

## System Bias session A: Analysis Results

- C. Luceri: Introduction to session
- T. Otsubo: systematic errors 2014-2015
- H. Mueller, M. Blossfeld: Impact of range biases on global reference frames
- G: Appleby, J. Rodriguez-Perez: ILRS station biases revealed by a 20-years analysis of Lageos observations
- V. Glotov: Main reason for RB&TB differences



## System Biases Session A: Analytic Results

Chairs: C. Luceri, H. Mueller, T. Otsubo

- How do we estimate our system biases in our processing and analysis systems?
- What examples of biases have been seen from the Q/C and final processing systems?
- What are the likely sources of biases? What are the big issues?

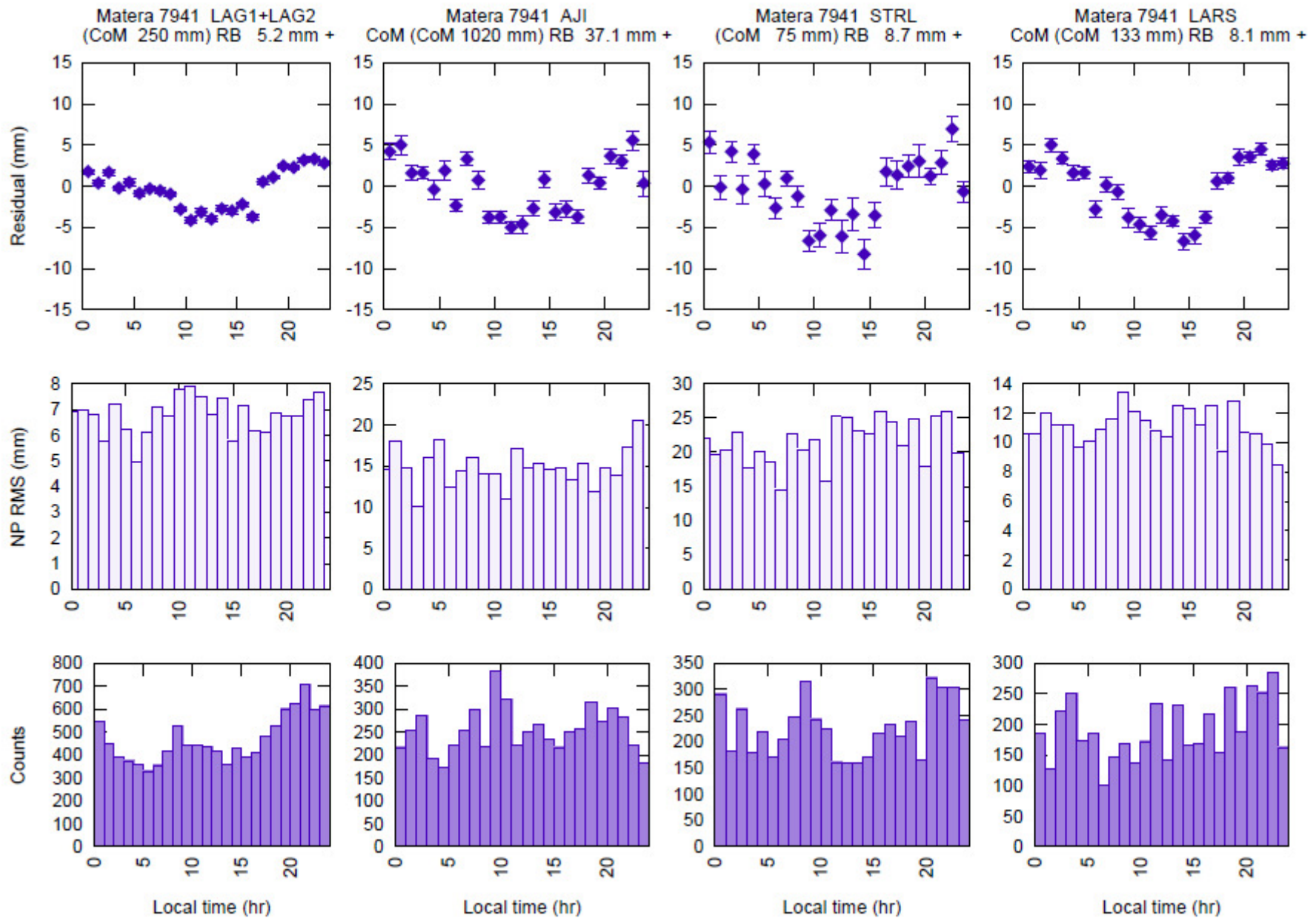
## **FIRST question**

**How do we estimate our system biases in our processing and analysis systems?**

Within ILRS there are basically 2 types of approaches to estimate system biases:

- Fast delivery Quality Check: pass by pass estimation of range and time bias available for some satellites and at different delivery frequencies depending on the AC
- Short/medium/long term estimation: weekly, monthly, yearly biases typically estimated in multiyear solutions by some ILRS Analysis Centers, mostly for Lageos

