

Workshop on Scientific Exploration of Induced Seismicity and Stress (SEISMS)



Earthquakes, both natural and induced, remain unpredictable because we lack understanding of the conditions necessary to cause them. In part, this is because direct observation of the basic processes that link parameters such as stress, pore pressure, and slip on a fault has proven impossible, particularly over the pre- to coseismic timescales. These parameters could be measured *in situ* by borehole and surface-based instruments during an earthquake if they were deployed near to the rupture source. Because it is difficult to predict when and where an earthquake will occur, in order to instrument a fault in advance of an earthquake, one possibility is to induce fault slip (an earthquake) and associated seismicity through fluid injection at an instrumented site suitable for scientific study. A project of this nature would aim to: 1. build an observatory for near-source observations of earthquake processes; 2. establish the physical and chemical effects of fluid injection into the subsurface on fault strength and earthquake source characteristics; 3. investigate the impact of deformation caused by earthquakes on the subsurface physical environment.

We invite participants to attend a workshop, funded jointly by International Continental Scientific Drilling Program, ICDP and the Southern California Earthquake Center (SCEC), to discuss the scientific merit and practical applications of a field-based investigation into the causes of induced seismicity. The workshop will focus on the types of earthquake science questions that could be addressed with fault zone boreholes in and around active faults, and will evaluate different strategies for making direct observations of earthquake rupture in the subsurface. We hope to bring together academic researchers, as well as industry and government employees, to leverage the data and observations from the recent surge in induced earthquakes in the continental USA and build a consensus on how to fill the critical knowledge gaps our understanding of how to mitigate the hazard of unwanted anthropogenic earthquakes.

The workshop will be held at Lamont-Doherty Earth Observatory from March 29-31, 2017. Limited partial and full travel funding is available thanks to the support of ICDP and SCEC. To apply, send a 2 page CV and a single page statement of interest to seisms@ldeo.columbia.edu. The statement should include your interest in the project and a summary of your expertise. The deadline for travel support application is January 6, 2017. Early career scientists are strongly encouraged to apply to help shape what will be a long-term project.

Conveners:

Heather Savage, *Lamont-Doherty Earth Observatory, Columbia University, USA*

James Kirkpatrick, *McGill University, Canada*

James Mori, *Kyoto University, Japan*

Emily Brodsky, *UC Santa Cruz, USA*

William Ellsworth, *Stanford University, USA*

Tom Daley, *Lawrence Berkeley National Laboratory, USA*

Frédéric Cappa, *University of Nice, France*

Brett Carpenter, *University of Oklahoma, USA*

Xiaowei Chen, *University of Oklahoma, USA*

Yasuyuki Kano, *Kyoto University, Japan*