



LAGEOS Sensitivity to Ocean Tides

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Abstract

Satellite Laser Ranging (SLR) to LAGEOS has a remarkable contribution to high-precise geodesy and geodynamics through deriving and validating various global geophysical models. This paper validates ocean tide models based on the analysis of satellite altimetry data, coastal tide gauges, and hydrodynamic data, *i.e.*, CSR3.0, TOPEX4.0, CSR4.0A, FES2004, GOT00.2, and the CSRC Schwiderski model. LAGEOS orbits and SLR observation residuals from solutions based on different ocean tide models are compared and examined. It is found that LAGEOS orbits are sensitive to tidal waves larger than 5 mm. The analysis of the aliasing periods of LAGEOS orbits and tidal waves reveals that, in particular, the tidal constituent S_2 is not well established in the recent ocean tide models. Some of the models introduce spurious peaks to empirical orbit parameters, which can be associated with S_2 , S_a , and K_2 tidal constituents, and, as a consequence, can be propagated to fundamental parameters derived from LAGEOS observations.

Key words: satellite geodesy, ocean tides, SLR, LAGEOS, orbit determination.