Geophysical Research Abstracts
Vol. 12, EGU2010-14978, 2010
EGU General Assembly 2010

Numerical study of librationally driven Flow in planetary interiors

Raphael Laguerre (1), Ozgur Karatekin (2), and Jérôme Noir (2)

(1) Observatoire Royal de Belgique, 3 Av. Circulaire, 1180 Belgique, (2) Department of Earth and Space Sciences, UCLA, CA 90095-1567, USA

Forced librations are observed for many planetary bodies. In the case of interior fluid layers, i.e. liquid cores or subsurface oceans, the resulting librational response could be different compared to that of a solid body. The coupling between the fluid layer and mantle depends strongly on the interior properties of the planet. Here we study numerically the properties of a librationally driven flow by taking
into account both longitudinal and latitudinal forcing. The numerical method is based on an finite element approximation in meridian planes
and a Fourier decomposition of the variables in the azimuthal direction (SFEMANS, Spectral Finite Element for Maxwell and Navier
Stokes). This allows us to specify the direction of rotation vector arbitrarily. In the case of longitudinal forcing we compare our
solutions to the experimental results of Noir et al. 2009 obtained for cores with spherical shape. For latitudinal librations, we consider
also the influence of ellipticity.