Geophysical Research Abstracts, Vol. 9, 10009, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-10009

Vertical motion at Laser Observatories

P. Dunn (1), H. Matsumoto (2), M. Torrence (3)

(1) Raytheon Inc., Greenbelt, Maryland, USA, (2) Hydrographic and Oceanographic Dept, Japan Coast Guard, Tokyo, Japan, (3) SGT Inc. Greenbelt, Maryland, USA (peter_jdunn@raytheon.com)

The Global Laser Tracking Network can provide accurate three-dimensional positions of participating LAGEOS I and II observatories at monthly intervals over a time span of fourteen years. Measurements of vertical change in a station can thus be used to monitor models of post-glacial rebound on a global scale, as well as, for example, visco-elastic relaxation after seismic events at stations in tectonic subduction zones. Other, shorter term contributions to the vertical motion include the Earth/s tidal response to the sun and the moon, atmospheric pressure loading, and ocean tidal loading. We examine evidence of unsteady motion at the observatories and explore the challenge of clarifying these results with position measurements derived from observations using other space techniques, which have been in operation over a more limited time span. In order to accurately model height variations at a space geodetic observatory, geophysical events must be distinguished from effects caused by instrument improvements. We provide examples of the appropriate corrections for the core stations in the SLR Network which define the International Terrestrial Reference System, as well as for Laser Observatories located near plate boundaries in Japan and South America.