

## Characteristics of seismicity within proximity to active geothermal and volcanic areas

Xiaowei Chen

University of California, San Diego, USA

E-mail: Xiaowei.fengr@gmail.com

Geothermal energy is renewable, clean, and has been utilized worldwide. Exploitation of geothermal energy involves fluid injection for heat circulation purposes and increasing permeability. Increased fluid pore pressure will accelerate the failure process under Coulomb failure criteria. Thus, correlations between seismicity and injection activities are identified at most geothermal reservoirs; one famous example is the Geysers. The triggering front of seismicity due to fluid is controlled by the pore pressure diffusion process in space and time. The hydraulic diffusivity can be obtained from the spatial-temporal pattern of seismicity, which is usually between 0.01 to 10 m<sup>2</sup>/s, and varies among different regions with generally higher values in geothermal and volcanic areas. California has ample natural resources for geothermal energy. Here, we try to understand the relationship among seismicity, tectonic environments and injection activities. The current study region is the Salton Trough; future analysis will include Coso area. In the Salton Trough, the first-order correlation is strong spatial clustering around injection wells, and temporal correlation between increased seismicity and increased injection. The pore pressure changes likely couple with tectonic applied shear stress, and with affect earthquake stress drop. Some correlation has been identified for hydraulic fracturing experiments. In the Salton Trough, we also find that the stress drop is correlated with distance from injection wells. We will investigate the variation in the Coso geothermal field, and compare seismicity with injection history. In the future, I will apply the analysis method in California to Japan earthquake catalog, to learn about the seismicity pattern in different tectonic environments using high-precision differential time relocation. A comparison of fluid properties will be synthesized based on results in California and Japan.