

Environmental measures of geothermal sites

Zayre Ivonne Gonzalez Acevedo

National Institute of Nuclear Research, Mexico

Abstract

Geothermal energy is the use of thermic energy that emerges from the interior of the Earth Crust up to the surface through rock and/or fluids to produce electricity. This energy shows up at the surface as thermal springs, geysers, fumaroles and volcanoes. Even though geothermal energy is considered as a renewable/clean energy source, environmental impacts cannot be excluded during geothermal power generation. The environmental effects that are temporary or irreversible in geothermal industry are: land subsidence, seismicity, noise, changes to landscape and land use, solid waste, ecological, emissions to the atmosphere such as: gases (CO₂, H₂S, NH₃, CH₄, N₂ and H₂), trace mercury, boron vapors and radon. Surface and groundwater contamination: hazardous substances used during exploration, construction or production stages. The geothermal reservoirs contain a range of toxic metals in suspension and solution: As, Hg, Pb, Zn, B and S, along with carbonates, silica, sulphates and chlorates. It is important to start an environmental monitoring before a geothermal power plant is created, to establish the environmental baseline. In this work, a polar sampling was made, starting from the geothermal expression in three geothermal sites from the central part of Mexico. Water, soil, vegetation and microorganisms were monitored in wet and dry season 2015. All environmental samples show concordance with respect to the 15 determined chemical elements, bacteria and microalgae, identifying specific characteristics related to the geothermal reservoir and other environmental stresses.

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Biography

Zayre González has completed her PhD on environmental geochemistry in 2006 from Ruprecht-Karls University Heidelberg, Germany. From 2006-2011, she worked at the Environmental Sciences Department in the National Institute of Nuclear Research in Mexico. Since 2012 she works as researcher in the Geology Department at CICESE.

In the CeMIE-Geo, she is leading a project on sustainable development and minimization of environmental impact from geothermal reservoirs in Mexico (2014-2018). In June 2016, she granted a project on environmental, social and economic impacts of enhanced geothermal system (EGS) and super-hot geothermal system (SHGS), in collaboration with the European Union (2017-2021).