On the tidal variation of the inner potential of the Earth mantle

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Abstract

In this paper the temporal variations of the mantle gravitational potential for its internal domain are defined. We take into account only the deformation of the mantle caused by tidal influence of the Moon and the Sun. The procedure of Takeuchi (1950) for the tidal deformation of the mantle is used in our investigation. The analytical expressions for tidal variations of the coefficients of the internal mantle potential are obtained in trigonometrical form as conditionally periodic functions using the method developed by Ferrándiz and Getino method (1993) to study the temporal variations of the external Earth's gravitational field. Numerical calculations and tables which show the periodic variations of the coefficients of the internal mantle potential have been obtained for two rheological Earth models, 1066A and 1066B of Gilbert and Dziewonski (1975). The results of this paper are very important for the study of the celestial–mechanical aspects of the motion of the internal and external cores of the Earth.

References

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