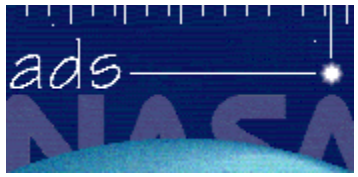

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Using Carbon and Nitrogen Isotopes in Lake Sediments to Detect Land Use Change

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Stable isotopes in lakes sediments are often used to reconstruct past environmental conditions. Carbon and nitrogen isotopes can provide information about both internal processes and terrestrial inputs to a lake. As such, they offer a powerful approach to detecting human impacts on aquatic systems. We investigated the potential of stable isotopes to trace anthropogenic land use changes by comparing stable isotopic composition of sedimentary organic matter at several river deltas in Lake Tanganyika, East Africa. Lake Tanganyika is a large rift valley lake draining watersheds that differ greatly in size, with land use patterns that vary from low-impact, protected areas (such as Gombe Steam National Park) to deforested and intensely cultivated regions. We found that carbon isotopes were related to both watershed disturbance and size, while nitrogen isotopes were related only to watershed disturbance. The direct relationship between ^{13}C and C:N ratios across all watersheds suggests that differences in $\delta\ ^{13}C$ may be attributed to terrestrial inputs rather than internal changes in the lake, such as increased productivity. Stable isotope analyses of cores taken at two sites were consistent with patterns seen in surface sediments. Our results suggest that nitrogen isotopes may be a better indicator of land use than carbon isotopes and that watershed size can be a confounding factor in the interpretation of geochemical signals in lake sediments.

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