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Analysis of 12 years (1993-2004) of Satellite Laser Ranging data

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The quality presently reached by Spatial Geodesy techniques, regarding precision, accuracy such as spatial and temporal distributions of their measurements, allow analysists to compute time series of geodetic products. In this context we have developed a method to compute time series of Earth Orientation Parameters and terrestrial station positions through the analysis of Satellite Laser Ranging (SLR) data. This technique is an important basis for the computation of the International Terrestrial Reference Frame. These times series are obtained with a good accuracy and a reasonable sampling (1 day for EOPs and 1 week for station positions). This good accuracy is ensured by a semi-dynamical approach and a rigorous control of ranging biases. In this paper, we first present this method and simulations showing its capabilities. In a second part, we analyse 12 years (1993-1994) of SLR data on both LAGEOS in order to study the Terrestrial Reference Frames so obtained. In particular we analyse the geocenter motion. Finally we demonstrate the ability of the SLR technique to evidence geodynamical effects such as loading effects on station positions and diurnal and semi-diurnal variations in EOPs.