Proceedings of the

YSCMR 2023

YOUNG SCIENTISTS' CONFERENCE ON MULTIDISCIPLINARY RESEARCH

VIRTUAL INTERNATIONAL CONFERENCE

ORGANIZED BY THE YOUNG SCIENTISTS' ASSOCIATION
NATIONAL INSTITUTE OF FUNDAMENTAL STUDIES
SRI LANKA

ISSN 2815-0260
Proceedings of the Young Scientists' Conference on Multidisciplinary Research-2023
Young Scientists' Association, National Institute of Fundamental Studies, Sri Lanka
09th November, 2023

Paper ID: CMT-098

Structural framework and geothermal fluid migration in the Kapurella geothermal area: A combined study of geological characteristics and magnetic mapping

A.M.A.M. Abeysinghe[1,2], M.P. Thilakarathna[1], N.D. Subasinghe[1*]

[1]*National Institute of Fundamental Studies, Kandy, Sri Lanka*
[2]*Postgraduate Institute of Science, University of Peradeniya, Sri Lanka*

[*]*deepal.su@nifs.ac.lk*

The Kapurella geothermal spring, situated in Sri Lanka, is renowned as the hottest spring of the country. This study aims to explore the geological features and subsurface structure of the Kapurella geothermal area by employing various maps (lithological maps, terrain maps and google maps), magnetic surveys, and geological observations. The geological analysis reveals the presence of synforms and antiforms surrounding the Kapurella geothermal spring, suggesting a potential connection between structural arrangement and geothermal activity. Abundant joint planes aligned in the northwest-southeast and northeast-southwest directions indicate the existence of a significant fracture system in the subsurface, serving as pathways for geothermal fluids. Intersecting lineaments further highlight major fracture trends which will contribute to enhance fluid flow rates. The magnetic survey provides valuable information on the magnetic properties of the subsurface. Linear features aligned in the northeast-southwest direction are observed, displaying alternating bands of low and high magnetic values. The upward continuation magnetic anomaly map unveils positive magnetic anomalies in the northeast-southwest direction, which may indicate subsurface lithological layers with magnetic minerals. The map also exhibits negative magnetic anomalies near the Kapurella geothermal spring signifying the presence of geothermal fluids, as reduced magnetic susceptibility is commonly associated with such systems. Combining the geological and magnetic survey results yields a comprehensive understanding of the Kapurella geothermal area. In conclusion, this study confirms that the Kapurella geothermal spring is mainly sustained by fractures acting as conduits for geothermal fluids. The presence of synforms, antiforms, and well-defined fracture trends support this conclusion, emphasizing the significant influence of structural controls on the geothermal system.

Keywords: *Fluid migration, magnetic survey, Sri Lanka geothermal resources, subsurface structure*