

## **ABSTRACT**

Only about 40% of Indonesia's Geothermal energy has been explored, given that geothermal energy is urgently needed and requires further development. However, various behaviors in exploration and development affect the surrounding environment. This research will investigate the condition of environmental changes in two areas, namely areas with geothermal fields and areas without geothermal fields by classifying them into potentially hazardous areas and non-potentially hazardous areas based on their environmental changes. Environmental changes will be compared based on Aerosol Optical Thickness (AOT), Sea Surface Temperature (SST), and Normalized Difference Vegetation Index (NDVI) parameters. These 3 parameters are taken from Himawari-8 satellite remote sensing data. Based on the changes that occur, it can be concluded that areas that have geothermal fields have significant changes that lead to potential geothermal hazards. The satellite data generated; shows that AOT and NDVI values in geothermal areas tend to reach hazardous values when compared to AOT and NDVI values in non-geothermal areas. While SST values tend to be the same between the two areas; because of Indonesia's tropical environment. This classification is carried out using machine learning based on 5 algorithms that are compared in accuracy, namely the Support Vector Machine (SVM), Decision Tree (DT), Random Forest (RF), K-Nearest Neighbors (KNN), and Regression Logistic (RL) algorithms. Where the accuracy of the classification based on the SVM algorithm is 83%, based on the Decision Tree algorithm is 90%, based on the Random Forest algorithm is 85%, based on K-Nearest Neighbors is 82%, and based on the Regression Logistic is 85%. This shows that the classification of geothermal environmental disasters based on these parameters has a high level of accuracy with various machine learning algorithms.

**Keywords:** Geothermal Disasters, Himawari-8 Satellite, Aerosol Optical Thickness, NDVI