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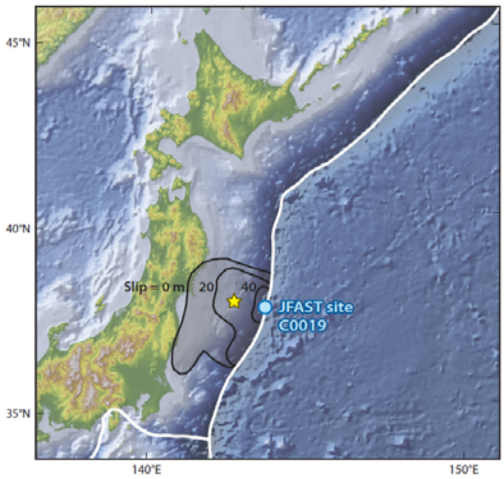
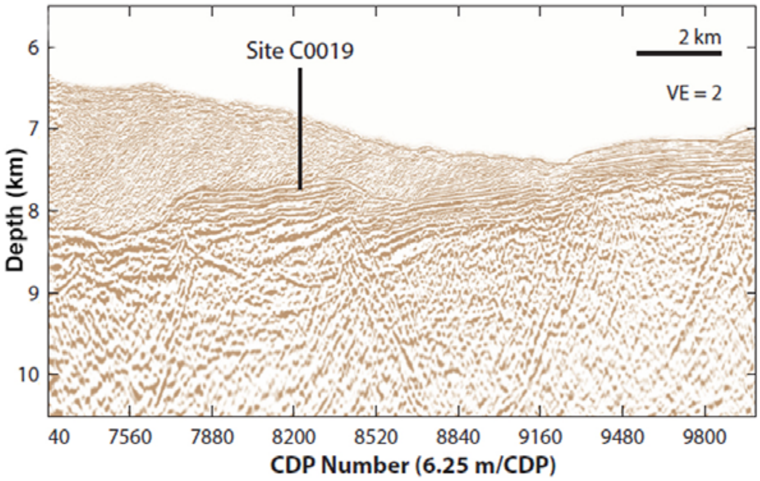
The mechanics of large earthquakes

Thursday, 10 December 2020 – 16:30

Webinar "Live" on-line at Zoom link:
https://unipd.zoom.us/j/82978693795?pwd=TmlBSDBVRFVNL3NwTUpGSW8rWFdpQT09

Speaker: **Prof. Emily Brodsky**
University of California Santa Cruz, Dept. of Earth and Planetary Sciences





Why do earthquakes start? What makes them get big? Why do they stop?

To answer these questions we use tools from a variety of geoscience disciplines including seismology, hydrogeology, structural geology, and rock mechanics.

Earthquakes occur by overcoming fault friction; therefore, quantifying fault resistance is central to earthquake physics. Values for both static and dynamic friction are required, and the latter is especially difficult to determine on natural faults. However, large earthquakes provide signals that can determine friction in situ.

The Japan Trench Fast Drilling Project (JFAST), an Integrated Ocean Discovery Program expedition, determined stresses by collecting data directly from the fault 1–2 years after the 2011 Mw 9.1 Tohoku earthquake. Geological, rheological, and geophysical data record stress before, during, and after the earthquake. Together, the observations imply that the shear strength during the earthquake was substantially below that predicted by the traditional Byerlee's law. Locally the stress drop appears near total, and stress reversal is plausible. Most solutions to the energy balance require off-fault deformation to account for dissipation during rupture. These observations make extreme coseismic weakening the preferred model for fault behavior.

Proposer: **Prof. Giulio Di Toro**