Direct measurement of internal fields in natural sands using scanning SQUID microscopy

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When samples of natural porous materials are studied using NMR, internal fields from magnetic components can lead to misinterpretation of relaxation, diffusion, or imaging data. We used scanning SQUID microscopy to study samples from natural unconsolidated aquifer material. We found large amplitude variations with a magnitude of about 2 mT, across a relatively long spatial scale of about 200 µm, and substantial variations exceeding 60 µT on small spatial scales of about 10 µm. We attribute these small-scale variations to very fine-grained magnetic material. Because we made our measurements at very low background field, the observed variations are not induced by the background field but due to magnetic remanence. Consequently, the observed internal fields will affect even low-field NMR experiments, such as for geological mapping.

REFERENCE:
“Direct measurement of internal magnetic fields in natural sands using scanning SQUID microscopy”