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Changes in C_3/C_4 vegetation in the continental interior of the Central Himalayas associated with monsoonal paleoclimatic changes during the last 600 kyr

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Abstract. A continuous lacustrine sediment core obtained from the Kathmandu Valley in the Central Himalayas revealed that cyclical changes in C_3/C_4 vegetation corresponded to global glacial-interglacial cycles from marine isotope stages (MIS) 15 to MIS 4. The C_3/C_4 vegetation shifts were reconstructed from significant changes in the $\delta^{13}C$ values of bulk organic carbon. Glacial ages were characterized by significant ^{13}C enrichment, due to the expansion of C_4 plants, attributed to an intensification of aridity. Thus, the southwest (SW) summer monsoon, which brings the majority of rainfall to the Central Himalayan southern slopes, would have been weaker. Marine sediment cores from the Indian Ocean and Arabian Sea have demonstrated a weaker SW monsoon during glacial periods, and our results confirm that arid conditions and a weak SW monsoon prevailed in the continental interior of the Central Himalayas during glacial ages. This study provides the first continuous record for the continental interior of paleoenvironmental changes directly influenced by the Indian monsoon.

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