School of Earth and Environmental Sciences
Fall 2025 Colloquium Series

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Science Building C-207

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New techniques to recognize deposits from dangerous tsunamigenic earthquakes: Application to the Japan Trench

The largest known earthquakes ruptured the entire seismogenic depth range of megathrusts at subduction boundaries. This includes the shallowest part near trenches where they developed large slip and generated enormous regionally destructive tsunamis. This type of rupture that reaches the sea-floor is fortunately rare, but, as a result, the most recent ones, M9.2 Sumatra in 2004 and the M9.0 Japan in 2011, were unexpected and caused great damage. A better-informed future requires recognizing where and when such earthquakes have occurred during pre-history. Our approach has been to compare earthquake event deposits in various depositional and tectonic settings (e.g., IODP Expedition 386, Haiti 2010; Jamaica Passage 2022; Bay of Bengal 2024) based on their lithologic, physical, chemical and isotopic characteristics, and to conduct sediment entrainment simulations in shaking tank experiments.