



Time-dependent core surface flow models and the 2003 jerk

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In this study we invert the CHAOS model for time-dependent core surface flows. The CHAOS model is a continuous description of the geomagnetic field and its temporal variation from 2000 to 2006. This model is based on satellite data (CHAMP, Oersted, SAC-C) and it provides a high-spatial resolution of the main field and its secular variation.

We compare different dynamical constraints for the fluid flow and attempt to interpret the geomagnetic jerk occurred in 2003 in terms of fluid flow acceleration. It appears that this interpretation is not an appropriate one, and we suggest that this is due to this jerk nature - fairly localized and mainly observed in the vertical component of the field. We then propose that this feature might be due to changes of the flux through the flux patch underneath Siberia. In our understanding, this can be an expulsion of the toroidal field by radial fluid motion or due to diffusive processes at the core mantle boundary (CMB). However, our method of core flow inversion assumes the secular variation entirely due to the horizontal advection of the vertical field at the CMB by the fluid motion and therefore may not properly explain this jerk in terms core surface flow and its variation.