Invited personnel：Nicolas Brantut　(University College London)
Host researcher：Hiroyuki Noda (Disaster Prevention Research Institute, Kyoto University)
Period：November 6-19, 2016
Purpose：Visiting DPRI, Kyoto University for a collaboration on dynamic rupture propagation and to give a special seminar, “Recovery of seismic wave speeds after deformation: A rock physics approach”, and visiting ERI, the University of Tokyo for discussion with researchers.

Seminar information：

Date and time: 10 November 2016, DPRI, Kyoto University

Abstract:

In the upper crust, rocks deform by fracturing and faulting. Fractures and microfractures have a huge impact on the physical properties of rocks, and especially their seismic wave speeds. It is well established from seismological evidences that important changes in seismic wave speeds occur around fault zones in the periods following earthquakes: seismic wave speeds tend to suddenly decrease during the earthquake, but tend to recover significantly in the following days and months after rupture. Such trends are key to understand how rocks recover after deformation and the state of stress in around faults during the interseismic period. In this presentation, I will show how laboratory rock physics experiments can contribute to improve our understanding of why seismic wave speeds recover after deformation, and what it tells about the stress state in the crust following earthquakes. The essential result from my laboratory experiments is that seismic wave speeds can recover very significantly (up to 10%) and rapidly (over a few days) due to time-dependent microcrack closure, even when the macroscopic stress state is maintained constant. This effect is due to internal stress relaxation.