

Geochemistry and genesis of lavas







behind volcanic front in El Salvador Hernández W.¹, Erban V.^{2,3}, Rapprich V.^{2,3}, Janoušek V.^{2,3}, Holub F.V.³

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pecent volcanic activity in El Salvador is concentrated at the subduction-related I volcanic front, which predominantly consists of andesitic to rhyolitic stratovolcanoes and calderas. Apart of it, several areas of cinder cones, lava fields and small shield volcanoes formed behind the volcanic front (BVF). Differentiated rocks are scarce in this setting.

In order to investigate the spatial variability of BVF products, we sampled two cross sections from the volcanic front landwards. One is located in the Cinotepeque range, north of San Salvador Volcano, the second one in the Salvadorian part of the Ipala Graben, north of Santa Ana - Izalco volcanic complex.





Ipala Graben, Salvadorian part

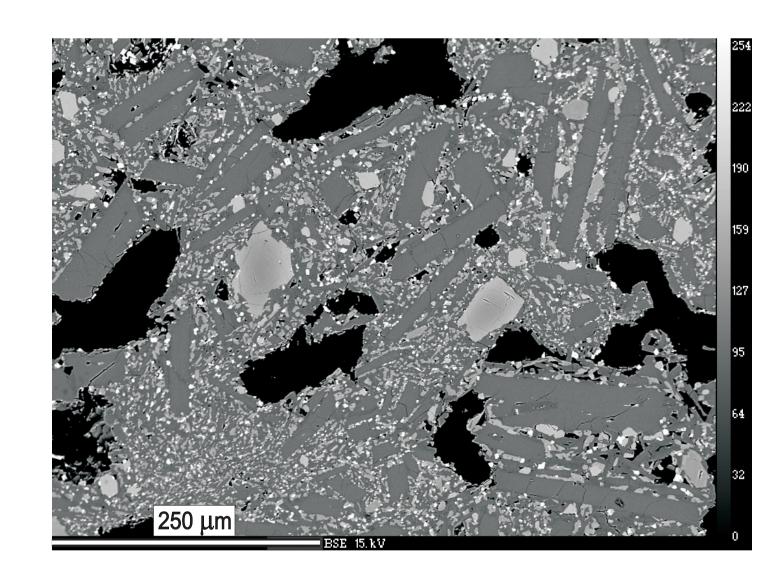
Gulf of

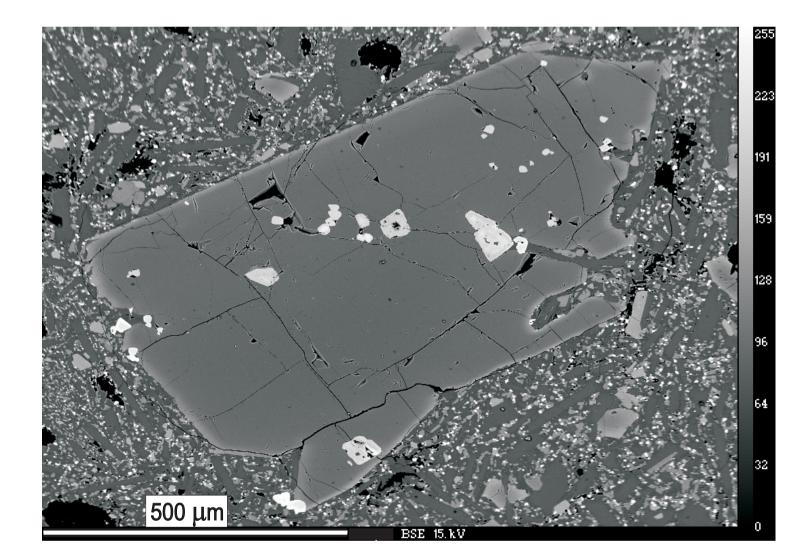
Mexico

- San Salvador Volcano (Boquerón)
- Santa Ana Izalco volcanic complex

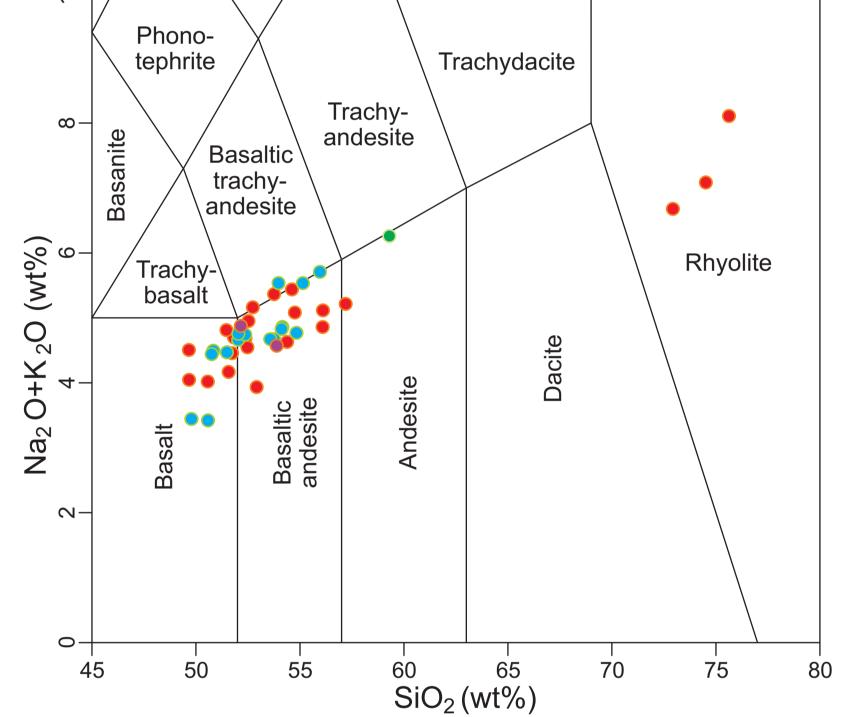
Data for Santa Ana - Izalco from: Carr and Pontier, 1981; Feigenson et al., 1986; Noll et al., 1996

he basaltic lavas consist mostly of plagioclase and olivine pheno-crysts, enclosed in plg-ol-px-mt matrix (below). Some very fine-grained varieties do not have phenocrysts. Pyroxenes are





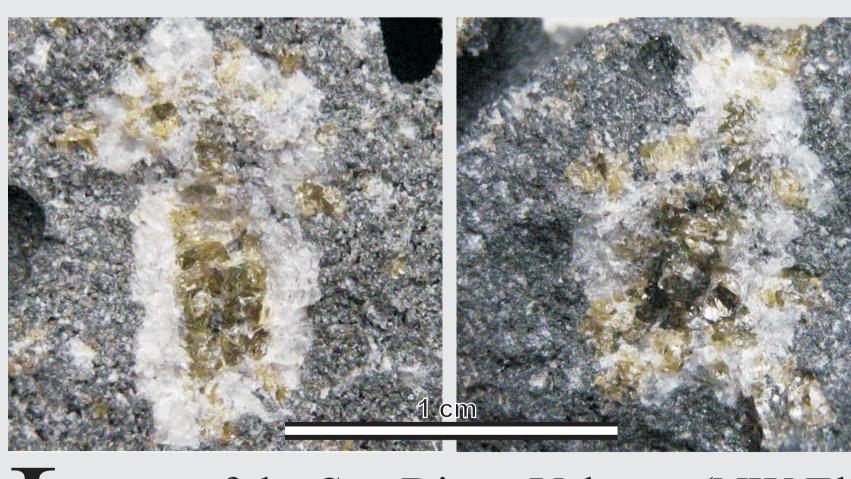
represented by both: ortho- and clinopyroxene. Occasionally, a clinopyroxene rim is mantling orthopyroxene core. Cores of Mgrich olivines enclose chromite inclusions (above).



