

Core Analyses Instruments
in the Center for Advanced Marine Core Research,
Kochi University

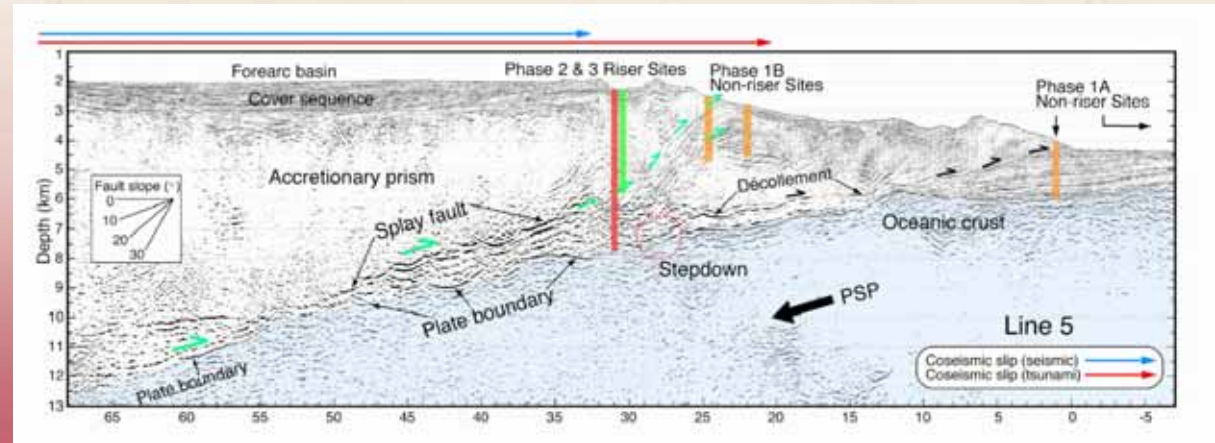
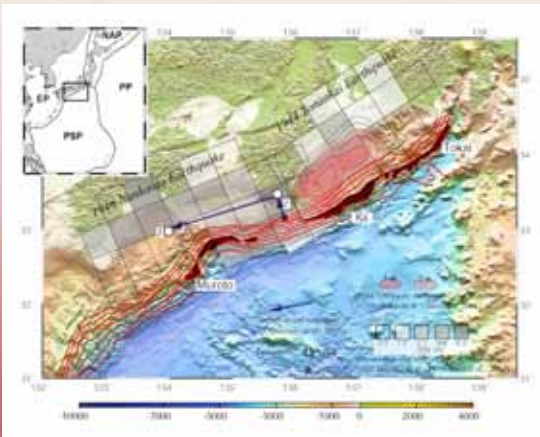
Tetsuro Hirono, Wonn Soh and Weiren Lin
(JAMSTEC, Japan)



