Testing the core stratification hypothesis against magnetic data

Two recent papers (Pozzo et al. 2012, Gubbins et al. 2013), based on theoretical calculations, conclude that a stratified upper layer necessarily exists at the top of the liquid outer core. We tested this hypothesis against observed main field secular variation recorded in observatories and CHAMP satellite data. Our approach consists of co-estimating the flow and the magnetic field at the surface of the outer core. We will present the characteristic of the magnetic field obtained and its associated flow. We show that a pure toroidal flow hypothesis, compatible with a very strong stratification, cannot explain the observed magnetic field. However, we found that with only a small contribution of diffusion and/or flow upwelling under Siberia it is possible to explain the observed field.