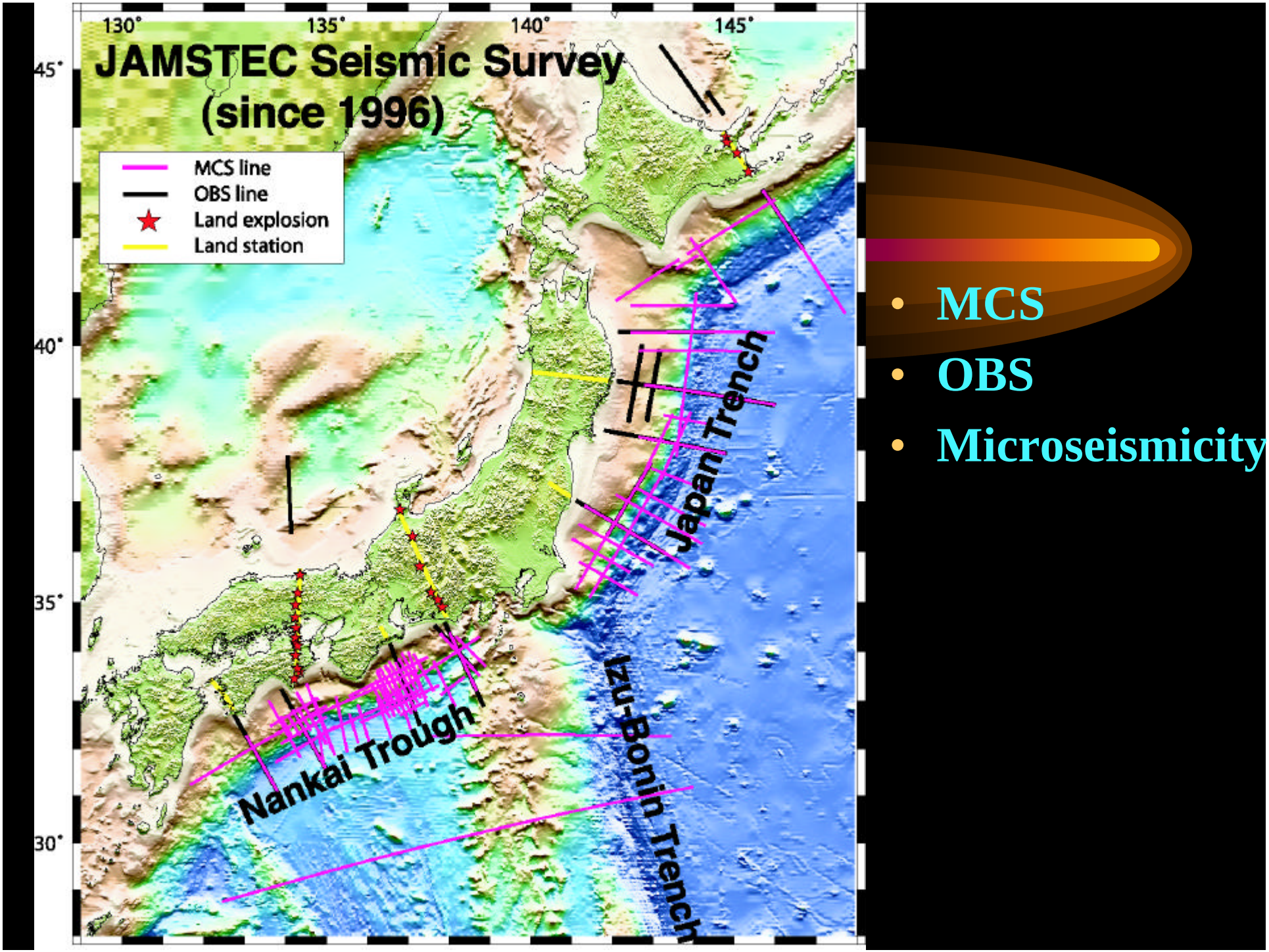
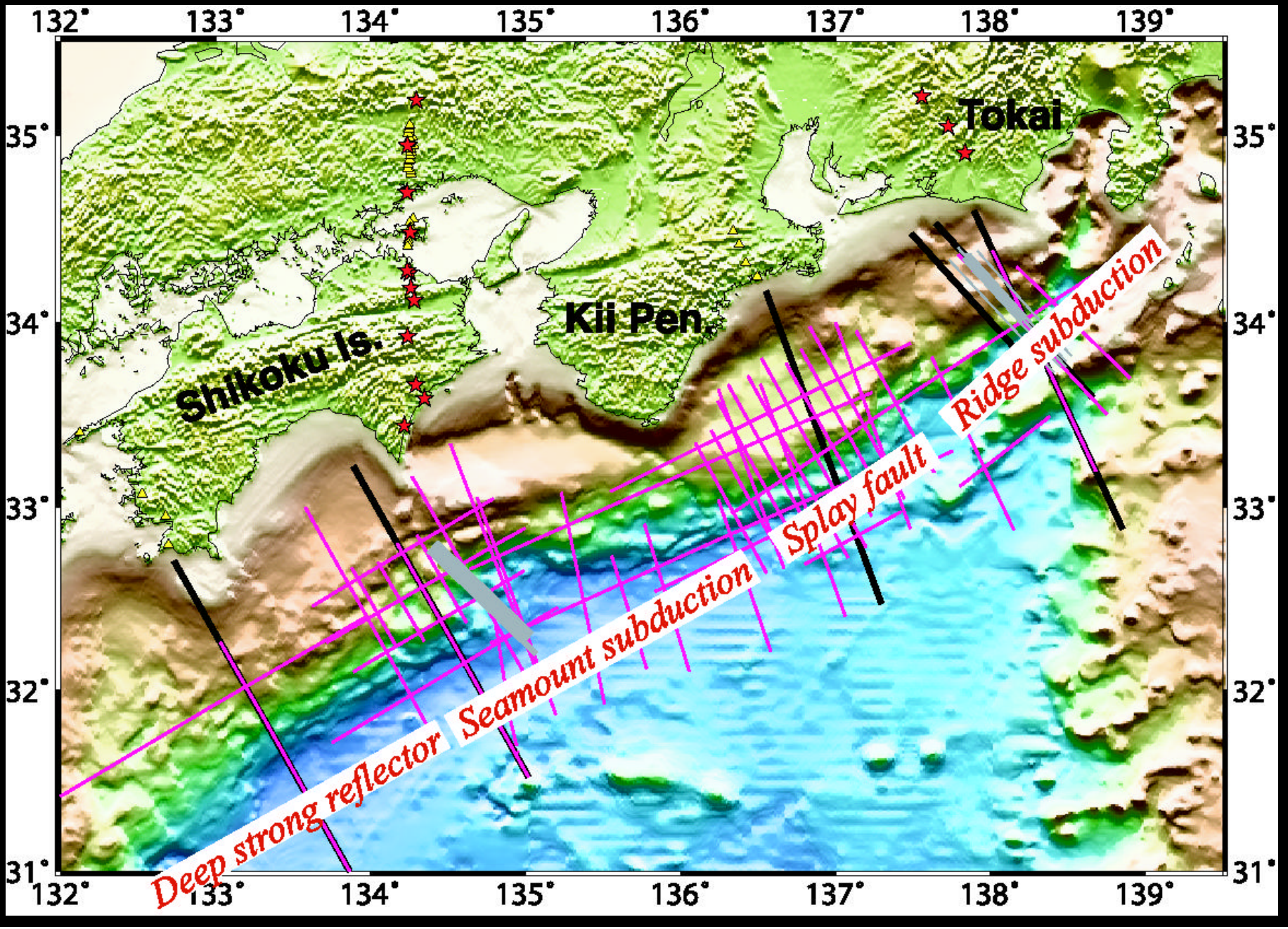
Splay Fault Branching From the Nankai Subduction Megathrust