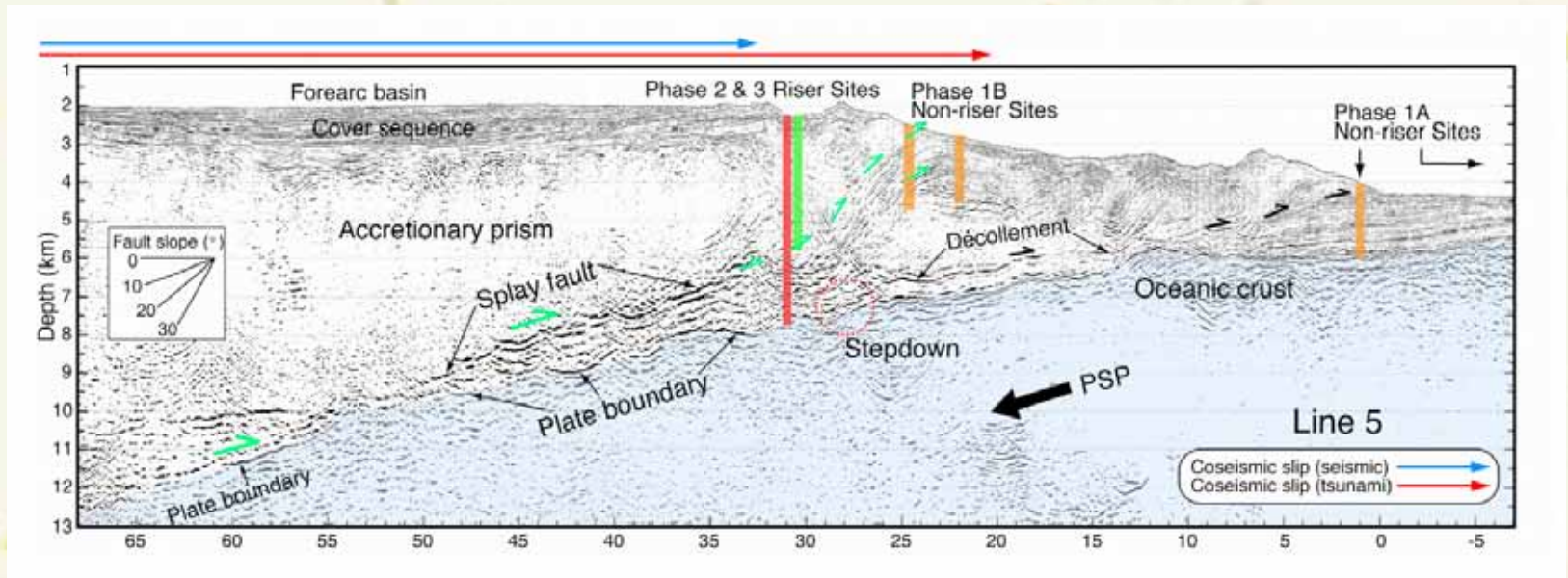
Our Motivations and Interests

Large displacement, high velocity and low level of high-frequency radiation in northern region at the 1999 Chi-Chi, Taiwan earthquake

Analogy with Splay Fault in Nankai Seismogenic Zone, i.e., Tsunami Earthquake



IODP Nankai Seismogenic Zone Drilling



Phase 1: Non-riser drilling of the sediments, oceanic crust, and fluids input to the plate boundary system

Phase 2: Riser and non-riser drillings of splay fault involving sampling and instrumentation

Phase 3: Riser drilling of the basal plate interface at 5.5 to 6 km sub seafloor, to sample and instrument the asperity in the 1944 great earthquake

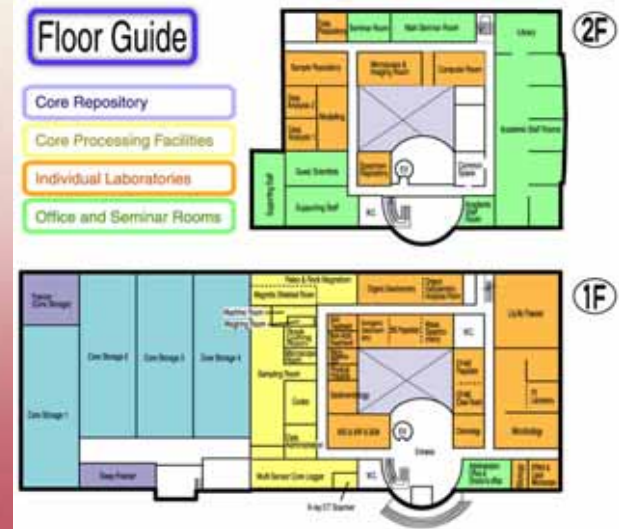
Non-riser drilling will start in 2005 ?
Riser drilling will be in 2008.

IODP Facilities in Japan

Riser drilling vessel "CHIKYU"