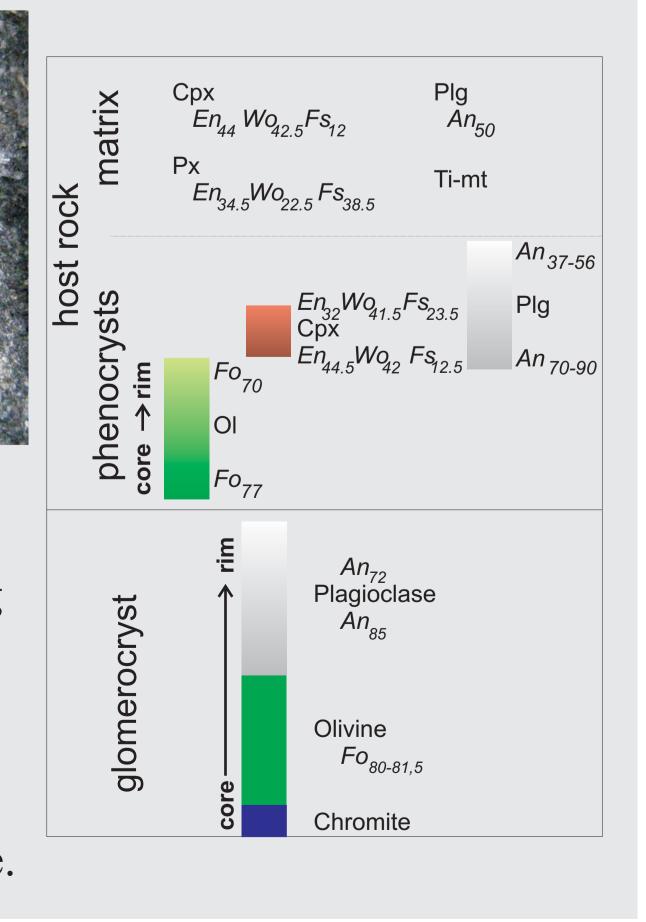
he Salvadorian BVF lavas were classified as subalkaline basalts to basaltic andesites, with rare rhyolitic occurrences. Mafic members are fairly fractionated, though the outcrops of the primitive lavas are rare (SiO₂ = 49.1-55.5 %, mg# = 28-63, Cr = 61-252 ppm and Ni =14–113 ppm). The position in the AFM diagram demonstrates its calc-