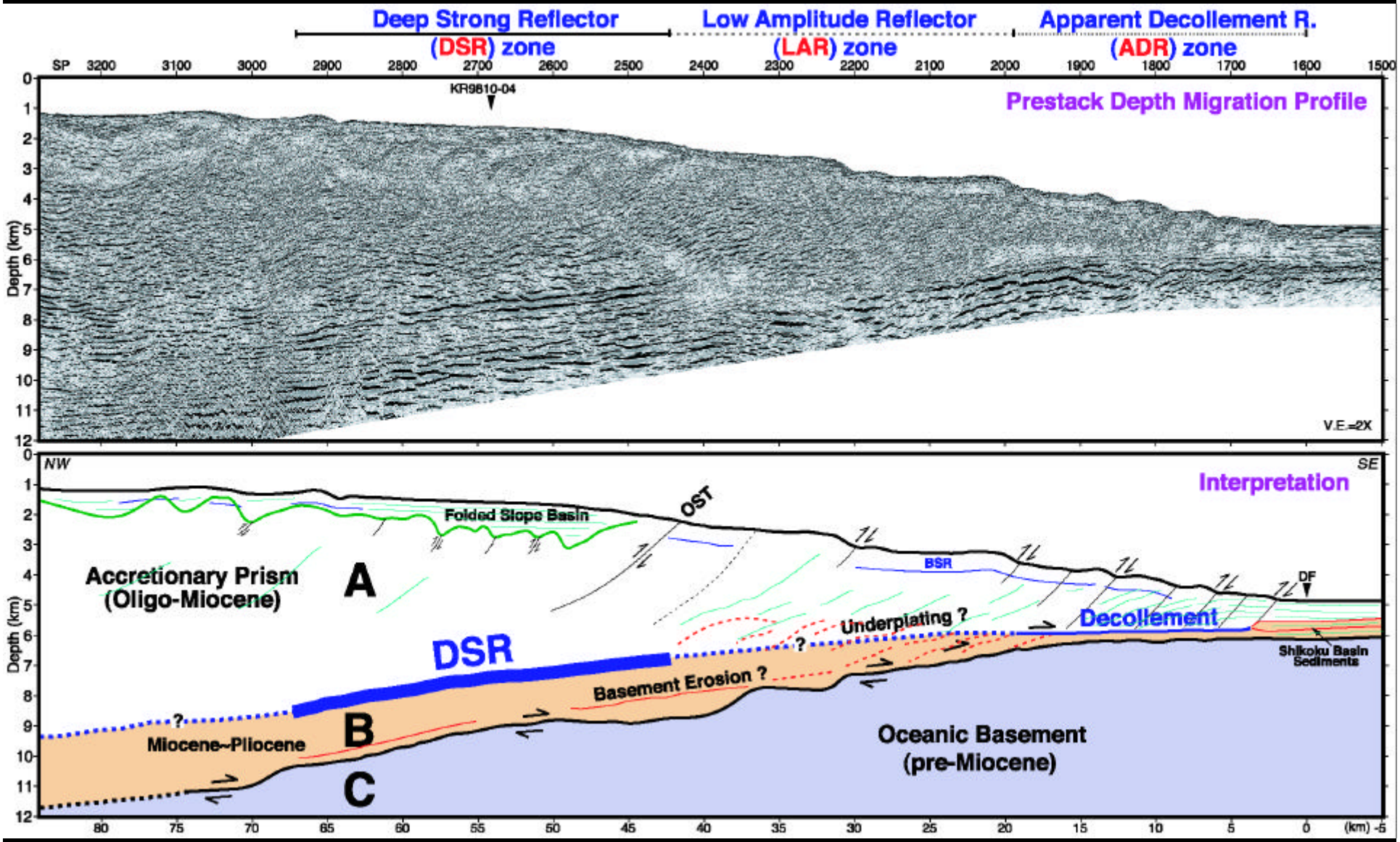
Jin-Oh PARK
(FREE/JAMSTEC)


