



Two types of reversals

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We explore the phenomenology of reversals in a multiscale dynamo model. In this schematic $\alpha\omega$ dynamo, a hierarchical structure of length scales accounts for the nature of turbulent thermal convection at very high Rayleigh number, and cyclones at different length scales contributes to the α -effect. During chrons, a progressive population inversion invariably yields to a change of sign of the α -effect which trigger reversals. The dipole weakens and turbulent motions are able to propagate on a wide range of length scales to produce large fluctuations of the α -effect. These fluctuations (1) reinforce the magnetic field on the other polarity or (2) initiates periods of strong variations of both the sign and the intensity of the dipole. Consequently, (1) simple and (2) complex reversals are observed over long times. These predictions are in good agreement with recent paleomagnetic observations describing the intensity of the magnetic field during reversals.