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Paired δ^2H and $\delta^{13}C$ of sedimentary n-alkanes reveal high Andean hydroclimate variability between three interglacials (MIS 7, MIS 9, MIS 11)

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We are experiencing a period of rapid climate change driven by fossil fuel use, leading to unprecedented environmental change . The key to understanding the ongoing climate scenario is to study other interglacials. The current interglacial period has been widely studied, but much less is known beyond that (~20,000 years ago), because reliable records of climate extending that far back into time are scarce. However, long sediment cores from Lake Junin, Peruvian Andes, span ~700,000 years, offering the opportunity to reconstruct climate over several interglacial periods, providing an unprecedented perspective on tropical climate change. Studying previous interglacial periods where greenhouse gas concentrations, temperature, and ice volume are different is a powerful tool for understanding the drivers and consequences of climate change. The South American Summer Monsoon is the main source of moisture in tropical South America. Identifying the magnitude and direction of change in monsoon intensity over long timescales will allow us to contextualize the future of this critical climate system under the current climate change scenario. Using a combination of δ^2H and $\delta^{13}C$ compound specific stable isotopes we aim to constrain large scale circulation associated with South American Summer Monsoon and Amazon moisture cycling, as well as the local basin response to changes in its climate system. By using a combination of both isotopes, we are able to constrain aridity and moisture availability, as well as changes in the plant communities (i.e. puna grassland, marsh, aquatic emergent and submerged macrophytes). The paleoclimate reconstruction will focus on three distinct intervals. A warm (MIS 11; 440,000-360,000 years ago), a cold (MIS 7; 260,000 -180,000 years ago), and an intermediate interglacial (MIS 9; 337,000-300,000 years ago). Constraining climate during these intervals in the Peruvian Andes will allow us to further understand the behavior of the monsoon under changing climate conditions in a region critical to the health of the Amazon rainforest and where large populations depend on the monsoon