

Sedimentary mechanisms for the late Miocene deep-sea nannofossil oozes from the South China Sea

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There are many carbonate layers within the upper Miocene and Pliocene cores at IODP Site U1433, located on the southwest subbasin (SWSB) of the South China Sea (SCS) at a water depth of 4379m. In our study of the calcium carbonate content and calcareous nannofossil assemblages of the late Miocene samples from the core, we were able to provide additional evidence for a turbidity current genesis of the carbonate layers that was suggested by the on-board scientists. The carbonates were deposited by a rapid transportation process that resulted in the sorting of various carbonate particles in the individual layers. The clay sediments were useful for biostratigraphy and paleo-environment studies.

We also revised the calcareous nannofossil biostratigraphy using the clay samples and constructed an age model for the late Miocene from about 10 to 5.3Ma. The results show that the components of the carbonate turbidites changed during the late Miocene, which probably reflects a change in the source area. We suggest that the source sediments of the carbonate turbidites were periplatform ooze mixed with neritic and pelagic carbonate particles. Changing water conditions and climate can cause alternation of periplatform

ooze components because neritic and pelagic productivity have inverse responses. This situation is confirmed by our study of nannofossil assemblages in the clays. We suggest that the upper water conditions of the SWSB and southern SCS were similar during the late Miocene and changed from strongly stratified conditions to well mixed conditions and thus to increased pelagic productivity. Furthermore, subsidence can decrease the size of the platform and decrease the neritic production. Consequently, we suggest that the upper Miocene carbonate layers were transported by turbidity currents from a slope area whose sediments were a mixture of neritic and pelagic components.

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