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High-resolution paleoenvironmental and paleoclimatic record of core MD06-3040 from East China Sea

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The river-dominated ocean margins play a significant role in global environment system. One of the best examples is the epicontinental shelf of the East China Sea, which receives a large amount of terrigenous material from two of the largest rivers in the world, the Yangtze River and Yellow River. An elongated subaqueous mud wedge extends from Yangtze River estuary southward off the Zhejiang and Fujian coasts [1]. It is referred to as the "mud belt deposit on the inner shelf of the East China Sea". Most of the sediments in the mud wedge come from the Yangtze River. The southward flowing East China Sea Coastal Current, the northward flowing Taiwan Warm Current, and the Kuroshio Current have played crucial roles in transporting and trapping most of the4 Yangtze-derived material in the inner shelf, and that preventing the sediments escape into the deep-sea.

IMAGES XIV 2006 Marco Polo II cruise recovered a high quality calypso core (MD06-3040, 27.43.3663'N, 121.46.8822'E, water depth 47m, core length 19.36m) from the mud wedge. Based on high resolution AMS14C dating, the core spans the time period from 10.6 ka to present. The grain-size compositions sensitive to the sea-level change and sedimentary environment were taken by the analysis of standard deviation and end-member modeling. The changes in fine population grain size (<12μm), EM3/(EM1+EM3) (contribution of clay to fine silt fraction relative to coarse silt fraction) and Fe/Ti ratio in the MD06-3040 core show good correlation with δ18O records of stalagmites from Dongge and Hengshan Cave in south China, which is a measure of summer monsoon intensity[2][3]with larger fine population grain size, lower Fe/Ti ratio, and smaller EM3 (clay to fine silt fraction) contribution and larger EM1(coarse silt fraction) contribution. This suggest that EM3 relative to EM1 decreases, representing less fine Fe-rich minerals and detrital materials supplied from Yangtze River be transported to ECS shelf during dry summer periods.

The East Asian Summer Monsoon and paleoclimate changes during the Holocene are discussed with high resolution. Increases in fine population grain size, EM3/(EM1+EM3) and Fe/Ti ratio coincide with weaker summer discharge events of Yangtze River detected at 9.3, 8.3, 7.3, 6.0, 4.8, 3.3, 2.3, 0.7, and 0.4 ka, which also agree well with weaker EASM precipitation events recorded in stalagmites and in northern East China Sea [2][3][4]. This indicates that the supply of the detrital materials to the inner shelf (MD06-3040) is strongly affected by summer monsoon intensity, and grain size and chemical composition of MD06-3040 core have a high potential to record EASM intensity changes during Holocene with high resolution. The further analyses of core sediments indicate that the Zhejiang-Fujian Coastal Current has formed and kept stable since about 7 ka BP.

References

[1] J.P. Liu e tal, 2007. Flux and fate of Yangtze River sediment delivered to the East China Sea. Geomorphology 85, 208–224.

[2] Carolyn A. Dykoski e tal, 2005. A high-resolution, absolute-dated Holocene and deglacial Asian monsoon record from Dongge Cave, China. Earth and Planetary Science Letters 233, 71– 86.

[3] C.Y.Hu e tal, 2008.Quantification of Holocene Asian monsoon rainfall from spatially separated cave records, Earth Planet.Sci. Lett., 266, 221–232. doi:10.1016/j.epsl.2008.10.015.

[4] Yoshimi Kubota e tal, 2010. Variations of East Asian summer monsoon since the last deglaciation based on Mg/Ca and oxygen isotope of planktic foraminifera in the northern East China Sea. Paleoceanography. 25,4205-4220. doi:10.1029/2009PA001891