

Petrogenesis of the basic volcanism behind the volcanic front (Cinotepeque range, El Salvador)

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Most of Quaternary volcanic activity in El Salvador is concentrated to 5 major volcanic centres, forming part of the volcanic front (VF), directly related to the subduction of the Cocos Plate under the Caribbean Plate. A volcanologically distinct volcanic province is represented by diffuse clusters of subrecent cinder cones and small shield volcanoes behind the volcanic front (BVF). While geochemistry of the prominent BVF zone, situated in the Ipala transtensional Graben along the Guatemalan–Salvadorian border, has attracted much attention, the minor Quaternary BVF field in the central El Salvador has been little studied so far. This zone of 30 individual volcanic bodies extends from the Boquerón Volcano (VF) c. 20 miles N, as far as the N–S trending horst of the Cinotepeque Range (Rapprich & Hradecký, 2005).

Compositional data available for the Cinotepeque area correspond to a suite of fairly fractionated subalkaline basalts and basaltic andesites (mg# < 55, Cr < 149 ppm and Ni < 56 ppm). Characteristic is steep increase in K₂O with increasing differentiation (SiO₂). Identical trend is observed in the lavas from Boquerón and, to some extent, the Ipala Graben (data of Carr, 2003). Similar behaviour may be demonstrated also for the other LILE. In the SiO₂–FeO^{tot}/MgO plot, the whole series falls within the Fe-rich, "tholeiitic" field. On the other hand, the K₂O increase in lavas from the more remote VF edifices is much slower and their FeO^{tot}/MgO significantly lower, typical of normal calc-alkaline rocks.

In spite of similarities of BVF and adjacent VF volcanoes, there are also differences. At the given SiO₂, the BVF lavas have higher MgO, lack the negative Eu anomaly, and show lower LILE/HFSE ratios indicative of diminishing subduction fluid involvement (Ba/La > 43). Similar pattern was reported previously also from the Ipala area.

Compositional trends in main oxides of the Cinotepeque lavas can be modelled by up to 40% fractional crystallization (plg 40%, augite 35%, olivine 20% and magnetite 6%). The enrichment in incompatible elements requires comparable degrees of fractionation. The variation in silica contents in the BVF lavas is limited. Clearly the SiO₂ content of the fractionating assemblage (43.6 %) was too similar to the most primitive lavas (49.7 %) to produce acid magmas.

References

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Geochemistry of an actual Fe-sulfides formation from Acisu district, Karsanti, Adana, Turkey

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The aim of this study is to elucidate the geochemical characteristics of the Acisu district actual Fe-sulfides (pyrite/marcasite) formation (Karsanti, Adana, Turkey). Around this mineralization, Upper Cretaceous ophiolite is cropped out and Paleozoic and Mesozoic aged sedimentary rocks are trusted over it. The Fe-sulfide occurrence is approximately 25 m length, 5 m width, and 3 m depth in diameter. The paragenesis comprises marcasite, chalcopyrite, quartz, hematite and calcite/dolomite. Approximately 0.5 l/s hydrothermal water (pH=4-6 and T=40-45°C) is going out to surface as a spring. Total sulfur concentration of the is 200-250 µM. It is known that Tl, Ni, Co, Mn, Zn, Pb, Ge, Cd, and As contents and Co:Ni ratio of the pyrite/marcasite are permit to distinguish them sedimentary, high and low temperature occurrences (Huston *et al*, 1995; Temur *et al*, 2006). Fe and Sb contents in the ore showed positive correlation, against to strong negative correlation of Fe and SiO₂, Al₂O₃, CaO, MgO, Sr, U. Wide ranges in concentrations of Cd, Cr, and Zn characterize the mineralization. The samples contain low Ag (12 ppm), As (26 ppm), Ni (14 ppm), Sr (1.4 ppm), Y (0.25 ppm), versus high Cu (9600 ppm), Mo (23 ppm), Pb (120 ppm), Se (86 ppm). Based on cluster analysis, four main groups can be clearly distinguished. These are **the main oxides group** (SiO₂, CaO, MgO, Al₂O₃, Sr and U) respecting enrichment of these element against to Fe; **the iron-sulfide group** (Fe, Sb, LOI and TOS) representing of the main marcasite mineralization; **the chalcophile elements group** (Zn, Cd, Hg, Ga, Ag and Cu) reflecting a mineral accumulations by sulfo-salt in solution; and the Co-Cr group (Co, Bi, Se, As, Cr, Y, and Au) representing contamination by ultramafic wall rock. On the triangular diagram of (Sb-Sr-Zn) and (Sr-Co-Zn), three mineralization types can be deviated from each other as (1) pure marcasite; (2) marcasite which contains rich lattice stoichiometric substitutions; (3) marcasite which contains rich other sulfide minerals.

References

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