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GEOMAGNETIC ANOMALY ASSOCIATED WITH 2018 GREECE EARTHQUAKE

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The existence of anomaly in geomagnetic and geoelectric data before earthquakes has been reported in many studies in recent years, and has been considered as an earthquake precursor. In the following work, a new method (Pourbeyranvand & Bali, 2008) is presented in order to process these data. This method can present these anomalies with higher accuracy comparing to previous works. We applied our method on geomagnetic data which has been recorded in a geophysical station in Greece. Data from every 24 hours during one year is plotted repeatedly in order to obtain the characteristic curve. We analyzed the Greece earthquake M_w =6.8 25/10/2018.

We plotted the data correspond to each day from 01/01/2018 to 31/12/2018 together in one plot, then we calculated the average of all these curves which in fact indicates the characteristic curve of the data. Next, we calculated the differences between the average curve and the curves of each day to obtain more reliable signal. In order to detect the anomaly in a more accurate way, we select a band based on the standard deviation with the width equals to Average± 3σ. The anomalies outside this range are considered as an earthquake precursor.

Our results present a very significant and conspicuous anomaly nearly two months before the earthquake; however, since a magnetic storm happened simultaneously with this anomaly, we cannot consider this anomaly as an earthquake precursor. Due to the appearances of magnetic anomalies several days before earthquakes; therefore, we plotted the data one month before the earthquake. This plot revealed some variations in horizontal component of magnetic field during the period of 18 to 12 days before the earthquake and after the earthquake which can be interpreted as the earthquake precursor. During the mentioned period, we also experience anomalies on the vertical component and the total field. As an instance, the diagrams for the horizontal component are plotted in the Figure 1. As a conclusion, this method can be useful in detecting anomalies as an earthquake precursor.

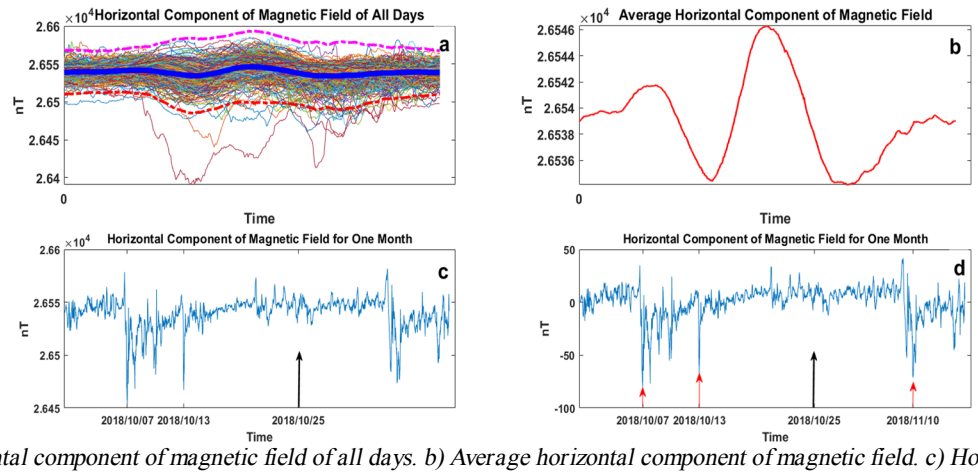

Figure 1. a) Horizontal component of magnetic field of all days. b) Average horizontal component of magnetic field. c) Horizontal component of magnetic field for one month before implementing the method. d) Horizontal component of magnetic field for one month after implementing the method (red arrows: anomaly, black arrows: earthquake).

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