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Citation	The 1st DIPPI-C Workshop, Durham, UK., 8-10 May 2012. In Abstract Bok of the 1st DIPPI-C Workshop, 2012, p. 32
Issued Date	2012
URL	http://hdl.handle.net/10722/149318
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An examination of the molecular distribution of a tropical lake sediment sequence to assess organic carbon records of climate and environmental changes

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The bulk organic carbon isotope ($\delta^{13}\text{C}$), as the conventional indicator of the C_3 and C_4 vegetation change, turns relatively contentious in the application of palaeoclimate reconstruction from the lacustrine sediments due to the similar $\delta^{13}\text{C}$ value between C_3 and aquatic plants, particularly in the eutrophic lakes. A long successive lacustrine sequence from Tianyang Maar Lake, locating in the tropical region of South China, has complex organic matter (OM) sources due to relatively high inputs from the aquatic macrophytes and diatoms. We examined the n-alkanes concentration of 80 selected samples from the Tianyangcore, as an additional index to assess the paleovegetation and lake-level changes. The n-alkanes results show some distributional patterns of compounds with carbon numbers ranging from C_{15} to C_{39} . These patterns indicate differences in OM sources and relative contributions from higher and lower plants, improving the interpretation of $\delta^{13}\text{C}$ records of changes in climate and depositional conditions. Meanwhile, more details of the aquatic macrophyte and diatom inputs revealed by the n-alkanes based proxies (TAR, Paq) replenish the evidence of the lake-level changes during the evolution history of Tianyang Lake.

Keywords: Asian monsoon, $\delta^{13}\text{C}$, n-alkanes, TAR, Paq, lake-level