A new perspective of the subduction zone derived from the Ocean Drilling Program for the Nankai Trough Seismogenic Zone Experiments (NanTroSEIZE)

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The NanTroSEIZE project has been one of the most complex and challenging scientific ocean drilling projects in history, and a milestone for the Integrated Ocean Drilling Program (2005-2013) and the current International Ocean Discovery Program (2013-present). The ambitious goal of investigating the fault mechanics and seismogenesis of the Nankai Trough, and studying the in situ fault slip, strain accumulation, formation composition, fault architecture and install advanced sub seafloor observatories for real-time investigations and analysis is now nearing its final stages: directly sampling and measuring the plate boundary fault system, believed to be the primary pathway for the historically recurring mega-earthquakes and associated tsunami. The study area is located South-Southeast of the Kii Peninsula, off the Kii Peninsula, and comprises a transect of drill sites beginning in the Kumano Basin, extending across the Nankai Trough and to the incoming Philippine Sea plate. As a result of the drilling campaign since 2007, many scientific results broke through the previously accepted common concepts in the Nankai seimogenic subduction zone.
1)The Nankai forearc has been punctuated grown since ~6Ma and ~2Ma due to the rapid sediment supply from the land area and the hanging wall wedge for the great earthquakes has been set up as a result. 2)Slips along the plate boundary megathrust and its splay fault once run away to the trench and ocean floor. 3)The fault composed of sedimentary gouge is absolutely weak whichever in static or dynamic behavior. 4)In-situ stress conditions of the accretionary wedge and the outboard Philippine Sea Plate are well measured and tectonically loaded status suggests the build up of the stress for the next Nankai great earthquake. 5)Borehole observatories combined with ocean floor network documented the 2016, Aril 1 earthquake, tsunami and slow slips along the megathrust and presented an innovatively new science and technology in ocean floor science.

