
Determination of the Temporal Variations of the Earth's Centre of Mass from Multi-Year Satellite Laser Ranging Data

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Abstract

Temporal variation of geodetic parameters (station positions, Earth's gravity field) that are used to monitor global change are referred to a time-varying terrestrial reference system (geocentre, orientation). The time evolution of the geocentre referred to the origin of the terrestrial reference system can be determined from estimates of degree one spherical harmonic representation of the Earth's gravity field. Weekly estimates of the degree one coefficients were undertaken for the period spanning 1993.0 to 2006.8 using SLR data from the global network for four satellites (Lageos-1, Lageos-2, Stella, Starlette). The data set, computation process and results of the geocentre estimates are presented. A comparison of the geocentre estimates from the satellite pairs at two different altitudes is shown. A system to "visualise" the motion of the geocentre as an indicator of mass transport is proposed.