

EFFECTIVE EVALUATION OF GEOCHEMICAL DATA OF STREAM SEDIMENTS FOR TARGETING RARE EARTH ELEMENT POTENTIAL AREA USING MULTIVARIATE ANALYSIS: A CASE STUDY OF GODHRA GRANITE, IN PANCHMAHALS DISTRICT, GUJARAT

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Abstract

A large number of geochemical data have been generated from the south-eastern part of Gujarat. Effective evaluation of these data has been done for achieving the multi-disciplinary objectives of this study. Histogram analysis, box plot, summation of mean, standard deviation coefficients and median are some of the classical statistical methods used for defining and characterising geochemical anomalies from the background values. Multivariate statistical analysis especially, factor analysis has been carried out to classify and reduce the number of geochemical variables. Factor analysis and cluster analysis have helped in identifying the anomalous zones using stream sediment geochemical data. The step-wise factor analysis was used to eliminate insignificant elements during statistical treatment of geochemical data and, which has lead to an increase in the intensity of the anomaly. Factor score maps were prepared from factor scores to delineate elemental associations. Factor score map of Factor-1 obtained during factor analysis represents the prevalent linear relationship among the elements Y-U-La-Ce-Pr-Nd-Sm-Eu-Gd-Tb-Dy-Ho-Er-Tm-Yb-Lu-Hf-Th-Pb and such a linear relation between these elements is observed to be strong towards the eastern part of the area, especially over Godhra granite, where the REE's shows higher values. This study reveals that multivariate statistical analysis, like factor and cluster analysis are effective evaluation tools for identifying mineral potential areas for further exploration.

Keywords: Godhra granite, Stream sediments, Statistical analysis, REE