JAMSTEC Seismic Survey
(since 1996)
MCS line
OBS line
Land explosion
Land station
130°
135°
140°
145°
45°
40°
35°
30°
Japan Trench
Izu-Bonin Trench
Nankai Trough
• MCS
• OBS
• Microseismicity

Structural variation along the Nankai Trough

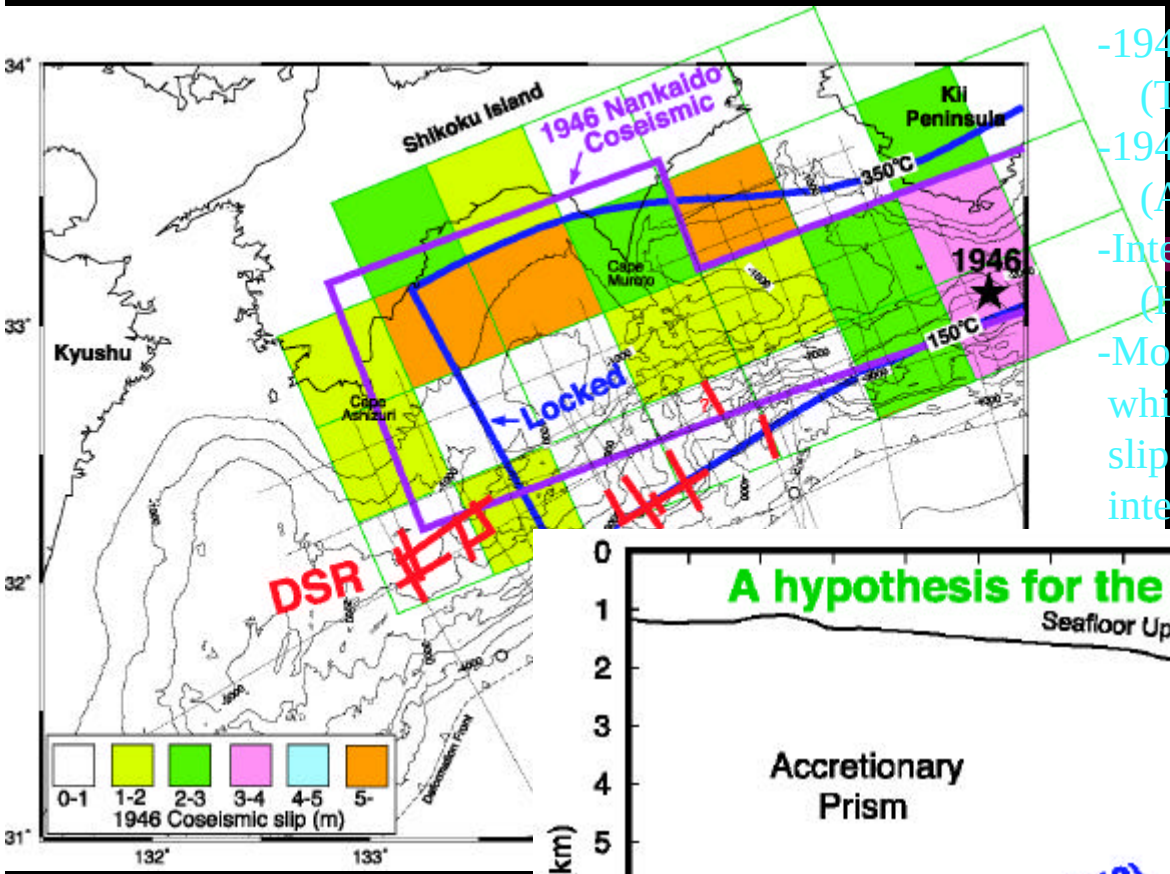


Prestack Depth Migration of Deep Strong Reflector (DSR)

