SARI

STUDI KARAKTERISTIK SISTEM PANAS BUMI BERDASARKAN DATA GEOLOGI DAN GEOKIMIA FLUIDA DAERAH ULUBELU DAN SEKITARNYA, KABUPATEN TANGGAMUS, LAMPUNG

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Penelitian dilakukan di Wilayah Kerja Panas Bumi Gunung Way Panas, daerah Ulubelu, Kabupaten Tanggamus, Lampung. Ulubelu termasuk kedalam Peta Geologi Regional Lembar Kotaagung, Sumatera. Adanya potensi panas bumi, dapat menjadi kesempatan dalam penentuan eksplorasi sistem panas bumi, melalui gabungan data penelitian geologi dan geokimia. Berdasarkan geomorfologi daerah penenelitian tersusun atas Satuan Kerucut Gunungapi Kukusan (V2), Satuan Lereng Gunungapi Kukusan (V3), Satuan Lereng Gunungapi Sula (V3), Satuan Lereng Gunungapi Kabawok (V3), Satuan Kaki Gunungapi Rendingan (V6), Satuan Dataran Kaki Gunungapi Sula (V7), dan Satuan Dataran Antara Gunungapi (V12). Stratigrafi daerah penelitian tersusun dari produk vulkanik yang didominasi berumur plistosen – pleistosen yaitu Satuan Andesit Tua, Satuan Tuf Pumis Gunung Sula, Satuan Lava Andesit Gunung Sula, Satuan Lava Andesit Gunung Kukusan, Satuan Piroklastik Gunung Kabawok, Satuan Tuf Dasit, Satuan Piroklastik Gunung Rendingan, dan Satuan Lava Andesit Gunung Rendingan. Adapun struktur geologi dan interpretasi kelurusan pada daerah penelitian merupakan dikontrol oleh Sesar Sumatera dan berkembangnya segmentasi sesar daerah penelitian yaitu Segmen Sesar Semangko. Dari arah tegasan utama didapatkan berarah baratlaut – tenggara. Akibat adanya pergerakan tektonik, terbentuk *pull apart basin* sehingga menghasilkan sesar minor yang berasosiasi dengan adanya manifestasi panas bumi. Karakteristik geokimia fluida daerah penelitian memiliki tipe air bikarbonat, tipe air sulfat, dan tipe air klorida. Pada bagian utara, tipe air sulfat pada manifestasi DT 2 mencerminkan zona *upflow* dan tipe air bikarbonat pada manifestasi KR 1, KR 2, KL 1, BK 1, dan LBP 1 mencerminkan zona tepian reservoir. Untuk manifestasi gas PA 1, PA 2, PA 3, PA 4, AB 2, DT 1, AB 1, GT 1, dan GT 3 memiliki kandungan CO2 yang tinggi sehingga mencerminkan zona *upflow*. Semakin arah selatan – barat daya daerah penelitian yaitu WP 1, WP 2, dan WP 3 memiliki tipe air klorida yang tinggi sehingga diinterpretasikan menjadi daerah *outflow* dengan temperatur reservoir berdasarkan geothermometer air yaitu 226°C - 235°C. Serta manifestasi gas WNG 5.2 memiliki konsentrasi NH3 yang tinggi sehingga mencerminkan zona *outflow*. Temperatur reservoir berdasarkan berdasarkan geothermometer gas CAR - HAR diinterpretasikan berkisar 220 - 315°C.

Kata Kunci: Ulubelu, Tanggamus, Rendingan, Lampung, Geologi, Geokimia Fluida, Sistem Panas Bumi, Geoindikator, Geotermometer.

ABSTRACT

CHARACTERISTICS STUDY OF GEOTHERMAL SYSTEM BASED ON GEOLOGY AND GEOCHEMICAL FLUIDS DATA AT ULUBELU AND SURROUNDING AREA, TANGGAMUS REGENCY, LAMPUNG

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The research was conducted in the Geothermal Work Area of Mount Way Panas, Ulubelu area, Tanggamus Regency, Lampung. Ulubelu is included in the Geological Map of the Kotaagung Quadrangle, Sumatera. The presence of geothermal potential can be an opportunity for determining geothermal system exploration through a combination of geological and geochemical research data. Based on the geomorphology of the research area, it consists of the Kukusan Volcanic Cone Unit (V2), Kukusan Volcanic Slope Unit (V3), Sula Volcanic Slope Unit (V3), Kabawok Volcanic Slope Unit (V3), Rendingan Volcanic Footslopes (V6), Sula Volcanic Plain Unit (V7), and Intervolcanic Plain Unit (V12). The stratigraphy of the research area is composed of volcanic products dominated by Pliocene-Pleistocene age, namely the Old Andesite Unit, Sula Pumice Tuff Unit, Sula Andesite Lava Unit, Kukusan Andesite Lava Unit, Kabawok Pyroclastic Unit, Dacite Tuff Unit, Rendingan Pyroclastic Unit, and Rendingan Andesite Lava Unit. The geological structure and lineament interpretation in the research area are controlled by the Sumatra Fault and the development of the fault segmentation in the research area, namely the Semangko Fault Segment. The main stress direction is northwest-southeast. Due to tectonic movements, a pull-apart basin is formed, resulting in the development of minor faults associated with geothermal manifestations. The geochemical characteristics of fluids in the research area include bicarbonate, sulfate, and chloride water type. In the northern part, the sulfate water type at the DT 2 manifestation reflects the upflow zone, while the bicarbonate water type at the KR 1, KR 2, KL 1, BK 1, and LBP 1 manifestations reflects the reservoir margin zone. For gas manifestations PA 1, PA 2, PA 3, PA 4, AB 2, DT 1, AB 1, GT 1, and GT 3, high CO2 content indicates the upflow zone. Moving towards the south-southwest of the research area, WP 1, WP 2, and WP 3 have a high chloride water type, interpreted as an outflow zone with reservoir temperatures ranging from 226°C – 235°C based on water geothermometers. Gas manifestation WNG 5.2 with high NH3 concentration reflects the outflow zone. Reservoir temperatures based on gas geothermometers CAR - HAR range from 220°C – 315°C.

Keyword: *Ulubelu, Tanggamus, Rendingan, Lampung, Geology, Geochemical Fluids, Geothermal System, Geoindicator, Geothermometer.*