

The effect of SLR tracking scenarios to GNSS satellites in a combined GNSS/SLR solution

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The rigorous combination of GNSS and SLR techniques is possible by using space ties, meaning that a SLR solution based on LAGEOS and Etalon is combined with a microwave-based GNSS solution using SLR observations to GNSS satellites. Due to the steadily increasing number of GNSS satellites that can be tracked via SLR extending the intensive tracking from GLONASS to all GNSS targets is not realistic for the present ILRS station network. A feasible strategy optimizing scheduling and priorities to track the GNSS satellites is needed. A simulation study considering the current tracking capability of the ILRS network was established. This study focused on the effect of tracking strategies on station coordinates, geocenter coordinates, Earth rotation parameters and the formal errors of these estimated parameters in the framework of the before mentioned combination. The actual observations to GLONASS satellites of the year 2016 were redistributed to differing GLONASS satellites and the impact of these modified tracking scenarios on the combined GNSS/SLR solution was assessed. Results from the following scenarios will be presented: GLONASS observations redistributed equally to all satellites of the constellation or focused on only two per orbital plane, scenarios with a coordinated tracking of the most productive European SLR stations. With the extension of trackable GNSS constellations in mind, additionally the potential impact of tracking more than just the GLONASS constellation was studied. For that SLR normal points to GPS satellites were simulated and used in the combined solution. Recommendations for tracking strategies to GNSS satellites can be derived from this simulation study.