

***Analysis of Temperature Distribution of Hot Spring Using Quantum
Geographic Information System (QGIS) and Field Observations in the Blawan
Ijen Manifestation Area***

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ABSTRACT

The geothermal potential of Indonesia is enormous, but it has not been optimally utilized. Until now, Indonesia has only been able to generate 2,131.7 MWe of electricity from geothermal energy. One method to address the suboptimal utilization of geothermal potential is through remote sensing. This research aims to understand the impact of day and night on the temperature of hot springs, the accuracy of temperature data obtained from satellite images processed using QGIS concerning field observation results, and the zonation of the Blawan-Ijen geothermal system. For this study, researchers used two thermal sensors: Landsat-8 OLI (Operational Land Imager) and Landsat-8 TIR (Thermal Infrared). These sensors were utilized to obtain optical data, were then processed using the Quantum Geospatial Information System (QGIS). The research was conducted in the Kalianyar Village, Sempol District, Bondowoso Regency, East Java Province, all the way to the Ijen Crater, Bondowoso Regency, East Java Province. The study area's coordinates range from x -8.019948333 and y 114.109786667 to x -8.061580000 and y 114.247481667. Based on the research results, it was found that day and night only have a minor effect on the temperature of the Blawan-Ijen hot springs, with an average temperature difference of 1.6 degrees Celsius. Additionally, the accuracy of the satellite image data compared to the field observation data was $R^2=0.7015$. The upflow zone was identified in the Blawan area, characterized by the presence of geothermal manifestations in the form of hot springs that emerge to the surface. The recharge zone is situated in the Banyupait River and Gunung Blau areas. Meanwhile, the outflow zone located in the Ijen Crater area, marked by the presence of sulfur smoke originating from the Ijen Crater.

Keywords: Geothermal Energy, Blawan-Ijen, Landsat 8, QGIS, Temperature.