Application of factor analysis method to the alkaline geochemical data from Central Anatolia (Turkey)

NURDANE ILBEYLI[1*] AND FUSUN YALCIN[2]

[1]Akdeniz University, Department of Geological Engineering, 07058, Antalya, Turkey, ilbeyli@akdeniz.edu.tr
[2]Akdeniz University, Department of Mathematics, 07058, Antalya, Turkey, fusunyalcin@akdeniz.edu.tr

The aim of this study applies factor analysis method using SPSS computer software to the alkaline Hamit plutonic rocks. Depending on the results of geochemical analysis factor method will be set automatically according to the geological interpretation will be made. Depending on the results of geochemical analysis according to factor groups, geological interpretation will be carried out. Geochemical analyses of sixty-three rock samples from the Hamit pluton were evaluated in terms of % and ppm. Descriptive statistics and factor analysis were applied to these data. SPSS software-21 program was used in multivariate statistical analysis. Interpretation of the origin of the elements with the help of factor analysis was conducted and the adequacy of the data was examined as well. Yalcin and Ilbeyli (2014) made 3 factor classifications. In their work the number of factors is not intervened. In this study a total of five factors are determined by the results of the analysis performed. The five factors are determined using 30 variables (SiO_2, TiO_2, Al_2O_3, Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5, Sc, Cr, V, Ni, Co,Cu, Zn, Ga, Rb, Sr, Y, Zr, Nb, Ba, La, Ce, Nd, Pb). Factor 1 is represented by Fe_2O_3, P_2O_5, CaO, Sr, Co, TiO_2, V, MgO, Ba, Cu, Sc, MnO, Nd and Ni, and there are highly positive relationships among them. SiO_2 showed high negative correlation among these data. Factor 2 is defined by Zr, Nb, Ga, Al_2O_3, Zn, Ce, La, and there is a high positive correlation among these data. Factor 3 is marked by Y. Factor 4 is represented by Cr. However Cr, Na_2O and Pb are in the same group showed a high negative relationship. Factor 5 is identified by negative K_2O. Factor 1 in the study of Yalcin and Ilbeyli (2014) [1] is similar to factor 1 in this study. The same applies to the factor 2. Both two studies show that factor 1 represents monzosyenite- syenite and factor 2 describes alkaline syenite. Elements within the same factors have similar origins. This study shows that application of SPSS is suitable to determine plutonic rocks forming elements similar to the ones of origin.

[1] Yalcin, F. and Ilbeyli, N. (2014) Multivariation statistics determination of the Hamit alkaline plutonic rocks (Kırşehir-Turkey). 30th International Conference on Alkaline, Kimberlite and Carbonatite Magmatism, *Antalya*, **228**.