

## **Chemical Composition Fluctuations of Popocatepetl Gaseous Emissions Recorded on Tephra**

M A Armienta (Instituto de Geofísica, UNAM, Circuito exterior C U, Mexico 04510 D F Mexico; ph. 525556224114; fax 52555502486; e-mail:victoria@tonatiuh.igeofcu.unam.mx); S De la Cruz-Reyna; O Morton; O Cruz; N Ceniceros; A Aguayo; E Hernandez (Instituto de Geofísica, UNAM, Circuito exterior C U, Mexico 04510 D.F, Mexico)

Studies on the chemical composition of gases emitted from Popocatepetl current activity, were done through tephra leachate analyses. Tephra samples from different eruptions, not exposed to rain, were treated with deionized water to dissolve their cover. Anions ( $\text{SO}_4^{2-}$ , Cl-, F-) and metals (Ti, V, Cr, Mn, Co, Ni, Cu, Zn, Pb, Mo, As, Se, Tl) were analyzed in leachates by ion chromatography, potentiometry and ICP-MS. Concentrations of these species in aqueous leachates represent an indirect way to determine the proportion of volatiles emitted during an eruption. Anions result mostly from  $\text{SO}_2$ , HCl and HF adsorption on the surface of the ash particles; metals may come from volatiles or from the rock matrix.

Different concentration ratios of anions were observed for eruptions of different types. Metals like Ni, Cu, Zn, Cd, As, Se, Pb, are more likely to form volatile compounds which are released in the volcanic plume. Enrichment factors (relative to the rock matrix) were used to assess the metal source in the leachates. Concentrations of metals and anions in leachates may also be used to assess the environmental exposure to toxic species. Low metal contents were measured in Popocatepetl leachates for most of the eruptions. Relatively high levels of Mn and Ni were found only on certain dates. Fluoride reached high levels in different occasions.

Compositional variations were also recorded on tephra settled at different distances from the crater for the same eruption. Several factors such as eruption type, tephra size, wind velocity and humidity were correlated with the observed concentration trends.