ABSTRACT

Geothermal potential studies and exploration using remote sensing have been widely used because of the simpler process and lower cost. This study aims to study the location and distribution of hot spots and permeable zones in geothermal areas based on digital analysis of LST (Land Surface Temperature) and FFD (Fault Fracture Density) images, and to integrate these data to study the location and distribution of geothermal manifestations. Landsat-8 satellite imagery data is used for LST analysis and DTM (Digital Terrain Model) data is used for FFD analysis. Mapping and identification of geothermal manifestation locations using the integration of digital analysis of Landsat-8 satellite imagery, geothermal manifestation location points based on literature, field survey data, and high-resolution satellite imagery. Interpretation and digitization of visual displays of faults and lineaments from DTM data are used to identify permeable zones. LST image analysis produced 33 hot spots with an LST value range of 30.6°C – 34.0°C spread across densely populated areas, open areas, and the crater of Mount Slamet, but did not show any geothermal manifestations. FFD analysis produced 5 permeable zones with a very high FFD value range (1.413 – 2.309 km/km²) which are mostly spread on the west side of Mount Slamet. There are 8 geothermal manifestation locations with 7 locations in the very high permeable zone and 1 location in the moderate permeable zone. The integration of digital analysis of LST imagery and FFD maps is effective in identifying and mapping geothermal manifestation locations on Mount Slamet.

Keywords*: remote sensing, geothermal manifestation, Mount Slamet, LST, FFD, Landsat-8, DTM*