

Monday, 20 March 2023

at 16:15 Studer Auditorium, 2 OG

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“IODP explores new frontiers in ultra-deep water hadal environments probing extreme events archived in the geological record of the Japan Trench”

Hadal oceanic trenches are the deepest places on our planet. They act as terminal sinks for sediment and particulate and dissolved organic carbon, and form high-resolution archives to unravel the history of subduction zone processes including the giant earthquakes and tsunamis that occur along the trench. Short historical and even shorter instrumental records limit our perspective of earthquake maximum magnitude and recurrence, and thus are inadequate to fully characterize Earth's complex and multiscale seismic behavior and its consequences. Motivated by the mission to fill the gap in long-term paleoseismic records of giant (Mw 9 class) subduction zone earthquakes, such as the Tohoku-Oki earthquake in 2011, International Ocean Discovery Program (IODP) Expedition 386 successfully collected 29 Giant Piston cores at 15 sites (total core recovery 831.19 meters), just recently recovering up to 37.82-meter-long, continuous, upper Pleistocene to Holocene stratigraphic successions of 11 individual trench-fill basins that are expected to have recorded past earthquakes. In this Kolloquium talk, I will present preliminary expedition results that document event-stratigraphic successions comprising numerous event deposits and initially characterize their different types, facies, properties, composition and frequency of occurrence, which show spatial variations along the Japan Trench. Our ~24 kyr event stratigraphic record will enable new perspectives for the discussion on long-term recurrence patterns of megathrust earthquakes. Furthermore, expedition achievements comprise the first ever high temporal and high spatial resolution subsurface investigation and sampling in a hadal oceanic trench, providing exciting new perspectives to advance our understanding of deep-sea elemental cycles and its influence on hadal environments.