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Records of climate change from sediments in Vietnamese maar lakes

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Many maar lakes formed throughout the Pleistocene (ages 2.4-0.2 Ma) in the Pleiku volcanic field of the Central Highlands of Vietnam and their sediment archives can provide critical evidence of environmental and climatic change affecting this region. Our biogeochemical studies focus on the sedimentary record of Lake Biển H`ôseeking to decipher and evaluate evidence for both recent variations in phytoplankton communities and post-glacial trends in terrestrial vegetation. Biomarker compositions of a 23 cm short core revealed many similarities to other maar lakes and tropical lacustrine settings, including series of *n*-alkenes, mono- and bicyclic tri-, tetra-, and pentaunsaturated botryococcenes, and des-A-triterpenes. The depth profile of hydrocarbon biomarkers in the short core reflect a lake setting sensitive to environmental change that is characterized by: (i) anoxia during deposition of its lower sections combined with inputs from terrestrial plant waxes, (ii) a succession of phytoplankton populations likely responding to variations in nutrient supply, including *Botryococcus* algae in mid-sections of the core, and (iii) enhanced contributions from emergent macrophytes in the upper core sections. Subsequent recovery of a ~15 m sediment core from Lake Biển H`ôaffords a 34 kyr record of its environmental history based on ^{14}C dating. Magnetic susceptibility variations reflect a weathering signal of allochthonous material and are consistent with other records from the region in suggesting that an arid and stable glacial period subsequently experienced increased moisture and variability in precipitation at the onset of northern hemisphere deglaciation and associated sea-level rise (~19 kyr) following the Last Glacial Maximum (LGM). $\delta^{13}C_{org}$ data for the sediments reveal a dominance of C_3 plants throughout the sequence, whereas their temporal trend shows a progressive shift to more negative values (-26 ‰ to -31 ‰) between the LGM and the Pleistocene/Holocene boundary. These results suggest a vegetation change that parallels the timing of deglaciation and is likely related to both increasing temperatures and abrupt sea-level rise associated with ice-sheet melting. Preliminary biomarker analyses also reveal differences in *n*-alkane distributions that appear to reflect temporal changes in terrestrial vegetation occurring independently of the transition in $\delta^{13}C_{org}$ values.