Evaluation of the present SLR tracking stations

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Processing

- Period January 2015 (1825) until September 2017 (1967)
- Station coordinates fixed to SLRF2014
- Fix EOPs to IERS C04 (2014)
- IERS standards, non tidal loading not applied
- Software DOGS-OC 5.4

- For each satellite compute weekly arcs, solving for pass biases
- Extract biases
- Generate running averages over 300 range bias values
- Compute mean monthly biases

- Analyse remaining residuals
- Compute monthly mean residuals
- Generate running averages over 10000 residuals
Problems during computation

- Station coordinates and velocities not precise enough for new stations
- Non tidal loading?
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- Centre of mass correction for Ajisai problematic for a few stations
Range dependence of biases

Yarragadee (7090)

-0.877 mm/1000 km + 2.633

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Analysing biases, day-night passes

SLRF2014 bias analysis: running average of passes
Herstmonceux (7840), lageos1

SLRF2014 bias analysis: running average of passes
Changchun (7237), lageos1

SLRF2014 bias analysis: running average of passes
Herstmonceux (7840), ajissai

SLRF2014 bias analysis: running average of passes
Monument (7110), lageos2
Analysing biases, ascending – descending passes
Analysis of mean orbit residuals

Time history of residuals monthly mean squared over all satellites
Analysis of mean orbit residuals

Elevation dependency, running averages over 10000 observations
Analysis of mean orbit residuals

Azimuth dependency

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Conclusion

- Station coordinates and velocities need a more often update
- Satellite Centre of Mass corrections should be redefined
- Stations do not show change in station precision in the last years
- There is no range dependency in the tracking data but CoM corrections need update
- There are differences in day-night resp. ascending-descending arcs
- Small dependencies on azimuth and elevation exist for few stations

- Results can found on DGFI-TUM Webpage:
  https://ilrs.dgfi.tum.de/quality/weekly_biases/stations/
Thank you