

ABSTRACT

Earthquakes are natural phenomena that produce vibrations and shocks on the earth's surface. Indonesia is an area where earthquakes often occur. The high risk of earthquakes is due to the geographical condition of the region which is located at the confluence of 3 tectonic plates, namely the Eurasian, Indo-Australian and Pacific plates. Every earthquake that occurs in Indonesia is very diverse both in terms of magnitude and location of the earthquake center. The large variety of earthquake center data needs to be grouped to find out the characteristics that have in common. The purpose of this research is to cluster earthquakes in Indonesia using the K-Means method and determine the optimal k value. This study uses a dataset of earthquakes that occurred in Indonesia taken from the United States Geological Survey (USGS) website. From the experimental results obtained optimal k is 5 shown by the SSE value = 370.14; DBI value = 0.83 and Silhouette Score value = 0.4299. The results of the grouping into 5 groups based on depth characteristics were obtained: the first, third, fourth and fifth groups are earthquakes with medium characteristics, while the second group is deep earthquakes. Meanwhile, the grouping based on magnitude is that the first group consists of earthquakes with small, medium and destructive magnitudes mostly in all provinces of Java to Nusa Tenggara; the second group of earthquakes with medium and destructive magnitudes mostly spread in Java, Maluku and Sulawesi; the third group of earthquakes with small, medium and destructive magnitudes spread in Sulawesi; the fourth group of earthquakes with small, medium, destructive and large magnitudes mostly spread in Maluku and Papua; and the fifth group of earthquakes with small, medium and destructive magnitudes mostly spread in all provinces of Sumatra Island except Lampung.

Keywords: earthquake, indonesia, k-means, magnitude, clustering