Geophysical Research Abstracts
Vol. 18, EGU2016-11689, 2016
EGU General Assembly 2016

Influence of dynamical equatorial flattening and orientation of a triaxial core on prograde diurnal polar motion

Rong Sun (1) and WenBin Shen (2,3)

(1) MOE Key Laboratory of Fundamental Physical Quantities Measurement, School of Physics, Huazhong University of Science and Technology, Wuhan, China (rsun1943@163.com), (2) Department of Geophysics, School of Geodesy and Geomatics/Key Laboratory of Geospace Environment and Geodesy of Ministry of Education, Wuhan University, Wuhan , China(wbshen@sgg.whu.edu.cn), (3) State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing, Wuhan University, Wuhan, China

The noise floor of empirical models of diurnal Earth Rotation could reach as low as 1μas as shown by several recent studies. In another aspect, the differences between these empirical models with the theoretical model predictions given by IERS Convention (2010) for certain diurnal frequencies are more than 10 μas (e.g. K_1). The traxiality of the core is ignored in the theoretical model given by IERS Convention (2010) because it is highly uncertain. To explain the difference between the empirical model and theoretical model, we consider the possible influence of a triaxial core. We use the difference between empirical models and theoretical model predictions given by IERS Convention (2010) as input to invert the traxiality parameter of the core. In the inversion, we assume the ocean tide response obeys the admittance theory. So extra six admittance parameters are introduced to model the difference between smooth responses inferred from empirical models and that given by theoretical model predictions from IERS Convention (2010). The results show that adding core triaxiality into the theoretical model could narrow the difference between empirical model and theoretical model at diurnal frequencies. The residual of amplitude becomes smaller. For a set of tide components consisting of seven diurnal frequencies (Q_1, O_1, M_1, P_1, K_1, J_1, Oo_1), the root mean square of the residual of this set have decreased from more than 10μas to 2$\sim$3μas for most of the empirical models. As for the dynamical equatorial flattening of the core, estimates inverted based on different empirical models are consistent within standard deviation. The results also suggest that the principal axes of the triaxial core does not coincidence with the principal axes of the whole Earth. This study is supported by National 973 Project China (grant No. 2013CB733305), NSFC (grant Nos. 41174011, 41210006, 41504019).