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SQUID based instrument for investigation of magnetic structures

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For the detailed reconnaissance of shallow and medium depth structures, for instance to understand fluid-fault interactions, a toolbox of three magnetic measurement systems based on Superconductive Interference Devices (SQUID) are introduced. The sensors are working at 4.2 K and provide exceptional high sensitivity.
The main tool is a system measuring the full tensor of the Earth's magnetic field (FTMG) in airborne or ground based operation. The sensors are planar gradiometer of first order with a base line of 3.5 cm and a sensitivity of below 100 fT/(m*sqrt(Hz)). Our gradiometers suppress the Earth's magnetic field by about four orders of magnitude and are well suited to map the gradient of the Earth's magnetic field.
The system can be operated in a nonmagnetic bird towed by a helicopter at low altitude or on a nonmagnetic cart towed by a 4x4 car. Both operations allow the investigation of huge areas in short time and record the full tensor gradient of the magnetic field.
The airborne FTMG system provides superior performance in fixed wing and helicopter based applications compared to conventional Caesium type magnetometers. First results of the new system flown in a newly developed bird are shown.
The data of the FTMG system will allow for a 3D inversion for the underlying magnetic sources. Examples of 2D maps of tensor components with high spatial resolution are shown.