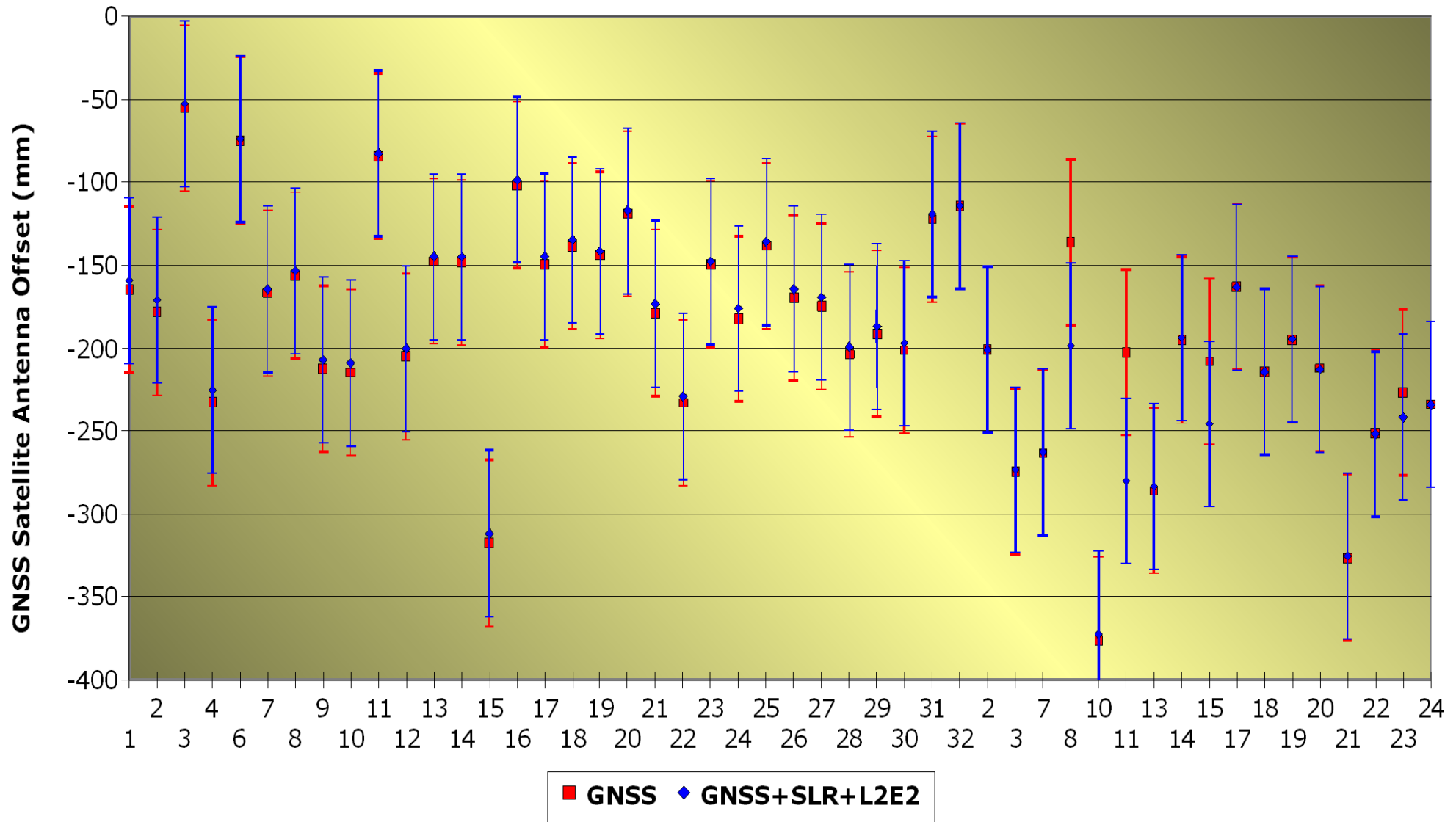
Reprocessed orbits from 1995-2008



SLR and GPS agree very well!
Only a small bias and eclipse (attitude) effects remain

- Satellite Antenna PCO and PCV
 - Still ~200 mm issues remaining
 - More info from IGS Antenna **Working** Group
 - Mainly Ralf Schmidt, Rolf Dach, Florian Dilssner
- Satellite Attitude model is coupled with PCO/PCV estimation
 - GPS model known but not implemented by all
 - GLONASS model unknown

GNSS Satellite Antenna Offset Relative to current IGS05.atx values



- Rough order of magnitude of the issues
 - 200 mm Satellite Antenna PCO and PCV
 - 100 mm Orbit model deficiencies
 - 30 mm SLR residual effects
 - 20 mm 14-day effects on Orbits
 - 13 mm Orbit scale differences (Albedo and co.)
 - 5 mm 14-day effects on TRF
 - ? mm Receiver antenna issues
 - ? mm UT singularity