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INVESTIGATION OF POSSSIBLE ULF VARIATIONS DUE TO EARTHQUAKE EVENT USING WAVELET TECHNIQUE

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ABSTRACT

Anomalous geomagnetic variations measured on the ground surface are not constant and generally, it might be triggered from external or internal sources with respect to the earth's surface. This paper will focus on the anomalous variations from internal sources due to earthquake event (Mw = 6.4) that hit eastern part of Taiwan at approximate depth of 45km on 19th December 2009. With distance about 20km from epicenter, the geomagnetic data from MAGDAS network at Hualien station (HLN) has been recorded in order to monitor the variations based on north-south (H-component) and vertical (Z-component). The wavelet transform is used to extract ULF signature associated with earthquake event. Wavelet transform (DWT and CWT) can decompose geomagnetic data into certain time and frequency range and it is approximated that the ULF variations can be observed before and after the event. From the results, the perturbations of ULF variations can be observed several days before the earthquake and lasted few weeks after. Besides, the pattern of the ULF polarization (Z/H) of the Pc3 amplitude and the ratio of H-component from two different stations show the sudden changes a few days preceding the earthquake. These facts demonstrate the validity of wavelet transform to investigate the possible ULF variations related with earthquake.

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