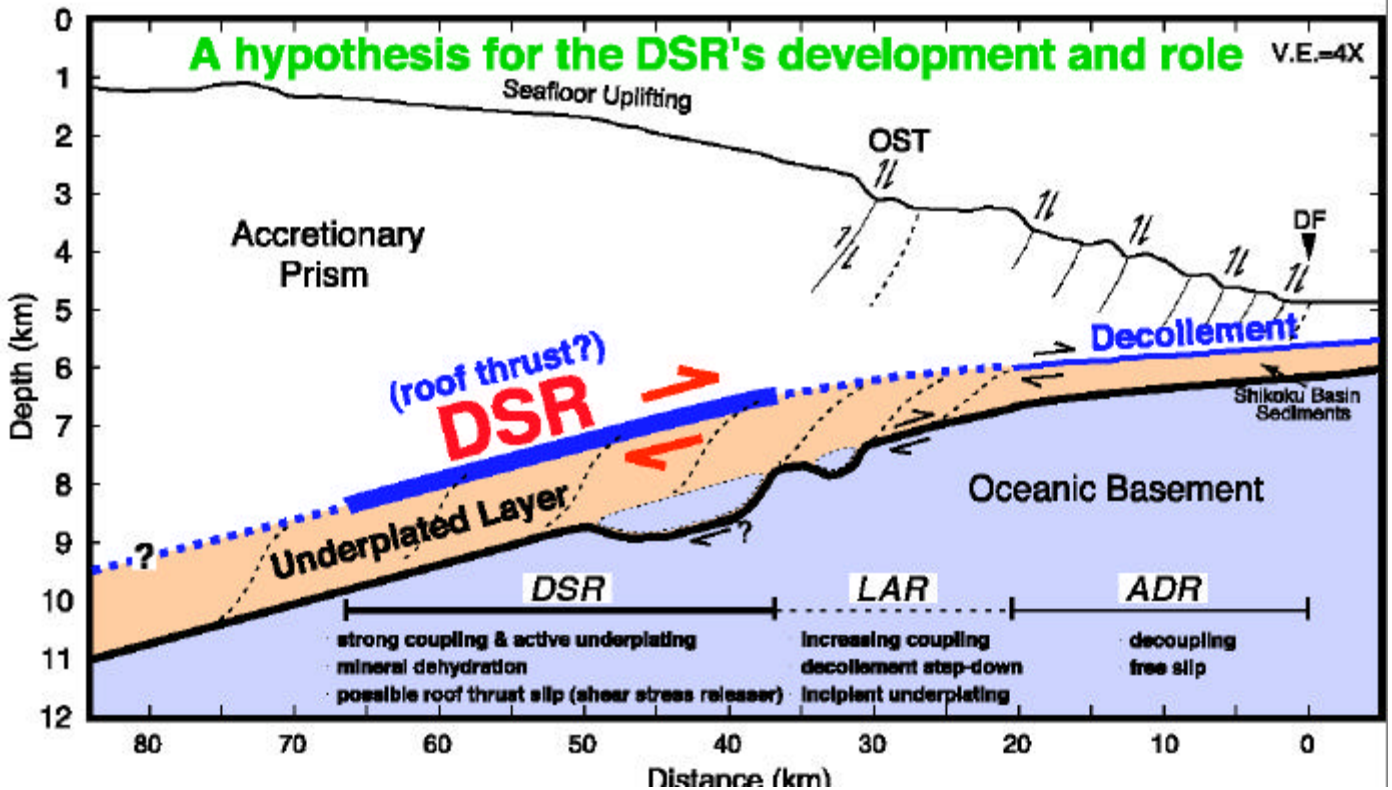


- Decollement step-down and underplating
- Landward, deep strong reflector (DSR) imaged at 6-8 km depth, reversal polarity

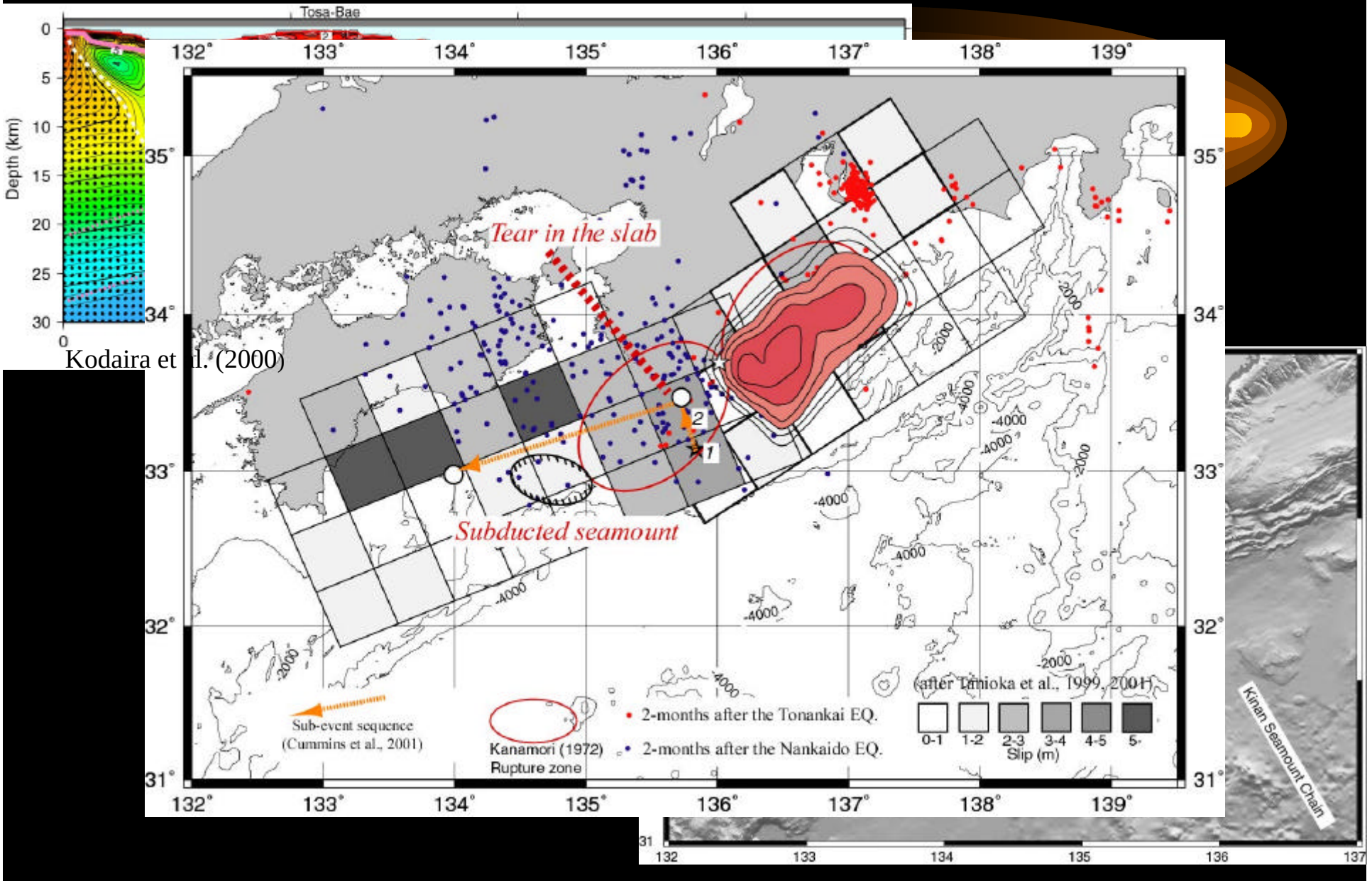
The DSR distribution in the Nankai accretionary wedge



