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A Study on Benthic Foraminifera Assemblages in the Upper Slope off Southwest Taiwan

Jen-Chu Yeh (1), Andrew T. Lin (1), and Chih-Wei Chien (2)

(1) Department of Earth Sciences, National Central University, Taoyuan, Taiwan (trombone79923@gmail.com), (2) Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan (blattus@gmail.com)

This study attempts to establish the spatial distribution of benthic foraminifera in the upper accretionary wedge off SW Taiwan. A few box cores (each core up to 49 cm thick) are retrieved onboard R/V Ocean Researcher I during 1092 cruise in 2014 at water depths ranging from 1,135 to 1,586 m lying in between the Good Weather Ridge and the Yuan-An Ridge.

Analyses on grain size reveal that the sediment size ranges from clay to silt for all sites with the exception of YT1 site, where a small percentage of fine sand (< 20%) is found to distribute evenly in a 32 cm-thick box core. Core images from X-radiographs show some layers of foraminifera ooze and rare traces of bioturbation. Age of sedimentation is obtained by using 210Pb dating method. The 210Pb concentration profile decays exponentially down core, indicating sedimentation from suspension. The measured sedimentation rate ranges from 0.47 to 2.4 mm/yr. Site YT1 has the lowest sedimentation rate (around 0.47 mm/yr), leading to high abundance of individual benthic foraminiferal species.

Living foraminiferal individuals were distinguished from dead assemblages by Rose Bengal staining method during the cruise. Our results show that the dominant living species of all studied cores is Chilostomella oolina, with subsidiary occurrences of Bulimina aculeata, Bolivinita quadrilateral, and Lenticulina spp. etc. Cluster analysis suggests that the forams have similar spatial distribution pattern at all studied sites, indicating uniform and stable hemipelagic sedimentation.

Analyses of dead assemblages reveal a remarkable decrease in the abundance of Bulimina and Uvigerina for the last 100 years at YT-2 site, with increasing abundance of Chilostomella. This indicates that the water masses may have turned from suboxic to dysoxic conditions since c. 100 year ago. This is the first study to report the living benthic foraminifera distribution in water depths up to c. 1,600 m off SW Taiwan, providing a basis for future studies.

Keywords: benthic foraminifera, upper slope, Taiwan