



S03.14 - From old cauldrons to young quaternary calderas context, processes, and economic potentials for geothermal energy and ore resources

Induced and triggered events in geothermal fields following large earthquakes. The example of the Los Humeros caldera, Mexico

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The local seismicity in geothermal fields is generally associated with perturbations of the pore pressure because of the fluid circulation imposed to run the power plants. On the other hand the geothermal regions are also susceptible to earthquake triggering as a result of transient stress variations caused by surface waves originated by strong regional earthquakes, as documented by several studies. To investigate possible changes in the seismicity rate in geothermal fields during and after the occurrence of regional strong earthquakes, we have analyzed the seismic records of 3 strong earthquakes that have been recorded in the Los Humeros geothermal field, Mexico; the first one, of magnitude 8.2, occurred on September 7, 2017, 500 km southeast of the geothermal field and associated with the interplate slipping of the Cocos subduction zone. The second one occurred after 12 days, on September 19, 2017 had magnitude 7.1 and located 180 kilometers southwest of the geothermal field and considered as an intraplate earthquake. The third event occurred on February 16, 2018 whose magnitude resulted of 7.2 and located 400 kilometers south of the caldera, and associated with the Pacific subduction zone too. From these observations an intense local seismic activity has been identified in the geothermal field, from which it has been possible to determine useful information on the active faults of the field and to obtain patterns about the behavior of such induced seismicity.

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