

Current Status and Perspective of IODP NanTroSEIZE Drilling & Observatory

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NanTroSEIZE is an integrated program of geophysical studies, drilling, and instrumentation designed to investigate the aseismic to seismic transition of the megathrust system and the processes of earthquake propagation and tsunami generation at the Nankai Trough subduction zone. Series of proposals have been submitted to the Integrated Ocean Drilling Program (IODP), and have been accepted recently. The fundamental goal is the creation of a distributed observatory spanning the up-dip limit of seismogenic and tsunamigenic behavior. This will involve sampling and instrumenting key elements of the active plate boundary fault system at several locations off the Kii Peninsula, Japan. NanTroSEIZE will test models for the frictional behavior of fault rocks across the aseismic - seismogenic transition, the composition of faults and fluids and associated pore pressure and state of stress, partitioning of strain spatially between basal interface and splays, temporally between coseismic and interseismic periods, and between infraseismic and aseismic events vs. seismic events. Long-term borehole observations potentially will reveal the in-situ strain distribution and ultimately test whether interseismic variations or detectable precursory phenomena exist prior to great subduction earthquakes. Drilling and instrumentation will span the zone from input of sediment, crust, and fluids at the trench through the mega-splay and decollement fault systems at up to 6 km below the sea floor. Eight distinct drilling sites are targeted, with a comprehensive program of coring, geophysical logging, downhole geophysical and hydrological experiments. Opportunities exist for many new researchers to become involved in the NanTroSEIZE effort.