Pengembangan model konseptual geotermal berbasis data MT 3-dimensi dan simulasi reservoir menggunakan simulator TOUGH2/iTOUGH2 di Lapangan Tulehu (Maluku) = Development of geothermal conseptual model based on 3-dimensional MT data and reservoir simulation using simulator TOUGH2 /iTOUGH2 in Tulehu Field (Maluku)

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Abstrak

Wilayah geothermal Tulehu ditandai oleh kemunculan manifestasi permukaan. Tidak ada manifestasi yang mengindikasikan zona upflow. Survei geosains telah dilakukan dan diikuti oleh pengeboran 4 sumur eksplorasi. Namun, penggambaran zona upflow suhu tinggi yang terkait dengan sumber panas masih sulit. Hal ini karena area survei geosains yang dilakukan belum mencakup keseluruhan sistem geotermal (daerah upflow dan outflow). Dugaan keberadaan sumber panas kemungkinan menuju G. Eriwakang seperti yang ditunjukkan oleh distribusi temperatur dari data sumur. Berdasarkan studi data geosains yang tersedia, diintegrasikan dengan data sumur yang ada, maka dibuat model konseptual yang mencakup kemungkinan keberadaan sumber panas (zona upflow) di sekitar G. Eriwakang dan kemunculan manifestasi permukaan sebagai zona outflow. Untuk menyelidiki kemungkinan lokasi sumber panas sistem geotermal Tulehu, maka simulasi reservoir dilakukan berdasarkan model konseptual yang telah dibuat dengan menggunakan simulator TOUGH2/iTOUGH2. Hasil simulasi setelah mencapai kondisi natural state menunjukkan bahwa sumber panas dimungkinkan berada di bawah G. Eriwakang. Hal ini ditunjukkan dengan kesesuaian kurva temperatur vs kedalaman antara hasil simulasi dengan data sumur. Untuk mengkonfirmasi hasil penelitian ini, maka direkomendasikan untuk dilakukan survei geosains lebih lanjut.
.....Tulehu geothermal area is characterised by surface manifestations. Fumarole and other steam-type manifestations are absent. Geoscientific surveys covering thermal manifestations area have been conducted followed by exploration drillings. However, delineation of high temperature up-flow zone associated with heat source is still challenging, even drilling data from 4 wells could not answer the question yet. Possible existence of the heat source is likely toward Mt Eriwakang as indicated by temperature distribution from wells. Based on the geoscientitic data study, integrated with the existing well data, a conceptual model was developed that includes the possibility of the existence of a heat source (upflow zone) around G. Eriwakang and the appearance of surface manifestations as the outflow zones. To investigate the possible location of the heat source of the Tulehu geothermal system, reservoir simulations using TOUGH2/iTOUGH2 simulator were carried out based on the conceptual model that has been made. Simulation results, after achieving natural state conditions, indicate that the heat source is possibly located under Mt. Eriwakang. This is indicated by the suitability of the temperature vs. depth curve between the simulation results and the well data. Furthermore, to confirm the existence of the heat source, further geoscientific surveys are recommended to be carried out in this area.