Origin of High-K Ignimbrite in the Miocene Volcanism Surrounding Uşak Region (Western Turkey): Rb-Sr, Sm-Nd Isotopic Evidence

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The Western Turkey is an active region formed in a complex crustal extensional regime, generating large volume of subduction and post-collisional-related magmas took place during the Middle Miocene-Quaternary time. The ignimbrite is mainly composed of plagioclase (oligoclase, andesine) + biotite + Fe-Ti oxides (magnetite, hematite) ± amphibole (brown hornblende) and has eutaxitic texture. Whole rock geochemical data reveal that ignimbrite, characterized by their trachy-andesite composition, high-K in character, show fractional crystallization primarily controlled by plagioclase, biotite, Fe-Ti oxide. The ignimbrite samples have Th/Nb (1.00-1.20), Nb/Ta (3.57-14.67), Ba/Nb (37.32-64.43), Hf/Th (0.18-0.44), K/P (16.99-34.76), Ce/P (0.06-0.10) and Th/U (1.60-4.03) incompatible element ratios and show Volcanic Arc Basalts (VAB) in character. According to spider diagrams; ignimbrite exhibits a clear enrichment in LILE and HFSE. Although it is close to Continental Crust value, there are generally slight decreases in the content of Sr, Ba, Nb, P and Ti ratios reflecting subduction related magma (Wilson, 1989). In REE diagram, it displays marked enrichment in light rare earth elements (LREE) ($(La/Sm)_N = 5.03$-5.97) relative to heavy rare earth elements (HREE) ($(Sm/Yb)_N = 4.36$-5.15). Furthermore, all samples have negative Eu anomalies ($(Eu/Eu^*)_N = 0.77$-0.90), indicating the significant role of plagioclase in the fractional crystallization. The ignimbrite display limited range in $^{87}Sr/^{86}Sr$ (0.708048 to 0.708782) and $^{143}Nd/^{144}Nd$ (0.512420 to 0.512436) isotopic ratios and similar to Continental Margin Volcanics. Petrographic, geochemical and Sr-Nd isotope datas indicate that the ignimbrite evolved through fractional crystallization and crustal contamination of the parent magma were formed during the partial melting of the lower crust and mixing with the upper crust material.

Metal mobilization by iron- and sulfur-oxidizing bacteria in a multiple extreme mine tailings in the Atacama Desert, Chile [2]

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The marine shore sulfidic mine tailings dump at the Chañaral Bay in the Atacama Desert, northern Chile, is characterized by extreme acidity, high salinity and high heavy metals concentrations. Due to pyrite oxidation, metals (especially copper) are mobilized under acidic conditions and transported towards the tailings surface and precipitate as secondary minerals [1]. Depth profiles of total cell counts in this almost organic-carbon free multiple extreme environment showed variable numbers with up to 10^8 cells g^{-1} dry weight for 50 samples at four sites. Real-time PCR quantification and bacterial 16S rRNA gene diversity analysis via clone libraries revealed a dominance of *Bacteria* over *Archaea* and the frequent occurrence of the acidophilic iron(II)- and sulfur-oxidizing and iron(III)-reducing genera *Acidithiobacillus*, *Alicyclobacillus* and *Sulfobacillus*. Acidophilic chemolithoautotrophic iron(II)-oxidizing bacteria were also frequently found via most-probable-number (MPN) cultivation. Halotolerant iron(II)-oxidizers in enrichment cultures were active at NaCl concentrations up to 1 M. Maximal microcalorimetrically determined pyrite oxidation rates coincided with maxima of the pyrite content, total cell counts and MPN of iron(II)-oxidizers. These findings indicate that microbial pyrite oxidation and metal mobilization preferentially occur in distinct tailings layers at high salinity. Microorganisms for biomining with seawater salt concentrations obviously exist in nature [2].

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