

Title: *History of Magnetic Activity*

Cluster: *Cross-Theme Theory and Data Analysis/SECTP*

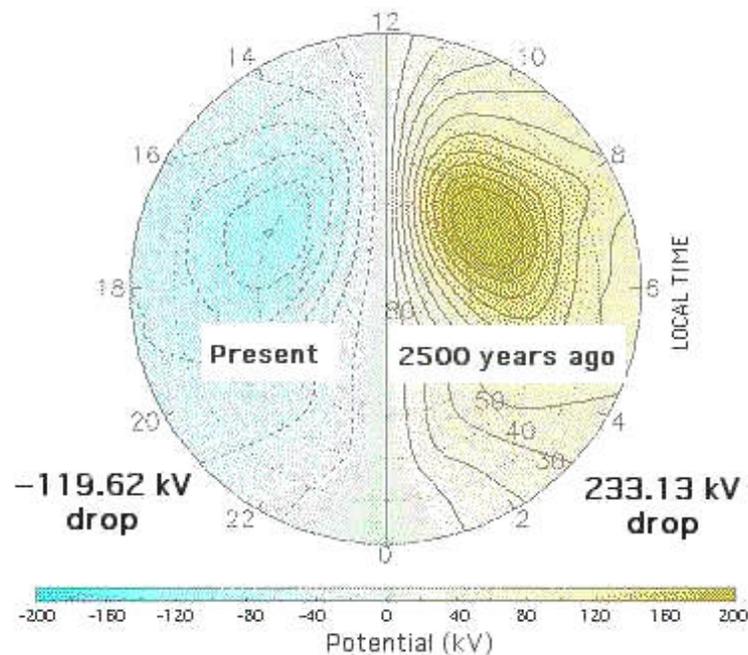
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### • **Magnetic Storms Stronger in Biblical Times**

The geomagnetic field is currently weakening by 5% per century from a peak nearly 50% stronger reached between 2000 and 3000 years ago. A new study of how geomagnetic storms might have varied as a consequence finds that storms get stronger when the field strengthens. The figure below splices together for identical storm conditions the electrical potential distributions in the ionosphere for the present magnetic field (left) and for a 50% stronger field (right). For the stronger dipole field the electrical potential drop across the ionosphere nearly doubles. In the latitudinal band between 30° and 40°, where Israel and Greece lie, the potential corresponding to 2500 years ago matches that in the auroral zones today. This might account for Aristotle 2340 years ago being able to name six different kinds of auroras.

Global MHD simulations supported by Sun-Earth Connections Theory Program provided the framework for exploring this interesting behavior. Model developments substantiated by comparison with current day measurements will provide us with more confidence that the models can be extrapolated back into time to explore important historical consequences.

#### *Electrical Potentials Over Half Of The Northern Polar Cap For Two Dipole Field Strengths (Left-Right) Under The Same Solar Wind Conditions.*



Siscoe, Erickson, Sonnerup, Maynard, Schoendorf, Siebert, Weimer, White and Wilson, "Region 1 Current-Voltage Relation", *preprint*, 2001.