

Unsupervised classification of lithological units using Aster satellite data by machine learning algorithms, case study in a region in the Makran subduction zone in southern Iran

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Over the past decade, Machine Learning Algorithms (MLAs) have achieved great success in accurately detecting and mapping geological targets compared to traditional methods. MLAs use artificial intelligence derived from input data by analyzing their features and patterns with minimal human intervention. In this study, MLAs were used to classify geological units in a selected area in southern Iran. After preprocessing the ASTER satellite data and performing the K-Means method, an unsupervised classification was performed to find out how efficient the result of the K-Means method is in the complicated geological zones with marine sediments up to 10 km thick compared to previous geological maps. In this study, nine clusters were used for classification. The analysis and results of this comparative study demonstrate the potential of K-means clustering for developing classified geological units that are prominent in the study area, particularly when adequate surveys such as litho-stratigraphic and structural studies are not available. It can also be used for quality control of geological maps. This method can help us save costs before preparing a geological map.