



## **The geomagnetic method on precursory phenomena associated with 2004 significant intermediate Vrancea seismic activity**

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The paper tries an association between geomagnetic anomalies and Vrancea 2004 earthquakes of moment magnitudes  $3.7 \leq M_w \leq 6.3$  and especially the October 2004 earthquake of moderate-to-high magnitude ( $M_w=6.3$ ) followed by weaker earthquakes ( $M_w < 5$ ).

While Vrancea earthquakes had never exceeded  $M_w=5$  for nearly seven years, they did so in October 2004, culminating with a seism of  $M_w = 6.3$  on October 27, 2004. The hypocentral coordinates of the Vrancea earthquake of October 27, 2004, are: 45.8 N, 26.7 E and  $h=100$  km. The earthquake occurred at 23:34:36 h local time. Its macroseismic intensity was  $I_0=VII$  as a maximum (on the Mercalli scale) and  $I = VI$  in Bucharest. Further data with respect to Vrancea seismic activity in 2004 were taken from the seismic bulletins of the National Institute for Earth Physics. The working data are represented by geomagnetic data as recorded at Muntele Rosu and Surlari (46.90N, 17.89 E) Observatories from Romania and Tyhany-Hungaria (46.90N, 17.89E) and Chambon la Foret-France (48.02N, 2.26 E) – part of the international INTERMAGNET organization, in the period January – December 2004. We used the magnetograms (components  $H_x$ ,  $H_y$ ,  $H_z$ , with  $H_x$  and  $H_y$  – the horizontal components along the north-south direction and east-west direction, respectively, and  $H_z$  – the vertical component of the geomagnetic field) and the polarization of the geomagnetic field.

The magnetic data as well as the global geomagnetic indexes prove that, from magnetic point of view, October 27<sup>th</sup>, 2004 was a remarkable quiet day. Between 26-28

October the solar-terrestrial perturbations were extremely small, providing a very good medium to observe possible precursory signals.

The fact that previous studies (Enescu et al., 2000-2004) of Vrancea seismogenic zone proved that observable precursory anomalies in the geomagnetic impedance have preceded 85% of all intermediate Vrancea earthquakes of moment magnitudes  $M_w \geq 4.0$  occurred between 1997- 2004 year encouraged us to continue the researches in this direction and to improve both the research and the record methods.