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Carbon dioxide diffuse degassing in the geothermal area of the Copahue – Caviahue Volcanic Complex

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The Copahue – Caviahue Volcanic Complex (CCVC) is located on the Argentinean – Chilean border hosting an important magmatic – hydrothermal system. During 2012 a new eruptive cycle start and it is still ongoing. Several techniques have been used to study the evolution of this cycle, however, simultaneously we have been working on a project of estimation of the geothermal energy available in this area. The development of a project of utilization of a renewable energy could constitute a great benefit for the region around this volcanic complex. In order to contribute to this eventual project, a carbon dioxide soil diffuse degassing survey has been performed over an area of about 1 km². 1819 measurements were collected over three campaigns carried out in the summers of 2014, 2015 and 2016. The data were elaborated using the Graphical Statistical Approach and the Sequential Gaussian Simulations method (GSA and SGS respectively). By means of the GSA, four log-normal populations were defined at CCVC geothermal field. Out of the entire dataset, 9% of the measured fluxes belong to a population with a CO₂ flux mean value of 1421 gm⁻²day⁻¹, and it is interpreted to represent a population fed by an endogenous, hydrothermal source. The other populations are interpreted as background populations related to soil respiration processes. The SGS method was applied in order to map the diffuse degassing structures present in the CCVC and to obtain estimates of the total CO₂ release. Carbon dioxide anomalies were registered at three out of the four geothermal sites located in the Argentinean side of the CCVC. The total amount of CO₂ released by the whole area of the geothermal field is 208.5 td⁻¹. Preliminary results by using CO₂ as a tracer of the original vapor phase indicate a natural thermal release of up to 100 MW.