NSF I/UCRC for Geomechanics and Mitigation of Geohazards (GMG)

Deep Dive
April 13 – 14, 2020

Schedule for deep dive meeting on projects GMG-4.1 and GMG-6.1

GMG-4.1 - Understanding conditions for stable/unstable fault slip induced by fluid injections

GMG-6.1 - Experimental investigation of the interaction between fluids and failure of rock faults in shear

Day 1

9:00 am, introductions

9:15 am presentations to begin

1. Basics of friction, including rate and state, concept and calculation of nucleation length, fast vs. slow slip, flash heating.
   (Elias Heimisson and Valère Lambert)

15 min break

10:45 am reconvene

2. Laboratory measurements of ruptures with digital image correlation (DIC) and other techniques. What do we get and with what accuracy.
   (Vito Rubino)

   - Field quantities (e.g. displacements, velocities, stresses, etc.) and time histories of particle motion

   - Frictional behavior

   - High peak resistance due to rate and state and low resistance due to flash heating

   - Experiments with rock gouge

12:00 pm adjourn
Day 2

9:00 am presentations to begin

3- Modelling of a field fluid injection experiment
   (Stacy Larochelle)
   - Effects of fluids on interfaces
   - Modeling setup
   - Insights from matching field observations
   - Effects of dilatancy and compaction

15 min break

10:15 am reconvene

4- Laboratory fluid injection experiments
   (Pond Sirorattanakul and Stacy Larochelle)
   - Injection conditions leading to fast or slow slip
   - Nucleation length and measurement of pore pressure in 2D experiments
   - Measurements of pore pressure in the interior of the specimen using DIC
   - Modeling laboratory experiments

11:30-12:00 pm – final questions and discussion with PIs.