



GGOS and the EOP – the key role of SLR for a stable estimation of highly accurate Earth orientation parameters

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The GGOS vision is to integrate geometric and gravimetric observation techniques to estimate consistent geodetic-geophysical parameters. In order to reach this goal, the common estimation of station coordinates, Stokes coefficients and Earth Orientation Parameters (EOP) is necessary. Satellite Laser Ranging (SLR) provides the ability to study correlations between the different parameter groups since the observed satellite orbit dynamics are sensitive to the above mentioned geodetic parameters. To decrease the correlations, SLR observations to multiple satellites have to be combined.

In this paper, we compare the estimated EOP of (i) single satellite SLR solutions and (ii) multi-satellite SLR solutions. Therefore, we jointly estimate station coordinates, EOP, Stokes coefficients and orbit parameters using different satellite constellations. A special focus in this investigation is put on the de-correlation of different geodetic parameter groups due to the combination of SLR observations.

Besides SLR observations to spherical satellites (commonly used), we discuss the impact of SLR observations to non-spherical satellites such as, e.g., the JASON-2 satellite. The goal of this study is to discuss the existing parameter interactions and to present a strategy how to obtain reliable estimates of station coordinates, EOP, orbit parameter and Stokes coefficients in one common adjustment. Thereby, the benefits of a multi-satellite SLR solution are evaluated.