

Spatial and temporal soil gas flux measurements at Acoculco geothermal area, Mexico: period 2015-2018

DANIEL PEREZ-ZARATE SR., PROFESSOR DR. EDGAR SANTOYO V, MIRNA GUEVARA, DAVID YÁÑEZ-DÁVILA AND GUSTAVO SANTOS-RAGA

Institute for Renewable Energy (UNAM)

Presenting Author: dapez@ier.unam.mx

The increase of geothermal energy production in Mexico has promoted intense exploration surveys for exploiting hidden geothermal systems (HGS) in the future. Previous geothermal exploration at Acoculco Caldera (AC) involving geological, geophysical, and geochemical studies indicates a promising enhanced geothermal system candidate for power generation. Diffuse soil gas flux surveying is the approach to identify thermal activity in HGS, which has been used to describe volcanoes and geothermal areas in diverse geological environments worldwide. Some investigations use the accumulation chamber method for soil CO₂ flux measurements and geographic statistical approach to differentiate the source of CO₂, while others use the eddy covariance method for continuous monitoring of CO₂ soil diffuse degassing along with meteorological parameters. Such methods allow the detection of CO₂ flux anomalies associated with thermal activity, faults, and fractures. Moreover, its natural spatial and temporal variability allows the estimation of CO₂ from geothermal sources to the global carbon cycle. This study presents results from an extensive sampling performed from 2015 to 2018 on Acoculco geothermal system. The variation of soil gas fluxes (i.e., CO₂, H₂S, and CH₄) in the geothermal area of Acoculco were quantified. The fluxes were based on the accumulation chamber method. The goal of the present work was also to delimit degassing and estimate the total output of CO₂ from the geothermal area of Acoculco.