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Late Quaternary environmental changes inferred from n-alkane evidence in coastal area of southern Hainan Island, China

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The studied core was a coastal core in Hainan Island, China. It is in length of 49.01m and divided into four Units (MIS 1∼MIS 6) according to lithology description. The Optically Stimulated Luminescence (OSL) attributes the sediments from Unit 3 to the Oxygen Isotope Stage of MIS 5e (Unit 3b and 3c) and 5d (Unit 3a). To interpret the origination of organic carbons and to reconstruct paleovegetation changes, n-alkane, δ13C and TOC have been used in the present research.

The result of n-alkanes distribution indicates a series of changes of sedimentary environment and terrestrial input. The shallow water facies at Unit 2, 3a and 4 is mainly characterized by short carbon chain n-alkanes and relatively low concentration. Contrasting with that of deep-water marine facies of MIS 5e (Unit 3b), the n-alkane pattern is typical bimodal and the main peaks are both in short and long carbon chains. During Unit 3b-1 (MIS 5e), more terrestrial original n-alkanes contribute to the concentration of TOC than oceanic. Organic matter source is mainly terrestrial origination. Total organic matter input mechanism of TLG-01 correlates with sediment grain size (average grain size). Total organic carbon input is enhanced with the increasing of fine grain size component.

The variation of CPI (25-33) value in this study correlates with hydrological energy. The highest CPI (25-33) value is shown in the high sea level period of MIS 5e, comparing with that in MIS 5d and MIS 1. High CPI value corresponds to high TOC and average grain size (Φ) value. In the weak hydrological energy sedimentary environment, more terrestrial organic matter, together with TOC, deposit in the study area. ACL (25-33) index display higher values in the interglacial period (MIS 5 and MIS 1) than MIS 3 (sediments weathered during MIS 2) and MIS 6. Paq proxy, together with δ13C, estimates the mangrove growing depth in MIS 5e. The correlation between δ13C and each carbon chain alkane state stabilize and turbulence of sedimentary environment in MIS 5e. Sediments deposit in stable weak hydrological energy environment show order and grouped alkanes distribution (Unit 3b-2). High and positive correlation coefficients of δ13C and each carbon chain alkane show the dominant alkanes contributed to organic carbon (δ13C).