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Holocene paleomagnetic secular variation of the East Asia and its chronological applications

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Paleomagnetic secular variation (PSV) bear great information on the geodynamo field of the Earth's interior and can be used for stratigraphic correlation on a regional scale. In this study, we constructed PSV curve of rapidly deposited Holocene marine sequence (Core MD06-3040) from the mud sediments on the East China Sea (ECS) inner continental shelf, and then a composite PSV curve of East Asia was established. Results show that the dominant magnetic carriers are pseudo single domain to multidomain magnetites, with some contributions from hematite and iron sulfide. Paleomagnetic information could still be retrieved after diagenetic alteration. The Characteristic Remanent magnetization is well defined by a single magnetization component and Maximum Angular Deviations values lower than 5°, which allows a reliable paleomagnetic results to be obtained.

PSV after principal component analysis of the core MD06-3040 exhibits seven inclination peaks, and four declination swings, respectively during the last 7500 years. Within dating errors, the PSV curves from the ECS are comparable to that obtained from lakes in Japan and south China, and also to that of historical data in Japan and archeological data in China. In our study, a PSV stack from East Asia was obtained from these sedimentary PSV records after revision of the ages by PSV comparison. This new PSV stack has great potentials for site correlations and relative dating for sediments in East Asia.

Age models for all the sediment cores are base on radiocarbon dating. In East Asia, 14C ages of Biwa Lake are consistent with various chronological data from other regions in Japan. However, there is no precise reservoir age of the East China Sea continental shelf, which would result in some dating errors. During the PSV comparison, age adjustment for core MD06-3040 is about 100-350 years, which is possible the effects from old carbon over this region. In this case, the potential the reservoir age should be calculated, as (100-350) $\pm$ (50-100) years. The new age model for core MD06-3040 is also confirmed by a strong correlation of paleoclimate records between magnetic susceptibility and stalagmite from upper Yangtze River. This correlation shows the links between mainland and the open sea (source and sink of sediments), which could be helpful for further paleoclimate studies.