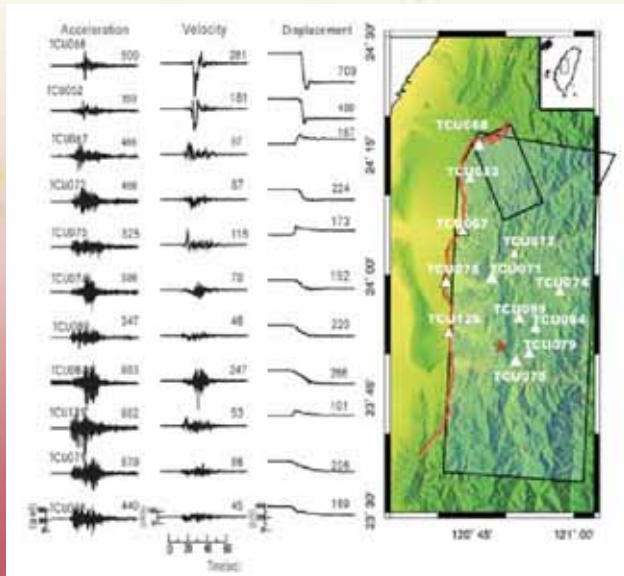


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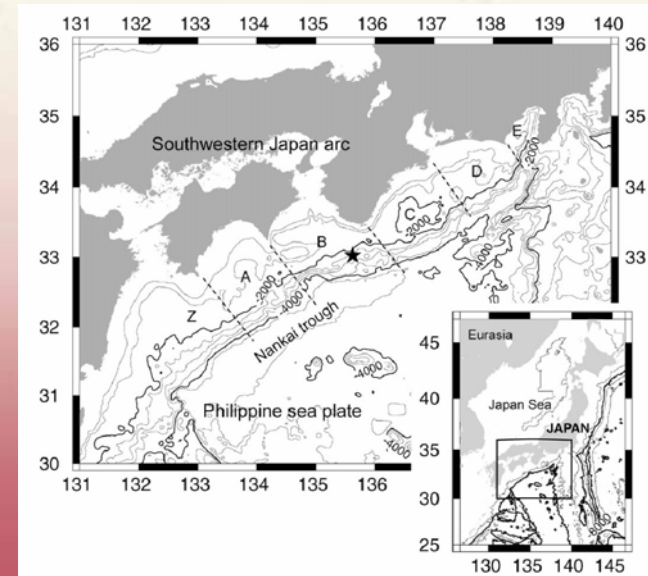


Common Interests between TCDP and NanTroSEISE Drilling

1. To understand “dynamic” mechanism of Tsunami Earthquake
2. What kind of materials play as “asperity” ?
3. Why and How do the materials play as asperity ?
(frictional behaviour, dynamic mechanism and physicochemical process)
4. To know the mechanical and physicochemical state of seismogenic fault zone throughout the seismic cycle



Ma et al. (2003)



Takahashi et al. (2003)

Core Analyses Strategy in the Center for Advanced Marine Core Research, Kochi University

Using core sample (400 m length) from Hole B

TCDP

Hypothesis #1: Fault zone was lubricated while generating large slip and slip velocity.

↳ Low frictional sliding of soft sediments with excess pore fluid pressure



Microstructural analyses of soft-sediment deformation (X-ray CT)

Continuous physical property (porosity, density and so on)

measurement on core scale (MSCL)

