

AOB Seminar

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開催日時: 2022 年 7 月 19 日 (火) 13:00-14:50

場 所: センターA 棟第一講義室(A205)と Zoom のハイブリッド開催

講演題目&要旨:

Continuous controlled-source seismic experiments to monitor in-situ stress changes associated with slip events

Continuous measuring in-situ stress-induced seismic velocity change has been providing an increasingly important contribution to the study of the earthquake nucleation process. Crosswell Continuous Active-Source Seismic Monitoring (CASSM) with an array of borehole sources and sensors has proven to be a very effective tool to monitor seismic velocity and to identify its temporal variations at seismogenic depth. An ultimate goal of our experiment is to continuously monitor tectonic stress across the San Andreas Fault at seismogenic depth and increase the likelihood of directly retrieving the ‘depth’ dimension of the deformation field. Our active-source experiment makes use of two boreholes drilled through the SAFOD project. A piezoelectric source and a three-component accelerometer have been installed at the SAFOD pilot and main holes (~1 km depth), respectively. A seismic pulse was recurrently fired from the piezoelectric source four times per second, and waveforms are recorded at 48 kHz to capture seismic velocity change at a high-temporal resolution. Our observation suggests two possible pre-seismic velocity reductions that occurred approximately 10 and 2 hours before micro-earthquakes. Additionally, seismic attenuation appears to be increased for one of micro-earthquake cases. Our working hypothesis is that pre-seismic velocity and attenuation changes may be related to pre-rupture stress induced changes in crack properties, as observed in early laboratory studies.