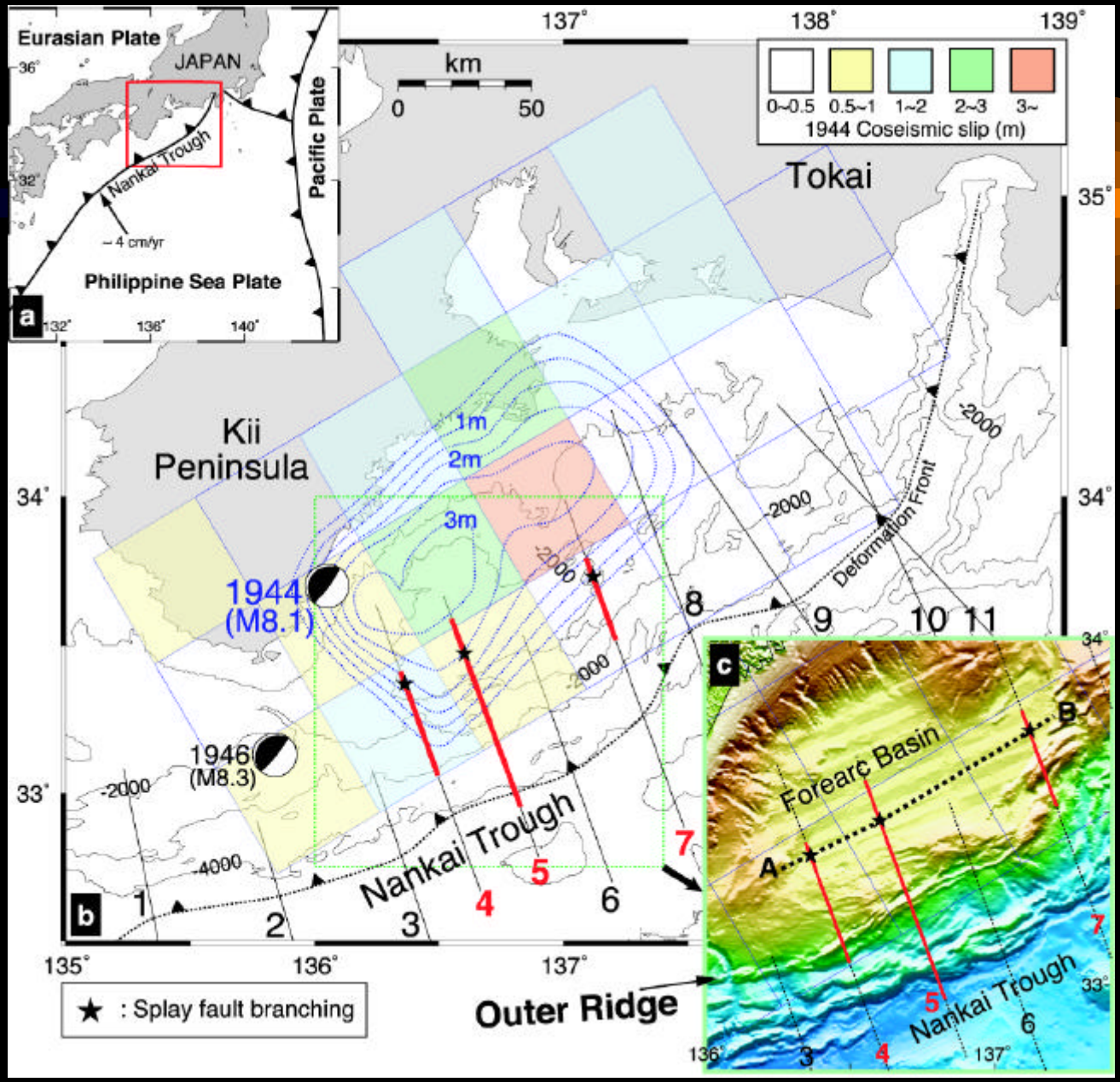
-1946 coseismic slip from tsunami inversion (Tanioka and Satake, 2001)
-1946 coseismic slip from fault modeling (Ando, 1981)
-Interseismic locked zone by thermal modeling (Hyndman et al., 1995)
-Most of the DSR was observed in a region which has not suffered from the 1946 coseismic slip even though it was locked during the interseismic period.



