

LASER RANGING CONTRIBUTIONS TO MONITORING AND INTERPRETING EARTH ORIENTATION CHANGES

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The groundwork for a new field in the geophysical sciences—space geodesy—was laid in the 1960s with the development of satellite and lunar laser ranging systems, along with the development of very long baseline interferometry systems, for the purpose of studying crustal plate motion and deformation, the Earth's gravitational field, and Earth orientation changes. The availability of accurate, routine determinations of the Earth orientation parameters (EOPs) afforded by the launch of the LAsER GEODynamics Satellite (LAGEOS) on May 4, 1976, and the subsequent numerous studies of the LAGEOS observations, has led to a greater understanding of the causes of the observed changes in the Earth's orientation. LAGEOS observations of the EOPs now span 26 years, making it the longest available space-geodetic series of Earth orientation parameters. Such long duration homogenous series of accurate Earth orientation parameters are needed for studying long-period changes in the Earth's orientation, such as those caused by climate change. In addition, such long duration series are needed when combining Earth orientation measurements taken by different space-geodetic techniques. They provide the backbone to which shorter duration EOP series are attached, thereby ensuring homogeneity of the final combined series.