

A reconnaissance survey of the CO₂ soil fluxes in the Michoacan Guanajuato Monogenetic Volcanic Field

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Measurement of gas emissions from central volcanoes has long been used as an efficient monitoring methodology for evaluating volcanic activity. Since no active vents exist in monogenetic fields until a new volcano erupts, no methods are presently used to monitor the gas emissions of such fields. A problem in monogenetic volcanic fields is recognizing the most active tectonic zones and therefore the most probable sites for the birthplace of a new monogenetic volcano, particularly in tropical settings where rapid soil development and intensive erosional processes, together with the young age of the volcanic products, act together to hide traces of active faults and fractures.

Using a portable West Systems soil CO₂ flux meter (accumulation chamber method) we propose to measure the base level of CO₂ flux from soils in the Michoacan-Guanajuato monogenetic volcanic field in the West-Central Trans-Mexican Volcanic Belt and recognize the CO₂ fluxes values at the two youngest cones of this monogenetic field. Routine measurement of these fluxes would allow discriminating areas with noticeable variations in CO₂ flux, which could be considered for the installation of permanent flux meters in order to correlate the gas measurements with possible seismic and/or volcanic activity.

In this work we present results of diffuse gas measurements made at Paricutin and Jorullo volcanoes and in some fixed points along the entire Michoacan-Guanajuato monogenetic field in April 2009, June 2011, May 2012 and November 2012. We measured more than 200 points at Paricutin volcano and over 150 at Jorullo volcano. Also, we present results for 30 fixed points that had been measured 4 times.