



Variations of the Earth's figure axis caused by pressure changes in the core

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Significant variations in the degree two and order one geopotential coefficients: C21 and S21 have been observed from analysis of the Satellite Laser Ranging (SLR) and GRACE data. The geopotential coefficients: C21 and S21, from SLR and GRACE data determine the principal figure axis of the entire Earth with respect to the z-axis of the terrestrial reference system as defined by the mean rotation axis on the mantle. The changes in the pattern of flow in the core result in the pressure variations acting at the core-mantle boundary (CMB), in turn, cause deformation of the mantle and produce a torque on the core. Thus, the observed mean figure axis from the recent GRACE and SLR solution could provide improved constraint on the Earth's core dynamics: tilt of the core figure axis from the mantle axis. We investigate the effects on the variations of the C21/S21 and lower degree zonal harmonics coefficients due to the surface deformation and torque changes of the mantle induced by the fluid pressure at CMB.