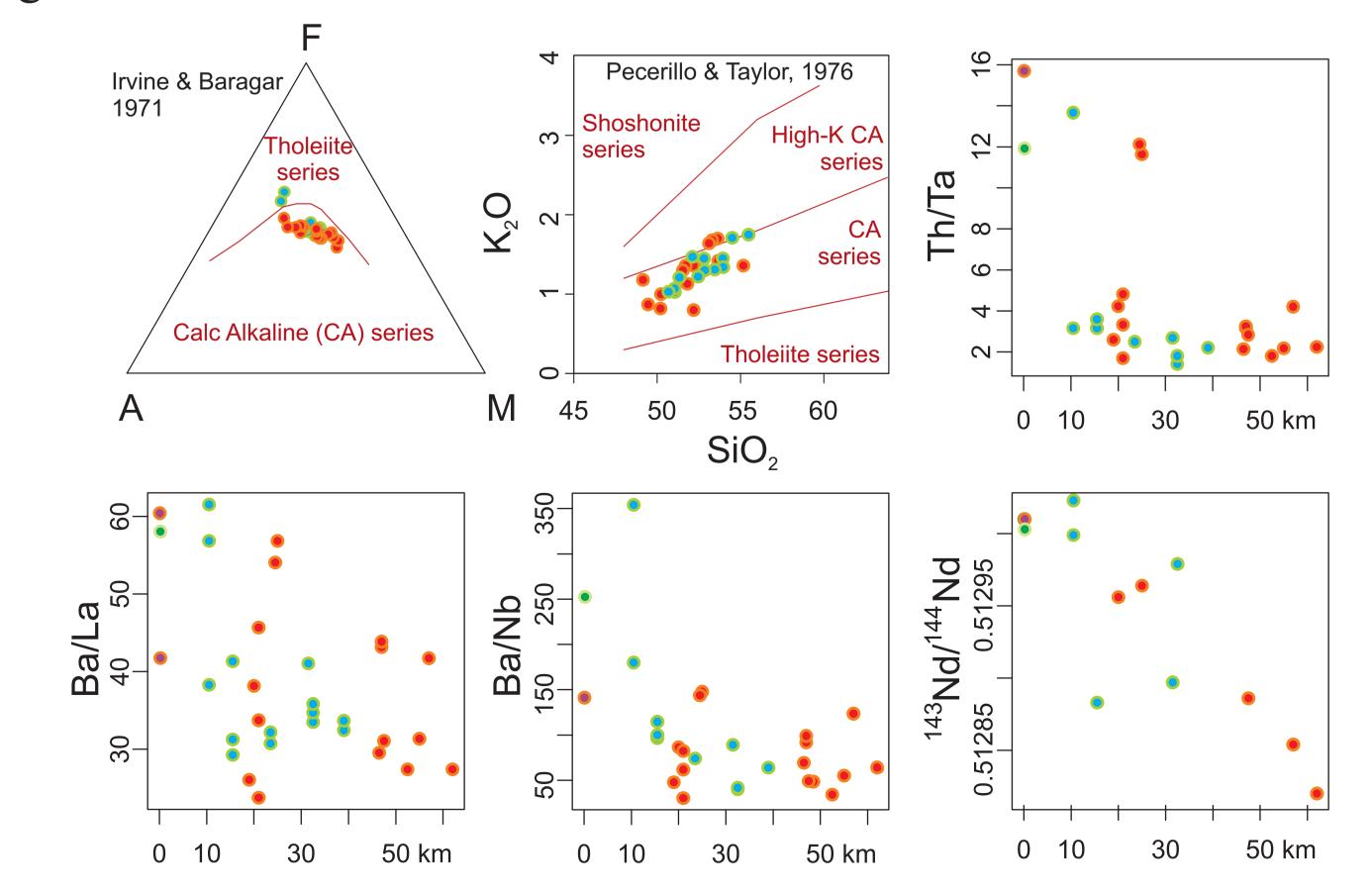
alkaline affinity. This is in sharp contrast with clearly tholeiitic lavas of the volcanic front Boquerón Volcano. A characteristic feature of the BVF lavas is a sharp increase in K₂O with increasing differentiation (SiO_2) .

There is a significant decrease in fluid-mobile vs. incompatible ratios (i.e. Ba/La) with increasing distance from the volcanic front. This indicates decreasing role of the slab -related fluid during magma generation.



avas of the San Diego Volcano (NW El ✓ Salvador) contains abundant chromiteolivine-plagioclase glomerocrysts, reflecting complex magmatic evolution of erupted lavas. We assume that deeply accumulated olivine was captured by a portion of more evolved magma and served as a nucleus for rapid heterogenous nucleation of plagioclase.





Data sources:

Carr M. J., Pontier N. K. Evolution of a young parasitic cone towards a mature central vent; Izalco and Santa Ana volcanoes in El Salvador, Central; America; J. Volcanol. Geotherm. Res. 11, 1981, 277-292 Feigenson M. D., Carr M. J., Maharaji S. V., Juliano S., Bolge L. L.; Lead isotope composition of Central American volcanoes: Influence of the Galapagos plume. Geochemistry Geophysics Geosystems 5 (2003GC0006), 2004

Noll P. D. JR., Newsom H. E., Leeman W. P., Ryan J. G.; The role of hydrothermal fluids in in the production zone magmas: Evidence from siderophile and chalcophyle trace elements and boron. Geochim. Cosmochim. Acta 60, 1996, 587-611