



A new Model for Predicting Geomagnetic Perturbations

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A new method for predicting ground-level geomagnetic variations has been developed. This empirical model is based on global measurements of the magnetic field at 115 stations in the Northern hemisphere over a four-year period, along with the simultaneous measurements of the IMF. Variations in ionospheric conductivity are implicitly contained in the measurements used in the model's construction. Other methods for predicting geomagnetic perturbations are often based on calculations of ionospheric currents that require estimates of the ionospheric conductivity; inaccurate conductivities may be their largest source of error. The new model calculates all three vector components of the magnetic variations. Maps of the Northward and Eastward components are consistent with the corresponding maps of the ionospheric electric potential. Interestingly, maps of the Vertical component have patterns that very much resemble maps of the overhead, ionospheric field-aligned currents. Comparisons of model calculations with measurements at different locations show very good results.