

Investigating past climate-biosphere links: Speleothem-based climate reconstructions to constrain controls on Late Holocene forest expansion in South America

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Reconstructions of vegetation dynamics from soil $\delta^{13}\text{C}$ profiles and pollen records suggest the expansion of tropical and subtropical forests in South America in the late Holocene, which has been generally attributed to an intensification of the South American Summer Monsoon. It is still debated, however, whether and how extensive biome shifts were driven by changes in precipitation. There are several existing reconstructions of Late Holocene monsoon variability based on $\delta^{18}\text{O}$ records from speleothems, lake carbonates and ice cores, but many of these records are from sites outside the monsoon core (e.g., Andean Mountain range and east and southeast Brazil). To address this, we present late Holocene reconstructions of monsoon variability from speleothems (cave mineral deposits) collected from the Brazilian Amazon and Cerrado (Savanna) along a transect from the core to periphery of the monsoon region. Further, we use a multi-proxy approach - using speleothem $\delta^{18}\text{O}$ values to reconstruct regional monsoon intensity and speleothem $^{87}\text{Sr}/^{86}\text{Sr}$ to provide insight into local moisture conditions - to assess temporal variability in coupling between monsoon intensity and local moisture conditions at each site. Our records will provide unique constraints on the role of climate in Late Holocene vegetation dynamics.