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A preliminary geomagnetic study of Wahawa-Padiyathalawa hot springs field

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Sri Lanka represents a tiny crustal fragment located far away from active plate boundaries. However, there are nine geothermal springs found in Sri Lanka. Among them, six geothermal springs are associated with dolerite dykes (160 Ma to 170 Ma). Several studies suggest that dolerite dykes play a major role in the geothermal occurrences of Sri Lanka. However, no conclusion has been made on the role of dolerite dykes in the formation of geothermal resources. The study was conducted at Wahawa-Padiyathalawa hot springs cluster to identify any relation between dolerite dyke and thermal discharges. Wahawa-Padiyathalawa geothermal discharges occur as a cluster of about 18 individual thermal springs in the paddy fields and as one artesian well. The study area has been intruded by a dolerite dyke that extends for 60 km in the North-West direction. A preliminary desk study has been carried out using geological maps and satellite images to study surface geology including lithological variations, intrusions and structural features such as lineaments. All the geological and structural features were compiled into digital maps using Arc GIS software to study any relation between geology and structural features. A magnetic survey was conducted using an Overhauser magnetometer and data were collected every 2 seconds covering a 5 km^2 area around the hot spring cluster. There are several interconnected fractures, some of which seem to continue on either side of the dolerite dyke. The cluster of hot springs is aligned with a lineament feature in the NW-SE direction. The magnetic anomaly map obtained from the survey clearly shows a low magnetic anomalous structure in the vicinity of hot spring cluster. Negative anomalies were observed in the area where fractures are accumulated and oriented in different directions. It is envisaged that the deep fractures are interrupted by the dolerite dyke which would allow the deep ground water to rise to the surface. The deep water retains a considerable amount of heat even at the surface, due to steeper geothermal gradient in the area. Thus, it is evident that the dolerite dykes at least play a passive role in producing thermal springs

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