

Estimation of the past bottom-ocean environment of 2Ma based on the benthic foraminifera stratigraphy: IODP Exp. 344

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IODP Exp.344 (Costa Rica Seismogenesis Project: CRISP 2) is designed to understand the processes that control nucleation and seismic rupture of large earthquakes at erosional subduction zones and drilled five sites off the western coast of Costa Rica around the southern end of the Middle America Trench, where the oceanic Cocos Plate is subsiding beneath the Caribbean Plate.

Site U1414 is the reference site and its 2Ma is characterized by lower slope assemblages and also there is not any big change of assemblages. However, a lot of *Chilostomella oolina* are in the upper samples. This means sea bottom environment is a little change from at least 0.12Ma to recent.

The assemblages of Site U1412 are very similar to U1414. The differences are two biozones; one has a lot of *Cibicidoides mackinnai*, and the other has *Brizalina bicostata*. These species are originally on upper shelf, and that means these zones are allocated layers.

Main objective of this study in the Site U1413 is to understand the tectonic-induced submergence/ uplifting history or paleoslope instabilities in the upper slope area. Benthic foraminifera (BF) are a useful tool to estimate the past bottom-ocean environment. Based on benthic foraminiferal biostratigraphy of U1413, we have recognized the following four biozones for the sequence of past 2 million years and identified plausible slump mass came from the shallower-water environment

The BF divided into Group A (Zone I) is distributed on the lower continental slope in the modern equatorial Pacific. (Smith, 1963, 1964). Group B in Zone II is reported mainly from the lower to middle slope environment of the Pacific. Group C in Zone III is estimated to be distributed in the upper slope. Group D in Zone IV lives in the upper to middle slope as well as the drill site.

On the other hand, some shelf species such as *Brizalina bicostata*, *Cibicorbis inflatus* and *Uvigerina incilis* (Group E) occur throughout the sequence of the hole. Those species are, however, considered to be reworked specimens from shallower environment, because they co-occurred with deeper water species as Groups A to D, and because a similar occurrence has been reported in the Peru-Chile Trench area by Ingle and Kolpack (1980).

In Zone III, another species group composed of *Brizalina* spp., (Group C), which is distributed mainly in the upper slope areas in the modern oceans. Because Group C is not accompanied by Group D or other deeper-water species, the interval of Cores 17H-11H in Hole A apparently correspond to the upper continental slope, at least shallower than the depth of Group D. Also, the tests of *Brizalina* spp. are well-preserved in contrast to the co-occurred Group E. These results imply that Zone III is allocated Mass transported sediments, like a slump. This interpretation has been also supported by geochemical and logging data. The slump mass has been inferred at the interval between 45-150 mbsf based on the irregular profiles for organic matters and a fold structure plausibly formed by slumping. The slump mass might reflect the active subsidence due to tectonic erosion or passage of subducting seamount at the plate interface.

Keywords: benthic foraminifera, paleobathymetry, Subduction zone