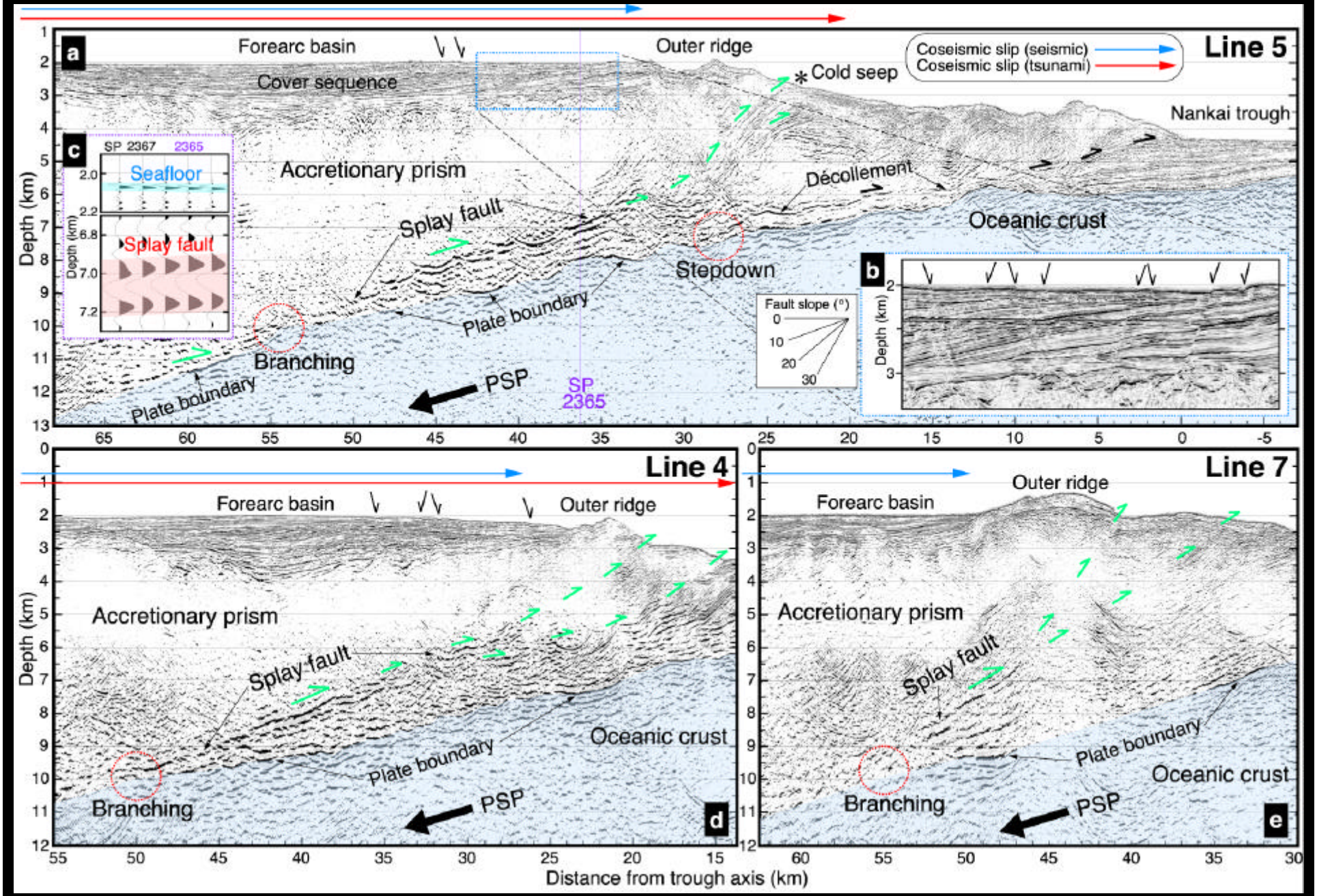
Structural factors in controlling the rupture processes : A subducted seamount as earthquake barrier



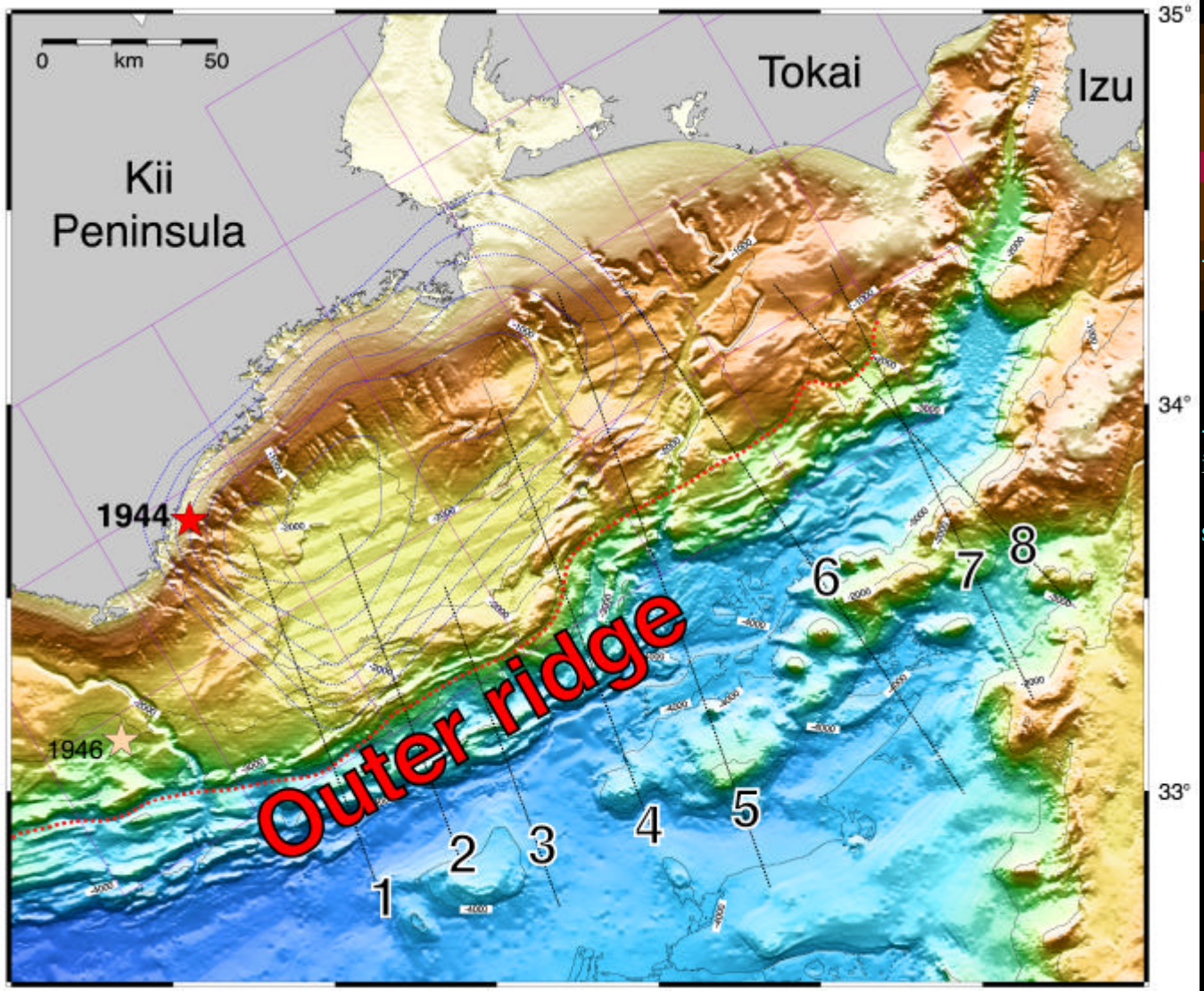
Swath-bathymetry & splay fault branching



