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Late Quaternary Coccolith Records in the South China Sea and East Asian monsoon dynamics

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Coccolithophorid assemblages over the past 260 ka were analyzed in three IMAGES cores (MD05-2901, MD05-2904 and MD05-2897) from the western, northern and southern South China Sea (SCS), respectively. Past changes in nutricline depth and primary productivity fluctuations were reconstructed using the abundance of the coccolithophore Florisphaera profunda. The nutricline in the SCS showed relatively strong temporal and spatial variability. Similar with tropical Indo-Pacific, the nutricline in the SCS deepened during glacial periods but shoaled during interglacial periods. The relative abundance of F. profunda show significant Milankovitch spectrum peaks at the three sites, and is out of phase with the global common feature at the precessional bands. Through Empirical Orthogonal Function (EOF) analyses on F. profunda records of the SCS and the Sulu Sea, two significant EOF modes are isolated. EOF-1 reflected glacial-interglacial variations which might be a response to the dynamics of the East Asian winter monsoon. EOF-2 shows both strong $\sim$20 kyr precession and $\sim$40 kyr obliquity cycles. We suggested that the East Asian Monsoon dominates the nutricline and primary production variations in the SCS. In the western SCS, the upwelling dynamics might be influenced by both of the winter and summer monsoons.