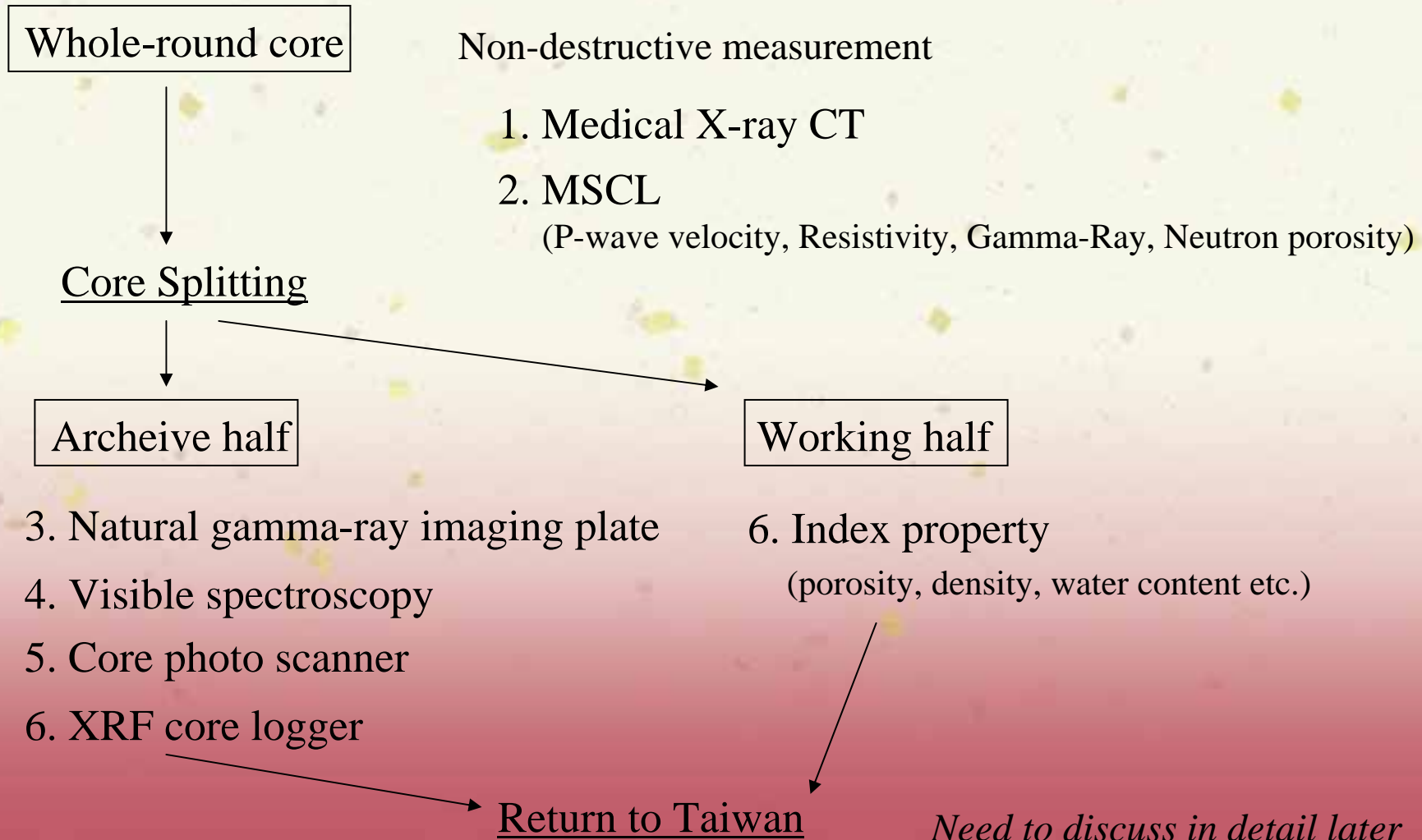
Radioactive imaging analyses of fault zone (natural gamma ray imaging plate)

Hypothesis #2: Weak faults, i.e., slip under conditions of low resolved shear stress.

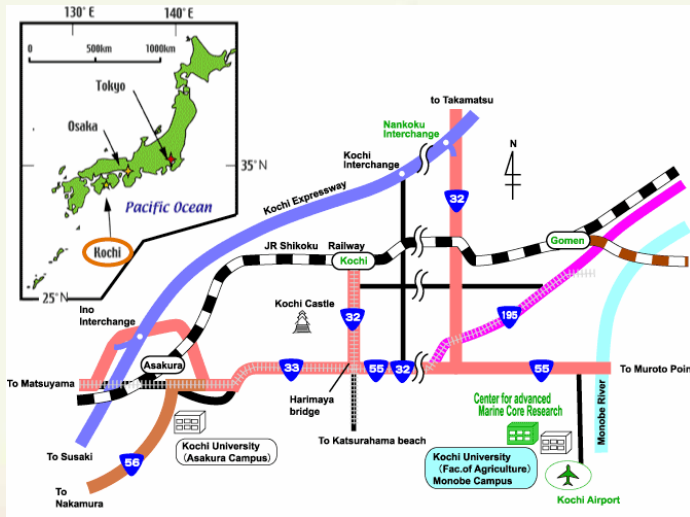


Stress measurement at the drilling site (ASR, DSCA) *presented by Lin*

Core Analyses Flow in Center for Advanced Marine Core Research, Kochi University



Analytical Instruments #1 in Center for Advanced Marine Core Research, Kochi University



core repository



sampling room

Analytical Instruments #2



Medical X-ray CT



MSCL



Visible spectroscopy



XRF core logger

Core Analyses Strategy in Center for Advanced Marine Core Research, Kochi University

Let's discuss this strategy with all at this afternoon

TCDP

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→ Low frictional sliding of soft sediments with excess pore fluid pressure



Microstructural analyses of soft-sediment deformation (X-ray CT)

Continuous physical property measurement on core scale (MSCL)

Radioactive imaging analyses of fault zone (natural gamma ray imaging plate)