Chaotic Tumbling of Geomagnetic Poles

W.-J. Wang (1,2), W.-B. Shen (3)

(1) Institute of Geodesy and Geophysics, Chinese Academy of Sciences, Wuhan, China, (2) Department of Geophysics, Wuhan University, Wuhan, China

Rotation of triaxial Earth may possess an unstable solution of inverted pendulum one-way motion with chaotic behavior as tumbling of the mantle. Considering the mantle as non-rotating but the liquid core as rotation relatively, the fluid core has also triaxial inertia momentum ellipsoid. Rotation of triaxial body may have tumbling solution according to the inverted pendulum motion criterion. In this study, we verify that the tumbling motion must be chaotic with inherent timescale of about 0.26 to 0.36 Myr (Million years) identical to the observed average timescale of 0.3 Myr or 16 times in 4 Myr.