

## ABSTRAK

### ANALISIS PERSEBARAN AKUIFER DAN LITOLOGI BAWAH PERMUKAAN BERDASARKAN PEMODELAN 3D MENGUNAKAN METODE GEOLISTRIK *SCHLUMBERGER* DI DAERAH SUMBERMUJUR, LUMAJANG, JAWA TIMUR

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Sumbermujur merupakan wilayah pengungsian warga terdampak Bencana Awan Panas Guguran Gunung Semeru. Permasalahan muncul dimana belum ada sumur air tanah yang bisa dijadikan alternatif untuk memenuhi kebutuhan wilayah hunian tetap. Penelitian geolistrik dilakukan untuk menentukan persebaran air tanah pada lokasi penelitian sebagai upaya pembuatan sumur air bersih pada daerah penelitian.

Penelitian ini menggunakan 10 titik pengukuran geolistrik resistivitas konfigurasi *Schlumberger* dengan panjang bentangan 600 meter yang tersebar di daerah penelitian. Selain itu terdapat beberapa data yang mendukung penelitian berupa peta Anomali Bouger menggunakan data *TOPEX*, data geologi daerah penelitian, dan peta cekungan air tanah.

Pendugaan geolistrik pada daerah Sumbermujur diidentifikasi terdapat 5 jenis litologi berdasarkan nilai resistivitas yang tersebar di bawah permukaan yaitu batupasir tuffan dengan nilai resistivitas berkisar antara 49,4  $\Omega$ meter hingga 91,83  $\Omega$ meter, *soil* vulkanik berkisar antara 31,66  $\Omega$ meter hingga 5595,33  $\Omega$ meter pada kedalaman kurang dari tiga meter, andesit berkisar antara 856,06  $\Omega$ meter hingga 1647,3  $\Omega$ meter, tuff berkisar antara 124,24  $\Omega$ m hingga 372,5  $\Omega$ m, breksi tuffan berkisar antara 425,64  $\Omega$ meter hingga 785,66  $\Omega$ meter. Akuifer pada daerah Sumbermujur tersusun atas litologi batupasir tuffan dengan volume 441.548.390 *meter*<sup>3</sup>. Pada daerah Sumbermujur tidak terdapat cekungan air tanah berdasarkan peta anomali gravitasi residual. Berdasarkan peta anomali gravitasi daerah penelitian merupakan wilayah transisi daerah tinggian dan daerah rendahan. Berdasarkan peta ketebalan dan kedalaman akuifer terdapat akuifer yang memiliki kedalaman dan ketebalan yang beragam, dimana kedalaman dan ketebalan akuifer yang paling potensial terdapat pada bagian barat daya, tengah, dan selatan Sumbermujur. Pendugaan keterdapatannya terdapat pada titik pengukuran 3, 6 dan 8 dengan ketebalan 44,4 meter hingga 54,42 meter, dan kedalaman 56 meter hingga 64 meter

**Kata Kunci:** Geolistrik, Akuifer, Air Tanah, Gravitasi, *Schlumberger*, Lumajang

## ABSTRACT

### ANALYSIS OF AQUIFERS AND SURFACE LITHOLOGY DISTRIBUTION BASED ON 3D MODELLING USING THE SCHLUMBERGER GEOELECTRIC METHOD IN SUMBERMUJUR, LUMAJANG, EAST JAVA

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Sumbermujur is an evacuation area for residents affected by the Volcano-Pyroclastic Flow from Mount Semeru. The construction of permanent housing has been carried out for the affected communities and has started to be occupied. Problems arise where no groundwater wells can be used as an alternative to fulfill the needs of permanent residential areas. Geoelectric research was carried out to determine the distribution of groundwater at the research site as an effort to make clean water wells in the research area so that it is hoped that the community can use groundwater as a source of water and become a solution for water availability.

This study used 10 geoelectric resistivity measurement points using The *Schlumberger* configuration with a span of 600 meters spread over the study area. In addition, several data support the research in the form of maps of the Bouger Anomaly using topex data, geological data of the study area, and maps of groundwater basins.

Geoelectrical estimation in the Sumbermujur area identified that there are 5 types of lithology based on resistivity values that spread below the surface, namely tuffan sandstones with resistivity values ranging from 49.4  $\Omega$ meter to 91.83  $\Omega$ meter, volcanic soils ranging from 31.66  $\Omega$ meter to 5595.33  $\Omega$ meter in depth of fewer than three meters, andesite ranges from 856.06  $\Omega$ m to 1647.3  $\Omega$ meter, tuff ranges from 124.24  $\Omega$ meter to 372.5  $\Omega$ meter, tuff breccia ranges from 425.64  $\Omega$ meter to 785.66  $\Omega$ meter. The aquifer in the Sumbermujur area is composed of good porosity tuff sandstone lithology with a volume of 441,548,390 meter<sup>3</sup>. In the Sumbermujur area there are no groundwater basins based on the residual gravity anomaly map. Based on the gravity anomaly map, the study area is a transition area for high and low areas. In the Sumbermujur area there are aquifers with various depths and thicknesses. The potential depth and thickness of aquifers are found in the southwestern, central, and southern parts of Sumbermujur. The Potential aquifers are estimatedment points 3,6 and 8 with a 44,4meters to 54,42 meters thickness, and 56 meters to 64 meters depth.

*Keywords:* Geoelectric, Aquifer, Ground Water, Gravity, *Schlumberger*, Lumajang