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# Magnetization distribution in meteorites and terrestrial rocks investigated with a new GMR scanning micro-magnetometer

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During the last decade, great efforts have been made to improve the resolution and sensitivity of small-scale magnetic measurements, in particular with the development of SQUID microscopes. We have recently developed a new scanning magnetic microscope to image surface magnetic fields of room temperature polished samples. This microscope is based on an array of Giant Magneto Resistance (GMR) sensors working at room temperature. These sensors are sensitive to one horizontal component of the magnetic field. The size of each sensing element is 5$\mu$mx50$\mu$m. The field equivalent noise of the sensors is about $1nT \Big/ \sqrt{Hz}$ with a sensing current of 1mA. The spatial resolution of the system is related to the sample-to-sensor distance that can be as low as 50 $\mu$m. This room-temperature small-sized magnetic microscope appears to be a powerful instrument for rock magnetic and paleomagnetic studies as it is capable of detecting and quantifying small-scale and weak magnetic field patterns. The magnetization distribution in the samples can be retrieved through the inversion of the magnetic field data provided by the scanning magnetic microscope.

We will present the first magnetic field data obtained with this scanning magnetic microscope on both synthetic materials and natural extraterrestrial and terrestrial rocks.

This includes natural magnetization of meteorites that are characterized by small-scale (mm) heterogeneous magnetization, micrometeorites (200 $\mu$m scale), and terrestrial basalts.