ABSTRAK

ANALISIS PERUBAHAN RESISTIVITAS BERDASARKAN *TIME-LAPSE* MAGNETOTELURIK SERTA HUBUNGAN TERHADAP NILAI *PEAK GROUND ACCELERATION* PADA DAERAH CEKUNGAN BANYUMAS

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Daerah cekungan Banyumas merupakan daerah yang memiliki potensi sumber daya alam yang banyak terbukti dengan adanya kegiatan penambangan emas lokal, serta adanya rembesan gas dan minyak bumi. Area penelitian terletak di selatan jawa berdekatan dengan zona subduksi lempeng australia sebagai sumber gempa. Untuk menjelaskan pernyataan diatas, diperlukan penelitian geofisika untuke mengetahui kondisi bawah permukaan. Penelitian geofisika pasif metode Magnetotelurik (MT) dengan analisis *time-lapse* digunakan untuk mengetahui geologi bawah permukaan berkala pada lokasi penelitian. Lalu penelitian *Peak Ground Acceleration* (PGA) untuk mengetahui hubungan gempa terhadap resistivitas pada saat akuisisi MT.

Pengukuran dilakukan oleh tim PSG menggunakan metode MT, tepat pada tanggal 17-29 Maret 2018, berlokasi di desa tambaksari kabupaten Ciamis, Jawa Barat. Berjarak 13 km dari Kota Banjar. Akuisisi secara berkala selama 13 hari pada jam yang sama dan memperoleh perubahan nilai resistivitas setiap harinya. Nilai PGA diperoleh dari hasil pengolahan data katalog gempa yang di akses melalui situs BMKG tepat pada waktu pengukuran dengan jarak ≤ 100 km dari lokasi penelitian. Analisis PGA menggunakan metode Fukusima dan Tanaka dikarenakan kondisi geologi dan parameter (*magnitude* permukaan dan hiposenter) yang digunakan lebih tepat menggunakan metode tersebut.

Berdasarkan model 1D MT time-lapse kedalaman kurang lebih 35 m nilai resistivitas yang rendah pada setiap hari pengukuran yaitu <1 ohm.m, diinterpretasikan adanya sedimen yang dapat meloloskan fluida (air tanah). Berdasarkan dominasi data kedalaman lebih dari 15 km diduga terdapat aktivitas perubahan suhu sehingga nilai resistivitas semu didominasi oleh nilai prosentase tinggi (>14%) dan cenderung berubah ubah terhadap waktu pengukuran, dan pada tanggal 21 Maret 2018 terdapat dampak gempa sehingga nilai resistivitas semu pada kedalaman lebih dari 15 km cenderung didominasi nilai prosentase rendah bila dibandingkan dengan hari lainnya (<7%). Pada analisis PGA, nilai percepatan tanah tertinggi berkisar 0.01099 - 0.11387 *gal* pada peta kedalaman 18 m, 350 m, 4 km, dan 26 km dari aktivitas gempa yang terjadi pada 21 April 2018, yang berjarak 80 km dari lokasi penelitian. Korelasi MT dan PGA terlihat pada analisis prosentase data, nilai resistivitas semu tertinggi 17.79 ohm.m (100%). Pada kedalaman lebih dari 15 km, nilai prosentase resistivitas cenderung lebih konduktif (0-6%) bila disandingkan dengan hari sebelum dan sesudah 21 April 2018 ketika aktivitas gempa terjadi (>12%). Hasil analisis yang telah dilakukan dapat diinterpretasikan nilai resistivitas dapat berubah seiring besarnya amplitudo gempa yang terjadi dan besaran percepatan tanah.

Kata kunci: Magnetotelurik, Resistivitas, *time-lapse*, *Peak Ground Acceleration*, Cekungan Banyumas,.

ABSTRACT

ANALYSIS OF RESISTIVITY CHANGES BASED ON TIME-LAPSE MAGNETOTELLURIC AND RELATIONSHIP TO PEAK GROUND ACCELERATION IN BANYUMAS BASIN AREA

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The Banyumas basin area has natural resource potential it can be seen from local gold mining activities, beside that, there is also local gold mining activities, as well as gas and oil seepage, but the area is include to vulnerability zone because it is located in south of java near subduction zone from Australia plate as an earthquake source. To know the relation between the natural resource and earthquake, subsurface description is needed. In this research Magnetotelluric (MT) method with time-lapse analysis used for subsurface information, then Peak Ground Acceleration (PGA) analysis is done to observe event earthquake during MT method acquisition, the indication is earthquake can affect resistivity.

The acquisition were carried out by the PSG team using the MT method, on March 17-29 2018, located in the village of Tambaksari, Ciamis Regency, West Java. It is 13 km from Banjar, West Java. Periodically acquisition for 13 days at the same hour and obtain changes in resistivity values every day. The PGA value is obtained from the processing of earthquake catalog data that is accessed through the BMKG site precisely at the time of measurement. Analysis PGA using Fukushima and Tanaka method, because the geology condition on the site and parameter (magnitude surface, and hypocenter) is belong to method above.

Based on the 1D MT time-lapse models the depths of 35 meters is interpreted as an aquifers because the resistivity values is very low (<1 ohm.m). Beside that, based on the dominance of resistivity (in percentages) in the depth of more than 15 km, there is temperature change activity, causing of apparent resistivity in percentages (>14%), but when 21st april 2018 there is a earthquake affect on the the site, causing of apparent resistivity in percentages (<7%). while in the PGA analysis, the highest ground acceleration values ranged from 0.01099 - 0.11387 *gal with hypocenter located at 0.0079 km, 1.1426 km, 4.4507 km, 26.8204 km from earthquake evidence in 21st april 2018, with distance of 80 km from site (research location). By the correlation between MT and PGA it can be seen the dominance of resistivity (in percentages) highest value dominance resistivity 17.79 ohm.m (100%). On depth >15 km the value of resistivity more conductive (0-6 %) when compared to the day before and after 21st April 2018 when event earthquake (>12%). The result, resistivity value can be change is causing magnitude of the amplitude earthquake occured and value of the peak ground acceleration.*

Keyword : *Magnetoteluric, Resistivity, time-lapse, Peak Ground Acceleration, Banyumas Basin,*