EGU2020-10795
https://doi.org/10.5194/egusphere-egu2020-10795
EGU General Assembly 2020

Simulation of frictional heat generation due to underground motion

Andreas Uslar
Universidad Técnica Federico Santa María, Departamento de Ingeniería Química y Ambiental, Chile
(andreas.uslar.13@sansano.usm.cl)

Frictional energy generating during an earthquake has been well studied in the last decades and quite a few laboratory experiments have been carried out recently with the objective to quantify and describe this type of energy in a better way. In our research we modelled the temperature rise during a simulated seismic event and the consequent equivalent heat released using the ANSYS® Mechanical software. Our approach is using the Finite Element Method to model a symmetrical fault plane where several parameters such as density, pressure, structural and thermal material characteristics are set according the conditions of a compressional tri-axial test. Natural and forced models were explored applying the Mohr-Coulomb failure criteria. Using a temporal window similar to a realistic situation, we are capable to observe the differences that occur during the stick-slip behavior in the co-seismic rupture process. On the other hand, the time lapse allows us to observe model and infer how the heat is generated and transferred around the fault plane. As a preliminary result, a variation of approximately 1.5°C was obtained simulating the conditions for a laboratory induced micro-seismic event modelled as a tri-axial test under 10 MPa of confining pressure and 20 MPa as vertical pressure, with velocities in the order of 1.5 mm/s.