

The Terrascanner - a ground based magnetic mapping system

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ABSTRACT

The aim of the Terrascanner instrument developed at IPHT Jena is the fast geomagnetic prospection of large areas. This enables applications like as archaeology, building-ground-analytics, geology and detection of unexploded ordnance. The instrument is based on nine thin-film planar-type SQUID gradiometers of first order, three of which are assembled in each of the three liquid helium cryostats. A fast SQUID electronics and a low-drift and low-noise data acquisition systems enables rapid exploration using an all-terrain vehicle. Hence, extended archaeological or geologic objects are mapped with high efficiency and quality of magnetic data.

In order to allow high spatial resolution (better than 10cm) and real time geo-referencing of the sensor signals a high-end differential GPS system with base station was implemented. Therefore, precise topographic models of the scanned area can be calculated which are useful for interpretation of the data.

In this work we present data acquired with the Terrascanner during a campaign within the Orkhon valley, Central Mongolia, carried out in autumn 2010. The joint interpretation of the magnetic and topographic maps of surveyed areas of up to 1km x 1km proved to be very helpful for large-area archaeological investigations of e.g. steppe regions like the Mongolian ones. We will show additional examples of magnetic scans for archaeology and geology in Germany.

Key words: SQUID, magnetic field sensor, gradiometer, geomagnetics, archaeology