Workshop on Drilling Investigation of Seismogenic Crust in Oklahoma (DISCO)

The drastic, unexpected surge of earthquake activity in the central United States since 2009 has alarmed the public and resulted in raising the earthquake hazard estimate for Oklahoma based on its induced seismicity. Induced earthquakes have also been observed throughout other portions of North America (Colorado, Arkansas, Texas, Ohio, Kansas, Illinois, western Canada), and worldwide (Switzerland, southern Italy, Germany, Netherlands, India, China). Most recent earthquakes occurring in Oklahoma nucleated at depths well within the igneous basement. Although much is known about the shallow sedimentary sequences in Oklahoma, where oil and gas are produced, little is known about the structure and in-situ properties of the underlying igneous basement, where the largest and most damaging earthquakes originate. Consequently, we propose a drilling project into the seismogenic, igneous basement of Oklahoma near and across a causative fault of a recent M5+ earthquake. Such a project will provide a better understanding the processes and conditions leading to the observed fluid-induced seismicity.

Members of the international scientific community are invited to attend a preparation workshop, funded jointly by International Continental Scientific Drilling Program (ICDP), industry partners and the School of Geology and Geophysics. The aim of the workshop is to discuss the proposed drilling project and to clarify the many outstanding questions concerning induced seismicity that are not limited to Oklahoma including: What are the conditions of stress and pore pressure within basement? What are the fluid pathways that allow injected wastewater to flow from the sedimentary layers and penetrate the basement below? What are the effects of basement alteration and chemistry of injected water on earthquake occurrence? What is the in-situ velocity and permeability structure of the basement? What are the strength and seismic stability of the basement rocks and how are these influenced by alteration? What are the structure and composition of a recently active fault-zone?

The workshop will be held in Norman, Oklahoma, May 3-5 and will be convened by Brett Carpenter, Ze'ev Reches, Cristiano Collettini, Francois Cornet, Heather DeShon, Stephen Hickman, Kuo-Fong Ma, Xiaowei Chen, Ahmad Ghassemi, Nori Nakata and Jake Walter.

Limited partial and full travel funding is available thanks to the support of ICDP and industry partners. To apply, send a 1-page CV and a statement of your interest in the workshop topic to disco@ou.edu. The deadline for travel support is February 16, 2018. We also ask those planning to attend the workshop, but not requesting travel assistance, to submit their intent via a statement of interest to disco@ou.edu by February 16, 2018. Early career and international scientists are strongly encouraged to apply to help shape what will be a long-term project.