# #8: Local time



# Summary & Discussion

## **Systematic trends seen in many stations**

**Understand your system's behaviour.**

**On-site test is essential.**

**Use this result just as a trigger.**

**(There is a risk of false alarm. ← POD is not perfect.)**

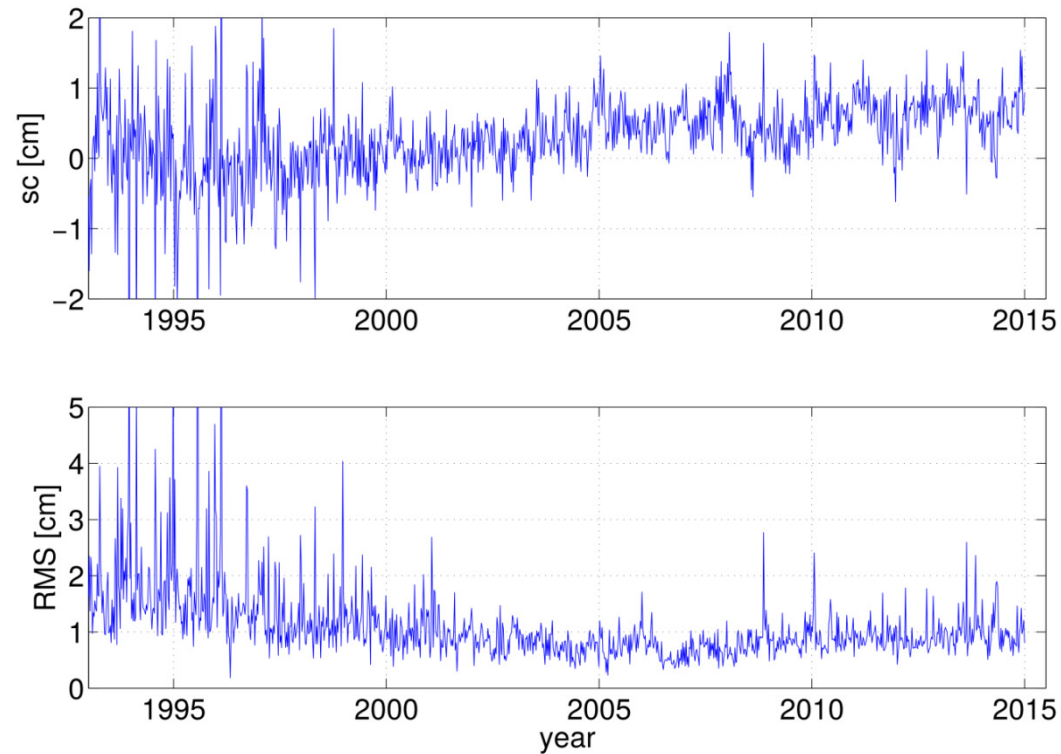
## **Station-Analyst interaction**

**Enjoy this session!**

**The charts for productive stations will be available on our website [geo.science.hit-u.ac.jp](http://geo.science.hit-u.ac.jp).**

# epoch-wise solutions

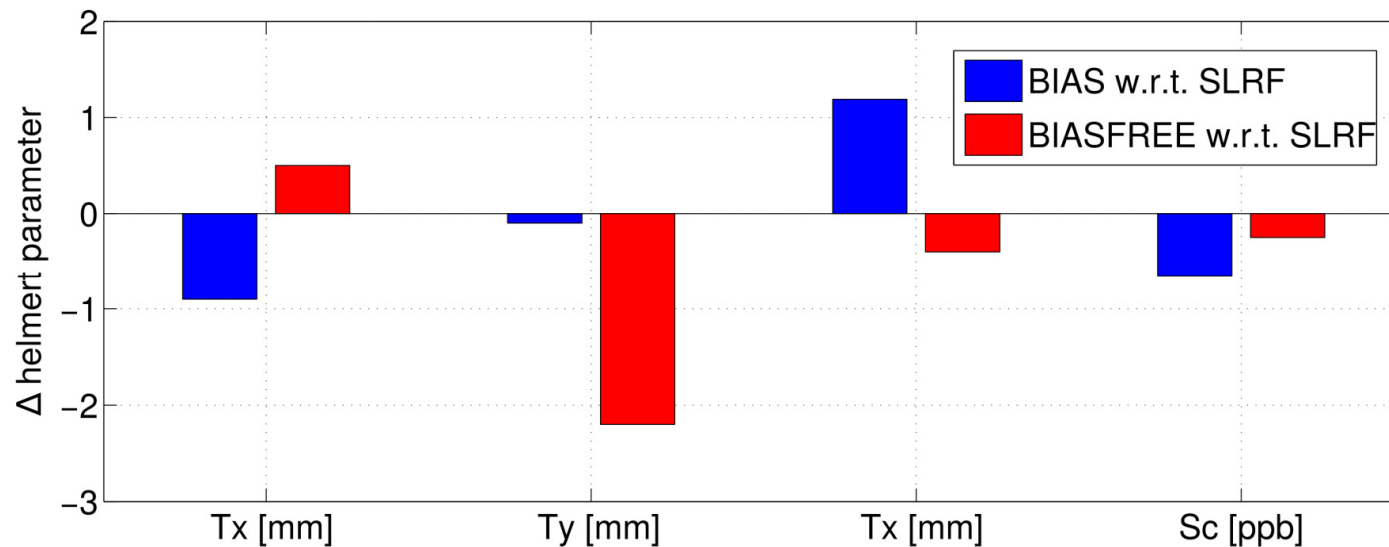
BIAS w.r.t. SLRF (1993.0 – 2015.0)



