



Satellite observations of electromagnetic effects connected with seismic activity: a statistical study using DEMETER data

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We present a statistical study of electromagnetic effects (possibly) connected with seismic activity observed in the upper ionosphere. A unique data set obtained by a newly (June, 2004) launched French spacecraft DEMETER is used. We have processed about 4385 hours of data measured during the first year of operation and more than 3500 earthquakes that occurred in the satellite zone.

Several possible approaches to the statistical study are discussed, as well as various possibilities for propagation of the signal from the Earth's surface up to the satellite altitude (approximately 700 km). Finally, we present a complex two-step data processing that enables us to distinguish weak effects connected with the seismic activity from the natural background. Its statistical consequences and reliability are thoroughly discussed.

It is shown that there is a statistically significant correlation between the seismic activity and wave intensity measured onboard the satellite. The frequency spectrum of observed emissions as well as dimensions and shape of the affected area are studied. Moreover, we discuss the most favorable natural conditions and earthquakes properties needed to observe the phenomenon.