

Long term variations in geomagnetic intensity: Links to mantle and crustal processes

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From the results of a rigorous statistical analysis, time correlations are evident between significant transitions in the dipole moment record for the period 10 - 400 Ma and first-order plate tectonic events. A qualitative first-order theory relating large-scale crustal behavior to changes in mean geomagnetic poloidal field intensity will be presented. This theory assumes that the passage of subducted material into the lower mantle produces an instantaneous increase in the mean heat flux across the core-mantle boundary through a process known as induced convection. The potential of this simple model for explaining the observed synchronicities between mean geomagnetic intensity and large-scale plate tectonic behaviour will be demonstrated.

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