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The IODP "Nankai Trough Submarine Landslide History" Drilling Proposal NanTroSLIDE

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With increasing awareness of oceanic geohazards, submarine landslides are gaining wide attention not only because of their catastrophic impacts (e.g. landslide-induced tsunamis), but also because they can be directly related to primary trigger mechanisms including earthquakes, rapid sedimentation, gas release, or clathrate dissociation, many of which represent geohazards themselves. Ocean drilling is a key element in understanding such geohazards, given that the submarine geological record preserves structures and past occurrences. To improve our knowledge, quantitative constraints on frequency and magnitude on relevant timescales need to be related to trigger and failure mechanisms.

Towards this goal, the Ancillary Project Letter "Nankai Trough Submarine Landslide History" (NanTroSLIDE) aims to add one site to the IODP Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) study area to constrain timing, causes and consequences of submarine landslides in this well-studied accretionary complex. 3D seismic data interpretation in this area offshore Kii Peninsula, SW Japan, reveals a peculiar slope basin sedimentary succession that is composed of stacked Pleistocene-to-recent mass-transport deposits (MTDs), as seismically imaged by acoustically transparent to chaotic bodies with ponded geometries. A nearby small slope basin has been drilled during IODP NanTroSEIZE Stage 1a expedition 316. Site C0008 is located seaward of a prominent out-of-sequence thrust (OOST - mega splay fault). In the lower part of the slope-basin stratigraphic succession, early Pleistocene MTDs document increased slope failure activity along the upthrusted hangingwall block during a period of increased OOST activity. Apart from the deepest section, Site C0008 lacks clear evidence for MTDs, mainly because of a significant hiatus in its upper part, resulting from recent slumping.

Proposed Drilling in a lower slope basin that (i) better represents the depocenter for downslope mass transport, (ii) is clearly characterized by stacked MTDs, and (iii) includes a large, up to 150 m thick MTD, aims at establishing a well-dated mass-movement stratigraphy along with clues on MTD´s depositional dynamics as they relate to tsunamigenic potential. In conjunction with 3D-seismic interpretation we aim to constrain landslide scales and magnitude. Results will be interpreted in terms of short-term trigger and long-term pre-conditioning factors by correlating MTDs magnitudes and frequencies to the seismicity and tectonic evolution of the margin.