



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

Minkang Cheng (1) and Ming Fang (2)

(1) University of Texas at Austin, Center for Space Research, Austin, United States (cheng@csr.utexas.edu, 1 512 4713570),

(2) Department of Earth, Atmospheric and Planetary Science, MIT, United States

Significant variations in the degree two and order one geopotential coefficients:  $C_{21}$  and  $S_{21}$  have been observed from analysis of the Satellite Laser Ranging (SLR) and GRACE data. The geopotential coefficients:  $C_{21}$  and  $S_{21}$ , 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 constant 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  $C_{21}/S_{21}$  and lower degree zonal harmonics coefficients due to the surface deformation and torque changes of the mantle induced by the fluid pressure at CMB.