The potential of increased station performances for scientific SLR products

Bloßfeld M., Kehm A.

The accuracy and reliability of geodetic products derived from SLR observations rely on numerous different aspects. Beside the quality of the scientific data analysis (models, algorithms, procedures, etc.) also the quality, amount and global distribution of SLR observations play a fundamental role. Currently, one limiting factor for the accuracy of geodetic products is the sparse global distribution of the ILRS ground stations. This fact is already well addressed by the Bureau of Networks and Observations (BNO) of the Global Geodetic Observing System (GGOS) chaired by Mike Pearlman. Moreover, the quantitative performance of the ILRS ground stations affects the ILRS product quality. Currently, only about 12 ILRS ground stations fulfil the recommendations of the ILRS of at least 600 LAGEOS-1/-2 passes per year which significantly lowers the accuracy and the quality of derived terrestrial reference frame (TRF) products. Reasons for such low station performances might be operating costs, political issues and/or technical limitations.

In this presentation, we quantify the impact of the ILRS ground station performances on derived geodetic products such as the TRF and the Earth orientation parameters. We will highlight that the scientific solutions can be significantly improved by increasing the quantitative performance of observation sites. A special focus is put on regions where an upgrade of low-performing stations would result in a significant improvement of the geodetic products. All investigations are based on simulation studies using the DGFI Orbit and Geodetic parameter estimation Software DOGS.

This presentation should encourage station managers, operators and other responsible persons for the ground-based ILRS infrastructure to further upgrade their SLR stations.