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SQUID Magnetometer Data Analysis

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The observation of very low magnetic fields is of primary importance for a better understanding of Earth and environment, as well as for early warning of potential hazards coming from space. Recent scientific studies have shown that magnetometers based on Superconducting QUantum Interference Devices (SQUID's) are able to detect P waves emitted during earthquakes or magnetic storms in the upper atmosphere with sensitivity far better than that of conventional magnetometers. During thunderstorms there are several types of TLEs (Transient Luminous Events), the most common being sprites. Sprites are flashes of bright red light that occur above thunderstorm systems, and can be observed with ultrasensitive high-speed cameras. During January and February 2018 SANSa embarked on a sprite campaign in the centre of South Africa. Significant sprites were identified during at least 3 nights and these occurrences are GPS time stamped. During the same time SQUID data were recorded from the SQUID located at SANSa Space Science in Hermanus. The aim of this project will be to correlate data from the sprite observations with data from the SQUID in Hermanus to establish if the magnetic signature of sprites can be identified in SQUID data. During a previous study the magnetic signatures of sprites were identified in the data from a low-Tc SQUID, located underground at the Low Noise Laboratory (LSBB), France, and partially shielded. The SQUID operating in Hermanus is a High Tc SQUID, with higher intrinsic noise levels, and operating completely unshielded in the geomagnetic field. The main aim of the project would be identification of magnetic sprite signatures in SANSa SQUID data.

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