



What does Long-term Geomagnetic Activity tell us about the Sun?

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Geomagnetic activity results from the interaction of the solar wind and the heliospheric magnetic field with the Earth's magnetic field. Geomagnetic activity has been monitored continuously for more than 160 years. Long-term geomagnetic activity depicts certain patterns and periodicities, the most dominant of which are the solar 11-year variation and the semiannual variation. Other significant fluctuations include the annual variation, 1.3-1.8-year variations and the 22-year variation. Moreover, the overall level of geomagnetic activity has increased during the last 100 years although the exact amount of increase is still debated. All of these variations reflect some fundamental properties of the Sun and the Sun-Earth connection. Although some of the above mentioned patterns and periodicities are known for a long time (e.g., the semiannual variation for nearly 150 years), the understanding of their connection with the Sun has been significantly improved recently. Here I will review the above mentioned properties in long-term geomagnetic activity and discuss the present understanding of their solar cause.