ON DYNAMOS DRIVEN BY TOPOGRAPHIC PRECESSION

Cheng-Chin Wu, PAUL H. ROBERTS

Institute of Geophysics and Planetary Physics, University of California, Los Angeles. email: roberts@math.ucla.edu

More than half a century ago, Bullard suggested that the motions in the Earth's fluid core responsible for the geodynamo may be driven by the luni-solar precession. The precessionally-forced motion of the mantle creates flow in the core through viscous coupling and also, because the deep mantle is electrically conducting, through magnetic coupling. Neither of these mechanisms is thought to be significant in comparison with the topographic coupling created by the oblateness of the core-mantle interface. Because magnetohydrodynamics in non-spherical bodies raises serious technical difficulties, few studies of topographically-driven dynamos have been undertaken. We will present preliminary results of some 3D MHD dynamo simulations in a precessing oblate spheroidal container. It will be shown that, in some parameter ranges, the magnetic field produced by the dynamo enhances the vigor of the precessional motions.

Geodynamo, Geomagnetic field, Luni-solar precession

Cheng-Chin Wu, Institute of Geophysics and Planetary Physics, University of California,Los Angeles. email: wu@physics.ucla.edu