EGU21-12492
https://doi.org/10.5194/egusphere-egu21-12492
EGU General Assembly 2021

Ohmic and viscous damping of the Earth's Free Core Nutation

Santiago Triana[1], Jeremy Rekier[1], Antony Trinh[2], Veronique Dehant[1], and Ping Zhu[1]
[1]Royal Observatory of Belgium, Reference systems and planetology, Brussels, Belgium (santiago.triana@oma.be)
[2]Lunar & planetary laboratory, University of Arizona, Tucson, USA

The cause for the damping of the Earth's Free Core Nutation (FCN) and the Free Inner Core Nutation (FICN) eigenmodes has been a matter of debate since the earliest reliable estimations from nutation observations were made available. Numerical studies are difficult given the extreme values of some of the parameters associated with the Earth's fluid outer core, where important dissipation processes can take place. We present a linear numerical model for the FCN that includes viscous dissipation and Ohmic heating. We find an asymptotic regime, appropriate for Earth's parameters, where viscous and Ohmic processes contribute equally to the total damping, with the dissipation taking place almost exclusively in the boundary layers. By matching the observed nutational damping we infer an enhanced effective viscosity matching and validating methods from previous studies. We suggest that turbulence caused by the Earth's precession can be a source for the FCN's damping.