Abstract Submitted
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Determining the temporal dynamics of the solar α effect ANDREW NEWTON, EUN-JIN KIM, University of Sheffield — We use observations of solar activity to constrain parameters relating to the α effect in stochastic nonlinear dynamo models. This is achieved through performing a comprehensive statistical comparison by computing probability distribution functions (PDFs) of solar activity from observations and from our simulation of $\alpha - \Omega$ mean field dynamo model. The observational data that are used are the time history of solar activity inferred for C14 data in the past 11000 years on a long time scale and direct observations of the sun spot numbers obtained in recent years 1795-1995 on a short time scale. Monte Carlo simulations are performed on these data to obtain probability distribution functions (PDFs) of the solar activity on both long and short time scales. These PDFs are then compared with PDFs from numerical simulation of our $\alpha - \Omega$ dynamo model, where α is assumed to have both mean α_0 and fluctuating α' parts. By varying the correlation time of fluctuating α', the ratio of the amplitude of the fluctuating to mean alpha and the ratio of poloidal to toroidal magnetic fields, we show that the results from our stochastic dynamo model can match the PDFs of solar activity on both long and short time scales.

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