Entropy based analysis of satellite magnetic data for searching possible e.m. signatures due to big earthquakes

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The importance of detecting possible electromagnetic signatures due to big earthquakes is self-evident, signatures which can be either anticipating, simultaneous or subsequent with respect to the main shock. Taking advantage of the present orbiting Champ satellite, we apply two "ad hoc" techniques both based on the Information Theory (after the seminal monography by Shannon, 1948) to the satellite magnetic data with the aim at extracting eventual time anomalies. These techniques have different time-space resolutions: the first technique requires a preliminary spherical harmonic analysis of daily magnetic data and, potentially, detects long-wavelength variations, while the second uses a preliminary wavelet analysis and can detect shorter-wavelength anomalies. Some examples are given for magnetic satellite data taken in correspondence with the two big earthquakes occurred in the Sumatra region on 24 December 2004 (M=9.1) and 28 March 2005 (M=8.6).