

THE DIVERSE UTILITY OF GROUND-BASED MAGNETOMETER DATA

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Modern magnetic observatory data are used for a wide variety of scientific applications. When observatories were first established in the 19th century, their data were used to support the global mapping of the Earth's main magnetic field. Since then, the variety of applications has expanded and diversified to encompass periodic solar-quiet variation having its origin in the ionosphere, and magnetic storm activity, originating in the coupled magnetosphere-ionosphere system. Today, with real-time availability, magnetic observatory data are an important contributor to multi-sensor monitoring of space weather and hazard mitigation. Magnetic indices, derived from observatory data, are fundamental measures of magnetic-storm intensity. The availability of real-time geomagnetic measurements is also extremely useful in improving the accuracy of wellbore surveying for directional drilling, and for monitoring of geomagnetically-induced currents that pose operational challenges for the electric-power grid industry. This diversification and expansion of the observatory-data user community has brought demands for data that meet new and more stringent standards. In this presentation, we highlight several projects that USGS is embarking on with a variety of commercial and government partners in the US and abroad. We discuss recent efforts to establish INTERMAGNET-quality observatories in remote arctic locations to better serve the scientific and directional drilling community, and also initial efforts to establish a variometer network in the US to support real-time monitoring of geomagnetically-induced currents. We discuss future opportunities, especially for global integration and data sharing.