

Geothermal Energy Potential Estimates of Niger Delta Basin from Recent Studies

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Abstract : In this work, geothermal energy resource maps of the Niger Delta Basin were constructed using borehole thermal log data from over 300 deep wells. Three major geothermal anomalies were delineated and quantitatively interpreted in both onshore and offshore parts of the Niger Delta. The geothermal maps present the distribution of geothermal energy stored in the sedimentary rock mass in two ways: the accessible resources in depth interval 0-4000 m and static geothermal energy resources stored in the complete sedimentary infill of the basin (from the ground surface to the basement). The first map shows two major onshore anomalies, one in the north (with maximum energy values, 800 GJ/m²), another in the east to northeastern part (maximum energy values of 1250-1500 GJ/m²). Another two major anomalies occur offshore, one in the south with values of 750-1000 GJ/m², occurring at about 100 km seawards and the other, in the southwest offshore with values 750-1250 GJ/m², still at about 100 km from the shore. A second map of the Niger Delta shows a small anomaly in the northern part with the maximum value of 1500 GJ/m² and a major anomaly occurring in the eastern part of the basin, onshore, with values of 2000-3500 GJ/m². Offshore in the south and southwest anomalies in the total sedimentary rock mass occur with highest values up to 4000GJ/m², with the southwestern anomaly extending west to the shore. It is much of interest to note the seaward-westward extension of these anomalies both in size, configuration, and magnitude for the geothermal energy in the total sedimentary thickness to the underlying basement. These anomalous fields show the most favourable locations and areas for further work on geothermal energy resources.

Keywords : geothermal energy, offshore, Niger delta, basin

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