

Geochemical and isotopic characterization of back-arc quaternary mafic volcanic rocks from Campo Volcánico Cerro Gordo, Trans-Mexican Volcanic Belt, México

G. SOLIS-PICHARDO^{1*}, K. GOMEZ-ALVAREZ²,
R. G. MARTINEZ-SERRANO² AND G. P. GARCIA-TOVAR²

¹Instituto de Geología, Universidad Nacional Autónoma de México, México, D.F. 04510 (*correspondence: gnsolis@hotmail.com)

²Instituto de Geofísica, Universidad Nacional Autónoma de México, México, D.F. 04510. (krynagoal@hotmail.com, rms@geofisica.unam.mx, tovar302@yahoo.com.mx)

The Quaternary Campo Volcánico Cerro Gordo (CVCG) is located in the eastern part of the Trans-Mexican Volcanic Belt (TMVB), in the back-arc region, approximately 85 km to the north of the present volcanic front. A group of andesitic and basaltic-andesitic radial lava flows and domes constitute Cerro Gordo; another group consists of basaltic and basaltic-andesitic cinder cones. The volcanic structures follow NE-SW and NW-SE alignments, suggesting the presence of a regional fault system.

Major elements compositions indicate some rocks of a calc-alkaline nature and others alkaline. Trace element patterns for the larger part of the samples show clear LILE and Pb enrichments with respect to HFSE. Some basaltic andesites and basalts display a different element distribution. REE patterns exhibit enrichment of LREE with respect to HREE with a sub-horizontal arrangement of the latter. Isotopic results have the ranges: $^{87}\text{Sr}/^{86}\text{Sr}$ from 0.70390 to 0.70481 and epsilon-Nd from +1.26 to +3.46; within mantle array values but with a slight interaction of magmas with crust. In contrast, Pb isotopic values $^{206}\text{Pb}/^{204}\text{Pb}$ (18.67 to 18.76), $^{207}\text{Pb}/^{204}\text{Pb}$ (15.58 to 15.61) and $^{208}\text{Pb}/^{204}\text{Pb}$ (38.42 to 38.54) imply mixing between a MORB type end-member and a more radiogenic component, similar to the oceanic sediments from the Eastern Pacific.

Results suggest that the magmas were generated in a back-arc setting, within a depleted heterogeneous mantle which was affected by the ascent of enriched asthenospheric mantle along with the addition of some subduction-related components. A possible tectonic setting is the retreat of the subduction plate (slab) which took place during Upper Miocene to Quaternary times.