Seafloor observation network in the Nankai Trough to model dynamics in seismically coupled plate interface.

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Recent development of DONET seafloor observation networks in the Nankai Trough enabled us to capture crustal activities occurring in seismogenic plate interface, which is considered to be in prior phase of large earthquake occurrence. Since the deployment of DONET seafloor observatories, occurrence of low frequency earthquakes has been documented, both in low frequency range as very low frequency earthquake (VLFE) and in relatively high frequency as low frequency tremors (LFT). Deployment of broadband and wide dynamic range seismic sensors in quiet environment in relatively dense configuration (15-30 km) was key technical points to enable detection and analysis of such low frequency earthquakes. Further expansion of our eyes on these slow earthquakes in the seafloor were achieved by instrumentation in deep seafloor boreholes. In deep seafloor borehole where sensors are coupled to cohesive crust, detection of slow change of strain is possible. We identified families of slow slip events (SSE) from pore-fluid pressure records obtained in two seafloor borehole observatories (C0002G and C0010A) deployed in Integrated Ocean Drilling Program (IODP). Now these borehole observatories are linked to DONET network delivering data together with dense seafloor observatories enabling us to study nature of these families of slow earthquakes (VLFE, LFT, SSE), although current number of borehole (=2) is insufficient to model extent of each SSE event in space. Moreover, our ability of seafloor observation is still limited in longer period than a month period. Therefore, we propose further expanding our ability to observe crustal strain in longer period so as to model these slow slip events and effect of these events to the status of coupled plate interface. This would be achieved either by deployment of number of borehole observatories or by improvement of seafloor observatories (already existing in more than 50 locations) to be able to instrument seafloor strain change.

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