# accumulated multi-year solutions

BIAS w.r.t. SLRF (1993.0 – 2015.0)

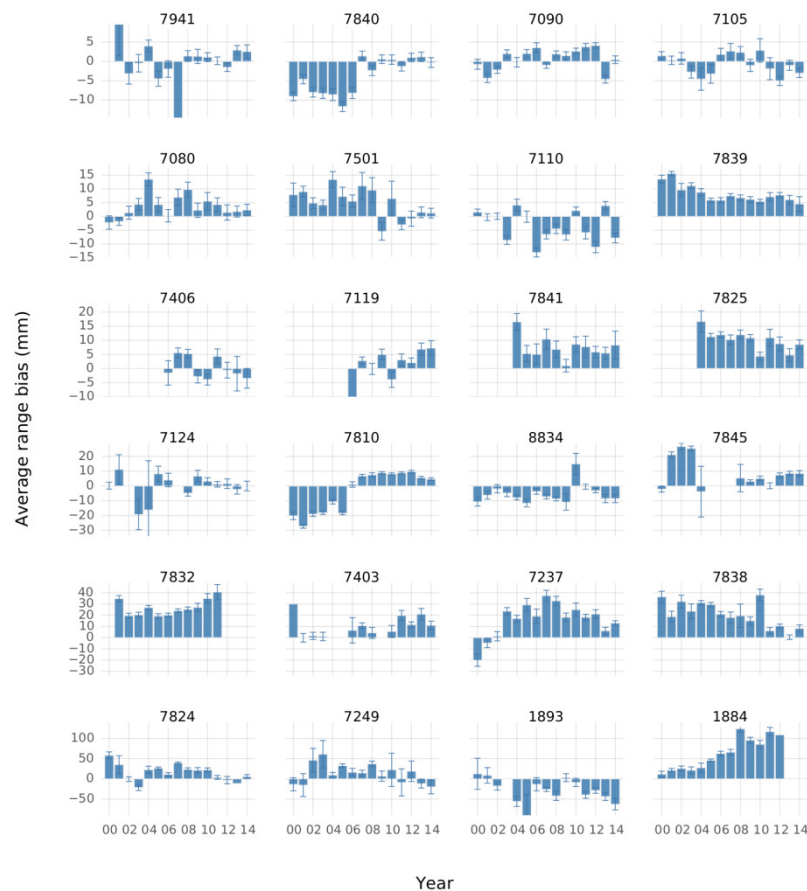
BIASFREE w.r.t. SLRF (1993.0 – 2015.0)



- differences in the origin up to 2.2 mm (Ty component)
- scale difference BIAS w.r.t. SLRF: -0.65 ppb ( $\rightarrow$  ca. -4.3 mm)
- scale difference BIAS w.r.t. SLRF: -0.25 ppb ( $\rightarrow$  ca. -1.6 mm)

# ILRS Stations' range biases revealed by a 15-year analysis of LAGEOS observations 2000-2014

Graham Appleby  
Jose Rodriguez



Range bias estimation for all sites reveals ~5 mm problems for most stations of the network

Biases most likely to be caused by a combination of factors (hardware issues, CoM modelling...)

Impact of biases on TRF scale quantified at about 1 ppb

RB can be mitigated in the analysis, but most satisfactory solution is for stations to identify and minimize systematics



## Recommendations for Analysis Centers:

- Agreement of the stations coordinates sets (for the new stations especially);
- Separation of the short and long (calibrating) passes estimation; (use the long passes for the correct RB&TB estimation)
- Timely and quickly contacts with other and main (???) Analysis Centers in the case of necessity
- To coordinate the final RB&TB estimation from ILRS

48.32°  
48.1°  
E No. 54°  
32.0°  
N 32.0°



37°5'  
55°  
E No. 54°  
48.32°  
N 32.0°  
37°5'  
55°  
E No. 54°  
48.32°  
N 32.0°  
37°5'  
55°  
E No. 54°  
48.32°  
N 32.0°