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Future global SLR network evolution and its impact on the terrestrial reference frame

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SLR is the unique technique that allows determining the geocentre with very high accuracy and contributes to the realization of the scale of a conventional reference frame. In addition, due to the high sensitivity of the SLR-tracked satellites on the Earth's gravitational field, SLR is a crucial technique for determining important geodetic parameters such as Earth Orientation Parameters (EOP) and low-degree spherical harmonics of the Earth's gravitational field model.
So far, the distribution of SLR stations has been quite inhomogeneous, especially in the southern hemisphere, mostly due to the lack of land-masses. With the set-up of a new SLR station in Brasilia in 2014 and the transfer of the former TIGO observatory from Concepción (Chile) to La Plata (Argentina) – now known as AGGO Argentinian-German Geodetic Observatory –, the shape of SLR subnetwork in South America has changed significantly. Furthermore, additional SLR stations in India (Mount Abu and Ponmundi), as well as a new station in Hartebeesthoek, are scheduled to start operations in 2016 and they will further improve the global SLR network geometry.
In this work, SLR data has been simulated in order to determine the influence of the changing SLR network geometry on the geodetic parameters such as a global terrestrial reference frame, EOP and the low-degree harmonics of the Earth's gravitational field. The simulations have been performed for different network geometries as well as different satellites. In this investigation, a special emphasis is placed on the improvement of the geocentric realization of a global SLR-derived reference frame.