The Shimanto Belt and the Nankai Trough revisit -Material Science of seismogenic subduction zone

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Combining Recent rapid progress of the geophysical and geological studies of the Nankai Trough and Shimanto Belt, we can focus on what kind of material science is more needed to understand seismic process in the subduction zone.

A progressive change in reflectors of decollement (apparent decollement reflector, Low amplitude reflector, and Deep strong reflector) is observed in the Nankai subduction zone. The change may correspond to the change in deformation mode from melange formation to duplexing observed in the Shimanto Belt.

Taking the negative polarity of the DSR into account, fluid behavior along the decollement and its relationship with the deformation mechanisms is a key to understanding a seismic process in the subduction zone.

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A progressive change in reflectors of decollement (apparent decollement reflector, ADR- Low amplitude reflector, LAR, and Deep strong reflector, DSR) is observed in the shallowest part of the Nankai subduction zone. The change may correspond to the change in deformation mode from melange formation (underthrusting) to duplexing (underplating) observed in the Shimanto Belt. A line of evidence is in the following;

1) Fluid inclusion analysis and deformation fabric analyses document that melange was formed by the shear along the decollement under the depth of several kilometers and temperature around 200 C. Such P-T condition is consistent with the depth of DSR.

2) Repetition of deformation mechanisms: pressure solution and cataclasis, is common, but the development of ultracataclasite and pseudotachylite is limited to the ramp, roof thrust or OST (out of sequence thrust). Such change in the deformation mechanisms depending on the setting is a key to understanding the interseismic and seismic events.

3) Cataclastic deformation is a common for the fragmented basalts in the melange. Such fragments might suggest the collapse of asperities in the subduction zone.

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