

An Application on Using Multivariate Statistical Techniques to Evaluate the Sediment Quality

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ABSTRACT:

Multivariate statistical techniques have been used to evaluate the environmental risks in recent years. Felent Stream, which has international important silver mine on the basin, is exposed to agricultural, domestic and industrial pollution. The aim of this study was to evaluate the sediment quality of Felent Stream using multivariate statistical techniques. For this purpose, the accumulations of some micro and macro elements (As, Cr, Cu, Pb, Zn, Ca, K, Mg, Mn, Na and P) in the sediment of Felent Stream were investigated seasonally and Pearson Correlation Index, One Way Anova Test, Factor Analysis (FA) and Cluster Analysis (CA) were applied to the results in order to estimate the data properly. According to the CA, three statistically significant clusters were formed: Cluster 1 corresponded to F4, F5 and F1 that were uncontaminated areas of the basin; Cluster 2 corresponded to F6 and F7 that were moderately contaminated areas of the basin; Cluster 3 corresponded to F2 and F3 that were strongly contaminated areas of the basin. According to FA, four factors have explained 75.92% of the total variance. First factor (F1) named as "Mine - Agriculture Factor" has explained 24.05% of the total variance, second factor (F2) named as "Geologic Factor" has explained 22.09% of the total variance, third factor (F3) named as "Urban - Industrial Factor" has explained 15.1% of the total variance and fourth factor (F4) named as "Natural Factor" explained 14.67% of the total variance.

Keywords:

Felent Stream, Sediment Quality, Heavy metal, Statistical Evaluation