MCS depth profiles off Kumano



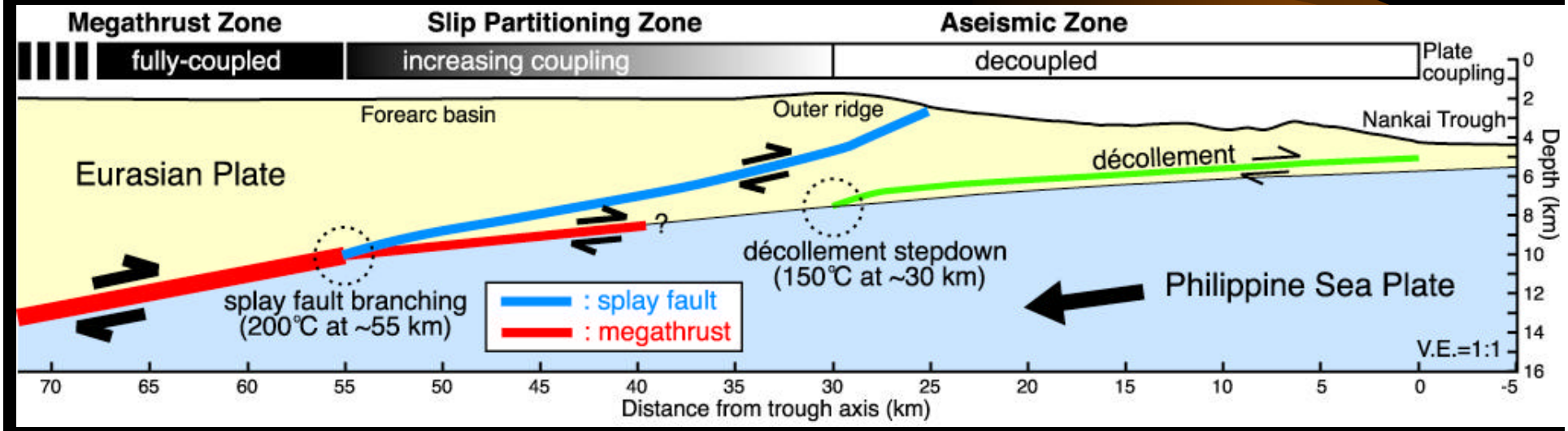
Surface manifestation of splay fault & Outer ridge



- This outer ridge topography suggests repeating slip on the splay fault during the historic earthquake cycles, rather than due to an isolated event.

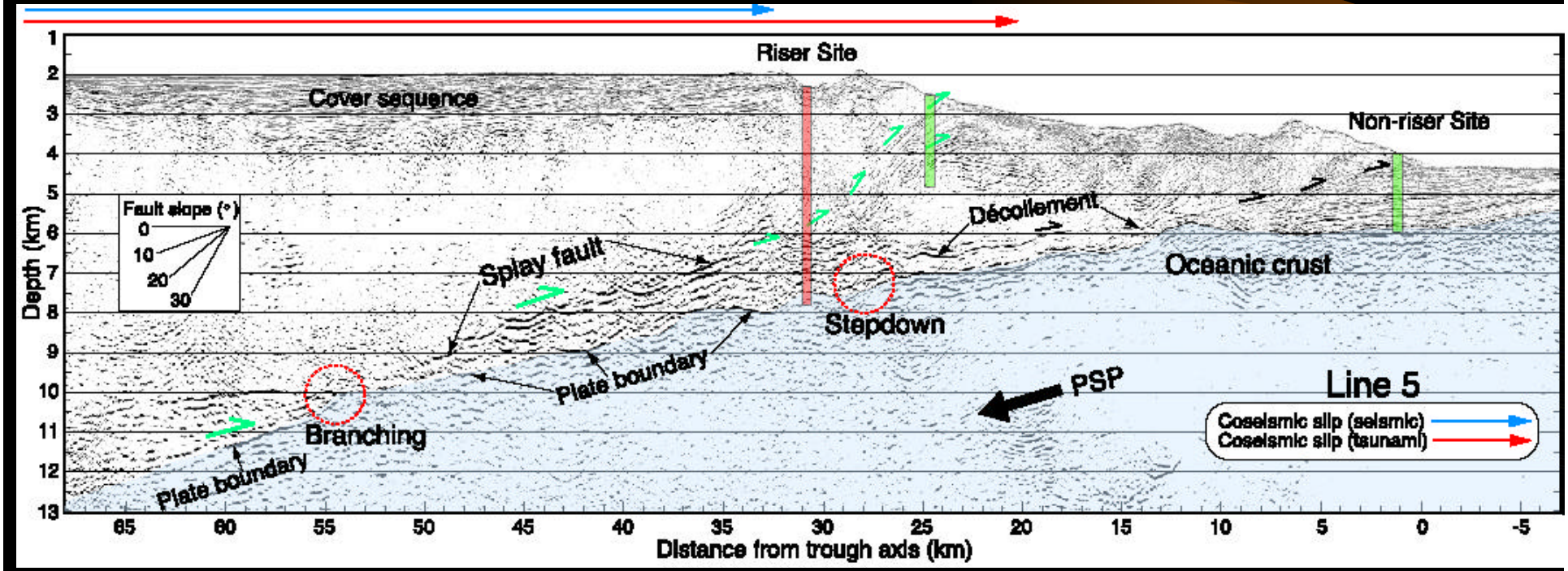
-The splay fault slip may provide an important mechanism to accommodate the permanent elastic strain due to relative plate motion.

