

Towards a 4D-Var MHD assimilation framework

N. Lardelli*, K. Li and A. Jackson
ETH Zurich

Numerical dynamo experiments cannot resolve MHD-systems past $E = 10^{-8}$. Hence, in the last decades, several Spherical Couette experiments were developed in order to achieve more Earth-like regimes. In these experiments, it is difficult to determine interior physical quantities such as flows and magnetic fields. One approach to resolving this differently is to use 4-dimensional variational data assimilation (4D-Var), a technique already successfully employed by Li et al. (2014) for the coupling between the induction equation and a diagnostic form of the Navier-Stokes (NS) equations. 4D-Var is also widely used in atmospheric physics to define optimal initial conditions for time-varying flow fields. Our goal is to couple the induction equation with a prognostic form of the NS equations and ultimately to present a method able to reconstruct flow fields of Spherical Couette experimental datasets.
