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## **Geological Review of Eburru-Badlands Geothermal prospect; Surface structural and geological mapping**



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**EBURRU VOLCANIC CENTRE HAS AN INFERRED CALDERA MARKED BY ALIGNMENT OF CRATERS AND IS STRUCTURALLY CONNECTED TO THE BADLANDS AREA EXTENDING TO THE NORTH OF THE CALDERA. pREVIOUS SURFACE GEOLOGICAL MAPPING WITHIN EBURRU CALDERA WAS DONE AND REPORTED BY OMENDA ET AL. [1] WHICH ESTABLISHED THAT EBURRU VOLCANIC ZONE CONSISTS OF EAST AND WEST VOLCANIC CENTRES OCCURRING AS CURVE-LINEAR STRUCTURES. THE TWO RING STRUCTURES ARE LOCATED AT THE CENTRE OF EBURRU AREA. CURRENT SURFACE STUDIES WERE CONDUCTED MAINLY TO MAP THE AREA OUTSIDE THE EBURRU VOLCANIC CENTRES IN ORDER TO DETERMINE IF THE RESOURCE EXTENDS NORTHWARDS TO THE BADLANDS AREA AND TO UNDERSTAND THE EVOLUTION OF BOTH FIELDS.**

The Eburru geothermal prospect is characterized by series of fault and fracture network system with a general N-S trends and minor E-W, NE-SW and NNE-SSW trending faults and ring structure. These structures play a significant role in controlling the recharge and fluid movement within the geothermal system especially at the intersection of E-W and N-S faults. On the other hand, the Badlands geothermal prospect has distinct N-S trending faults and fractures outlining both the regional and local tectonics with minor NE-SW trending faults, possibly the main control of recharge and fluid movement within the geothermal system in the area. These faults and fissures represent the fissure swarm of the Eburru central complex, forming a fissure zone of approximately 7-10 km wide. However, within the fissure zone at least one mini-graben was observed (approximately 2.2 km wide), which may be of significant geothermal interest.

Rock types range from mafic to siliceous rich lavas. Trachytes, pantelleritic trachytes and rhyolites and pyroclastics are common in the Eburru area. Few obsidian outcrops and pumice were noted at hill tops. Basalts with minor obsidian, trachyte, volcanic agglomerates, pyroclastics, tuff and sporadic trachy-andesites are the predominant rock types characterizing the Badlands geothermal prospect. Geochemical models of basalts and silicic peralkaline lavas show that the magmas are ultimately mantle-derived and that the evolution was dominated by fractional crystallization processes. This classification shows an evolution trend from basalts through trachyte to pantellerite.

The area is also characterized by presence of numerous volcanic centres such as craters and calderas that indicate the existence of a heat source. Heat discharges at the surface were noted by the presence of thermal features such as hot springs, fumaroles, altered and steaming grounds. The measured temperatures of these features range between 90°C and 96°C which gives a guide to the geothermal potential of the reservoir of Eburru and Badlands geothermal prospects.

*References:*

[1] Omenda, PA et al. (1993) Geothermal Resources Council, 17, 155-160