Schematic cross section of updip portion of the Nankai seismogenic zone



* 150~200 °C : concordant with geologic evidence

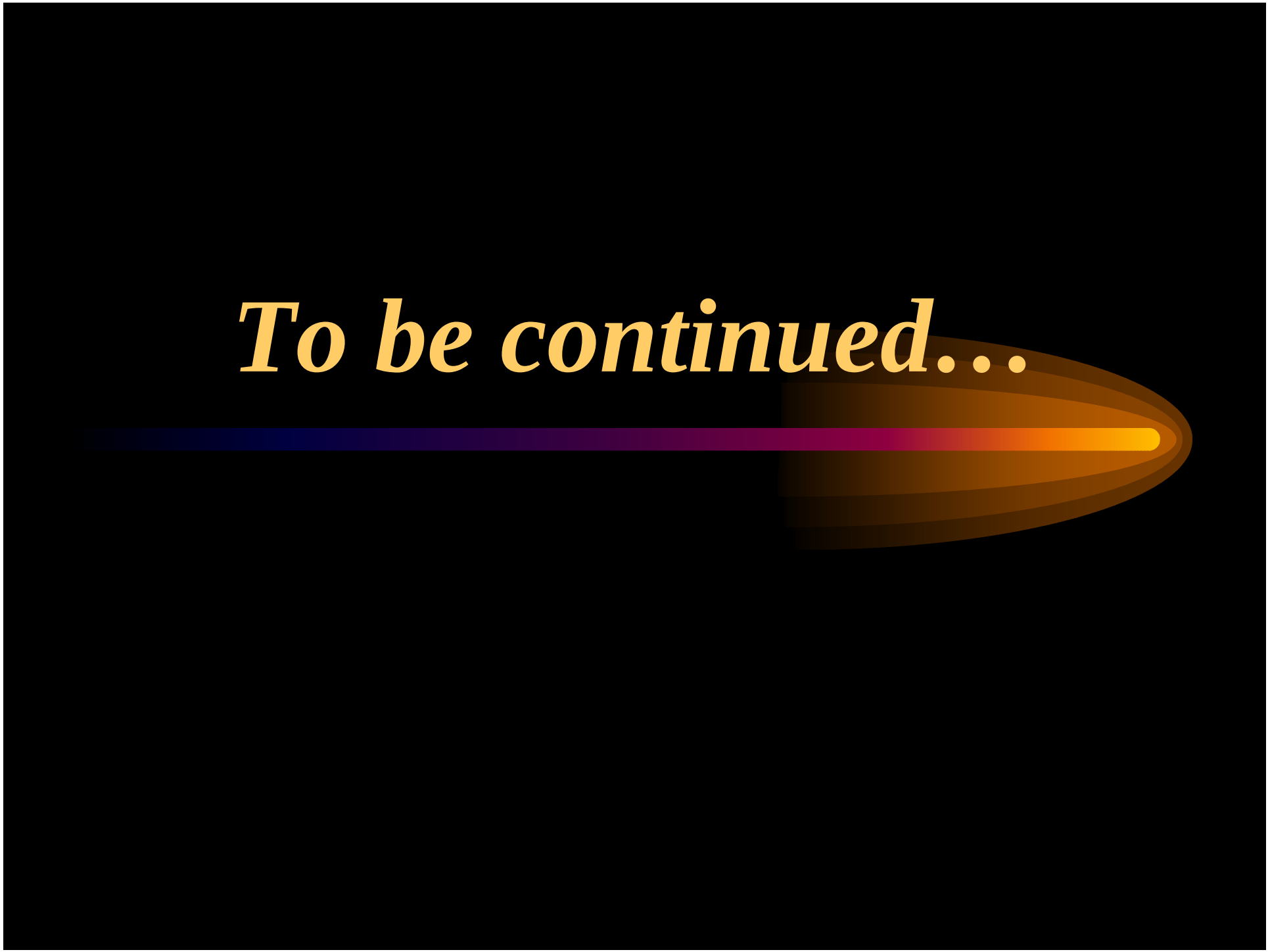
Candidate sites for IODP (Integrated Ocean Drilling Program) Nankai seismogenic zone drilling



The Deep Sea Drilling Vessel "CHIKYU" for IODP Era

Length Overall: 210.0 m
Breadth (mld): 38.0 m
Depth (mld): 16.2 m
Gross Tonnage: Abt.57,500 TON
Max. Complement: 150 persons
Maximum Drill String Length:
12,000 m (10,000 m at 1st stage)
Operation Capability for Water Depth:
-Riser Drilling: 4,000 m (2,500 m at 1st Stage
-Riserless Drilling: 7,000 m

Launching Ceremony of Deep Sea Drilling Vessel CHIKYU
(January 18, 2002)


To be continued…