Tropical climate response to the ocean circulation disruption 8200 yr ago from lipid δ^2H in Palau & Galápagos lake sediments

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The Earth's climate system has shown the ability to experience dramatic reorganization on decadal timescales. The most recent such event occurred ca. 8200 years ago, during the otherwise-stable climate of the Holocene. An outburst of glacial meltwater into the Labrador Sea disrupted the Atlantic Ocean's meridional overturning circulation (AMOC), plunging the North Atlantic region into cold conditions for more than a century, and, through less-certain means, impacting climate globally. Climate models produce a southward shift of the tropical rain bands in response to such a meltwater pulse. The veracity of this response is largely untested, however, owing to a lack of paleoclimate data from non-monsoon and oceanic regions where the Intertropical Convergence Zone (ITCZ) is well defined. We will present hydrogen isotope analyses of the microalgal lipid dinosterol (δ^2H_{dino}) from lake sediments on the Pacific islands of Palau (7°N, 134°E) and the Galápagos (1°S, 89°W), near and on the northern and southern edges of the ITCZ, respectively. δ^2H_{dino} values in Palau increased 35-55‰ at the time of the 8200-year event, implying drying. Concurrently, sedimentary δ^2H_{dino} from Galápagos decreased 30‰, indicating wetter conditions. A drier Palau and wetter Galápagos provide evidence for the predicted southward shift of the Pacific ITCZ 8200 years ago, representing important data in our efforts to understand the mechanics by which abrupt AMOC disruptions impact global climate.