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"Biomarker reconstructions of vegetation and hydrology"

Abstract: When considering the changing nature of our environment, water is a key variable shaping what is habitable and what is not, as denoted by the distribution of vegetation on the planet. The hydrogen and carbon isotopic compositions of terrestrial plant biomarkers offer powerful tools to reconstruct the nature and causes of vegetation and precipitation change. In particular the waxy coating on plant leaves and the lignin in tree wood allow us to trace both foliar and woody biomass. As a community, we've studied the plant synthesis of these compounds and the sedimentary archives of these biomarkers over geological time. But we still don't know much about how these molecules are exported from plants to sediments. My talk will take you on a picturesque journey from the high Andes, down into lowland Amazonia, via the Madre De Dios River within Peru. Through large volume sampling in remote environments, we acquire unprecedented sampling resolution across a steep topographic, environmental and ecological gradient. We analyze the biomarkers of terrestrial vegetation and find they capture elevation specific isotopic signatures. We can thus monitor the spatial and temporal integration processes in the river, and the downstream propagation of those signals. This new study provides much needed insights into the source to sink processes of terrestrial biomarkers, needed for two important objectives: 1) the spatial significance of terrestrial signals in lake and marine core sediment core reconstructions, and 2) quantification of export versus remineralization of terrestrial organic carbon from major tropical montane river systems.