World Academy of Science, Engineering and Technology
International Journal of Geological and Environmental Engineering
Vol:13, No:02, 2019

Geological Structure Identification in Semilir Formation: An Correlated Geological and Geophysical (Very Low Frequency) Data for Zonation Disaster with Current Density Parameters and Geological Surface Information

Authors : E. M. Rifqi Wilda Pradana, Bagus Bayu Prabowo, Meida Riski Pujiyati, Efraim Maykhel Hagana Ginting, Virgiawan Arya Hangga Reksa

Abstract : The VLF (Very Low Frequency) method is an electromagnetic method that uses low frequencies between 10-30 KHz which results in a fairly deep penetration. In this study, the VLF method was used for zonation of disaster-prone areas by identifying geological structures in the form of faults. Data acquisition was carried out in Trimulyo Region, Jetis District, Bantul Regency, Special Region of Yogyakarta, Indonesia with 8 measurement paths. This study uses wave transmitters from Japan and Australia to obtain Tilt and Elipt values that can be used to create RAE (Rapat Arus Ekuivalen or Current Density) sections that can be used to identify areas that are easily crossed by electric current. This section will indicate the existence of a geological structure in the form of faults in the study area which is characterized by a high RAE value. In data processing of VLF method, it is obtained Tilt vs Elliptical graph and Moving Average (MA) Tilt vs Moving Average (MA) Elipt graph of each path that shows a fluctuating pattern and does not show any intersection at all. Data processing uses Matlab software and obtained areas with low RAE values that are 0%-6% which shows medium with low conductivity and high resistivity and can be interpreted as sandstone, claystone, and tuff lithology which is part of the Semilir Formation. Whereas a high RAE value of 10% -16% which shows a medium with high conductivity and low resistivity can be interpreted as a fault zone filled with fluid. The existence of the fault zone is strengthened by the discovery of a normal fault on the surface with strike N550W and dip 630E at coordinates X= 433256 and Y= 9127722 so that the activities of residents in the zone such as housing, mining activities and other activities can be avoided to reduce the risk of natural disasters.

Keywords : current density, faults, very low frequency, zonation
Conference Title : ICEGG 2019 : International Conference on Environmental Geology and Geophysics
Conference Location : Bangkok, Thailand
Conference Dates : February 04-05, 2019