A COMPARATIVE STUDY OF THE SHIMANTO AND NANKAI ACCRETIONARY PRISMS

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One of the critical questions to understanding the seismogenic subduction zone is what controls the updip limit of the zone. The question is quite significant to address why the rupture zone stops in some case or propagates to shallow portion and results in the tsunamigenesis in another case. The Nankai trough is a single most unique subduction zone in the world, where historical repetition of large earthquakes and tsumani more than 700 years are well recorded and the updip limit is located enough shallow to drill by riser vessel. That is one of the reasons why drilling into the seismogenic plate boundary has been proposed in the Nankai Trough (Harold, this meeting).

Before drilling, we are conducting a comparative research on exhumed seismogenic fault in ancient accretionary complex on land, which was once located in the sesimogenic depth, and the modern Nankai Trough of targeted site for drilling. Several new findings from the exhumed rocks stimulate the understanding of the sesimogenic zone and sharpen the targets by drilling.

1. Break and involvement of oceanic basement into the accretionary complex as blocks of melange is suggested to be a seismic process because of ubiquitous brittle (cataclastic to ultracataclastic) breakage of the oceanic fragment in contrast to ductile deformation of underthrusted sediments.

2. A boundary fault such as sandstone dominated coherent unit (might be offscraped) and mudstone dominated chatoic one (might be underthrusted) is a clear seismogenic fault and a candidate for a major seismogenic plate boundary. A discovery of pseudotachyllyte from the fault strongly suggests a melting lubrication for rupture propagation around the updip limit of the sesimogenic zone.

3. Detailed analysis of the fault suggests a repeated activity of pressure solution creep (interseismic?) alternated with cataclastic or melting slip (coseismic) within a narrow (about 30 cm) fault zone.

4. Crack seal mineral veins are also developed in and around the fault. P-T condition from H2O-CH4 fluid inclusions and vitrinite reflectance suggests the development of the veins within the seismogenic zone. Vein development especially within the fault and shale dominated part below the fault suggests the place where dehydrated fluid pool and pathway is strongly controlled by structural and lithological setting.

These geologic aspects suggest the plate boundary fault around the updip limit of the seismogenic zone, which is imagined from strong and negative reversal polarity reflectors on the seismic profile and might be a significant target of IODP (NantroSEIZE proponents).