ANOMALOUS GEOMAGNETIC VARIATION ASSOCIATED WITH THE Vrancea EARTHQUAKE (Mw=5.5) ON 28 OCTOBER 2018

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ABSTRACT

In this study, the anomalous geomagnetic variation related to the moderate Vrancea earthquake (Mw=5.5) on 28 October 2018 was shown. This anomaly and its associated seismicity were analyzed and compared with a similar anomaly which occurred on October 2016- May 2017. To better distinguish the seismotectonic anomalies from external geomagnetic variations (geomagnetic storms), the datasets recorded at Muntele Rosu (MLR) located inside seismogenic zone were compared with datasets recorded at Surlari (SUA) located at 100km away to the seismogenic area. Also, the geomagnetic data were correlated with the daily geomagnetic indices taken from NOAA/Space Prediction Center. During these two anomalies, were plotted graphs with daily and cumulative energy release for every earthquake larger than Mw>3, occurring inside the anomalies.

The anomaly which accompanied the moderate earthquake from October 28th, 2018 is visible only on By component (EW component) of the local geomagnetic field and this anomaly is looking similar to the anomaly which occurred during October 2016- May 2017. Both of them shows a step-type change in By component and the total decrease measured on By component is around 100 nT. The computed seismic energy during the late geomagnetic anomaly showed low seismic activity in both magnitude and number. The unequal distribution of seismic energy during these two anomalies is explained by the depth occurrence of main shocks. During the anomaly occurred between October 2016 and May 2017, the seismic activity was greater and was concentrated in 90-100 km depth interval. Otherwise, during the recent anomaly, the seismic activity was lower and concentrated in 130-150 Km depth interval.

In the study of the relationship between geomagnetic anomalies and the occurrence of intermediate earthquakes is mandatory to take under consideration the depth interval where the earthquakes are concentrated. The mechanical response of intermediate depth structure could variate with the depth because the rheological properties of rocks are closely related to the changes in the pressure-temperature domain.

Keywords: geomagnetic, earthquake, anomaly, seismic energy, seismicity.

INTRODUCTION

Vrancea zone is affected both by crustal and intermediate earthquakes, but the occurrence of moderate and strong earthquakes is more frequently in the intermediate