

# Chikyu Shallow Core Program (SCORE)

## Proposal Cover Sheet

|               |               |
|---------------|---------------|
| Received date | 28 April 2018 |
| Proposal No.  | 005_R         |
| New / Revised | Revised       |

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### Basic Information

|                          |                                                                                                              |
|--------------------------|--------------------------------------------------------------------------------------------------------------|
| Title:                   | Early evolution of the Kumano forearc basin and its relationship to subduction progress in the Nankai Trough |
| Keywords:<br>(5 or less) | Forearc basin, subduction reinitiation, tectonic hysteresis, earthquake segmentation, Nankai Trough          |
| Area:                    | Kumano forearc basin off the Kii Peninsula                                                                   |

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
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### Scientific Objectives (250 words or less)

The initiation of modern subduction in the Nankai Trough could be middle or late Miocene. However, the initiation age has been still debated. This information is also related to the earthquake rupture behaviors, because the tectonic hysteresis generates heterogeneous structures in the accretionary wedge. The overburden structures above the plate interface could influence upon the rupture segmentation and coupling degree of the plate interface. The dating of the unconformity beneath the northern edge of the Kumano forearc deposits will give a clue to the timing of initiation.

Recent studies suggested that the oldest unconformity between the Kumano forearc basin and basement (accretionary prism) may be dated ~6 Ma based on far-distance correlation of the seismic reflectors in the forearc basin. They further inferred that the age (~6 Ma) is suggestive of the subduction initiation, because the age of oldest forearc sediment is similar to the timing of accretion initiation. This correlation and hypothetical interpretation must be documented by direct dating the old portion of the forearc basin sediment, close to the Kii peninsula. We can determine the age of the sediments by SCORE shallow drilling, because the old portion of the basin sediments is exposed on seafloor as results of uplift and erosion in the proposed sites. The improved correlation between the proposed site and Site C0009 (Exp. 319) could precisely infer the age of the forearc basin sediment. The recovered core is dated by microfossils, Zircon U-Pb dating and correlated to the already dated core at Site C0009.

## Proposed Sites

| Site Name | Position (Lat, Lon)                           | Water Depth (m) | Penetration (m) | Primary or alternate |
|-----------|-----------------------------------------------|-----------------|-----------------|----------------------|
| KB-01     | Lat: 33° 24' 30.24''<br>Lon: 136° 19' 46.04'' | 1990            | 90              | Primary              |
| KB-02     | Lat: 33° 26' 11.45''<br>Lon: 136° 18' 38.19'' | 1890            | 90              | Alternate            |

[Note: Only shallow-penetration coring (about <100 m below seafloor) is available.]

## Non-standard Measurements

None

[Note: Please describe above any non-standard measurements needed to achieve the proposed scientific objectives. Standard measurements are X-ray CT, Multi-sensor core logger, and split surface image.]

## List previous drilling in area

C0009 by IODP #319

## List potential hazards and preferred weather window

Potential hazards: Gas hydrate

## Proponent List

| First Name | Last Name | Affiliation                 | Country | Expertise     |
|------------|-----------|-----------------------------|---------|---------------|
| Takeshi    | Tsuji     | Kyushu University           | Japan   | Geophysics    |
| Gaku       | Kimura    | Tokyo Univ. Marine S<br>& T | Japan   | Tectonics     |
| Asuka      | Yamaguchi | AORI, the Univ. Tokyo       | Japan   | sedimentology |
| Yoshitaka  | Hashimoto | Kochi Univ.                 | Japan   | Geomechanics  |
| Rina       | Fukuchi   | JAMSTEC                     | Japan   | sedimentology |

[Note: For proponents who do not have J-DESC memberships, please picut an asterisk (\*) AFTER his/her last name.]