

GEOCHEMISTRY OF SOILS FROM ODE IRELE AREA, SOUTHWEST NIGERIA, IMPLICATIONS: FOR PROVENANCE AND TECTONIC SETTING

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ABSTRACT

The study is aimed at determining the the provenance and tectonic setting of soils from Ode Irele area of Ondo State, Nigeria. The provenance discriminant function diagram shows the samples plotting in the quartzose sedimentary provenance and mafic igneous provenance. The chondrite-normalized REE patterns for the Ode Irele soil displayed high LREE/HREE ratio, flat HREE pattern and pronounced negative Eu anomaly that is typical to that of UCC and PAAS suggesting derivation from felsic source rock. The bivariate plot of Na₂O-K₂O illustrates that the samples are quartz-rich, which suggests that they may be of felsic origin. The La/Co and Th/Co values of 9.94 and 6.67 respectively and the plot of La/Co vs Th/Co suggests a felsic source. The V-Ni-Th*10 ternary plot indicates derivation from felsic rocks. The TiO₂ versus Zr plot, the bivariate plots of Th/Co vs. La/Sc ratios, Cr/Th against Th/Sc, Ti and Ni suggests derivation from felsic rocks. Plots of Y, Nb, Zr and Sc versus Th showed positive correlation. The incompatible element pairs Th–Y, Th–Zr, and Th–Nb show the effect of heavy mineral concentration and felsic source. The average Th/Sc and Zr/Sc ratios of the sediment is 1.48 and 101.4 respectively, and a plot of Th against Sc shows the samples plotting around the Th/Sc = 1 axis suggesting a felsic source. The Ode Irele samples have an average Cr/V ratio of 0.8 while the Y/Ni ratio is 0.9; signifying a felsic source, also, a plot of Y/Ni vs. Cr/V follows the felsic calc-alkaline trend. Tectonic discrimination analyses using major oxides and trace and rare earth elements indicates passive margin tectonic setting.

Keywords: Ode Irele, provenance, tectonic setting, mafic, felsic.