



Volcanic Ashes Intercalated with Cultural Vestiges at Archaeological Sites from the Piedmont to the Amazon, Ecuador

Viviana Valverde, Patricia Mothes, and Daniel Andrade

Instituto Geofísico, Escuela Politécnica Nacional, Quito-Ecuador (vvalverde@igepon.edu.ec)

A mineralogical analysis was done on 70 volcanic ashes; 9 corresponding to proximal samples of seven volcanoes: Cotopaxi (4500 yBP), Guagua Pichincha (3300 yBP, 1000 yBP and 1660 yAD), Cuicocha (3100 yBP), Pululahua (2400 yBP), Ninahuilca (2350 yBP and 4600 yBP) and 61 to distal ashes collected at eight archaeological sites in the Coastal, Sierra and Amazon regions of Ecuador. Cultural vestiges are from Pre-ceramic, Formative, Regional Development and Integration periods, with the exception of a site denominated Hacienda Malqui, which also has Inca vestiges.

The sampling process was done in collaboration with various archaeologists in 2011-2013. The volcanic ashes were washed, dried and divided in order to obtain a representative fraction and their later analysis with binocular microscope.

The microscope analysis allowed determination of the characteristics of each component of volcanic ash. These main elements are: pumice fragments, minerals, volcanic glass, lithics and exogenous material (non volcanic).

The petrographic analysis of distal volcanic ash layers at each archaeological site was correlated by their components and characteristics with proximal volcanic ashes of source volcanoes. Some correlations permitted obtaining a relative age for the layers of distal volcanic ash in the archaeological sites.

The petrographic analysis showed a correlation between the archaeological sites of Las Mercedes – Los Naranjos, Rumipamba and El Condado (located west of Quito) with the eruptive activity of Guagua Pichincha volcano (3300 yBP, 1000 yBP and 1660 yAD) and Pululahua volcano (2400 yBP). Also, a correlation with eruptive activity of Ninahuilca (2350 yBP), Cotopaxi (4500 yBP) and Quilotoa (800 yBP) volcanoes at Hda. Malqui (60 km west of Latacunga) was provided by mineralogy of the respective ashes expelled by these volcanoes. The ash layers at Cuyuja (50 km east of Quito) are mostly superficial; they are associated with Quilotoa's 800 yBP plinian. Finally at the Huapula and Pablo VI sites (in the western Amazon region of Ecuador), the reworked ashes are predominantly of Sangay volcano (in permanent eruptive activity since 1628).

Finally, the work shared between archaeologists and volcanologists allowed us to discover more deposits of volcanic ashes at archaeological sites. These layers sometimes have more than 30 cm thickness in distal regions, such as the thick ash layer left by Pululahua's 2400 yBP eruption, a fact which helps us to comprehend the impact of volcanoes on past cultures.