PRECESSION-DRIVEN SOUTH AMERICAN PRECIPITATION DIPOLE OVER THE LAST 113 KA

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RESUMO

Tropical South American hydroclimate sustains the world's highest biodiversity and hundreds of millions of people. Whitin this region, Amazonia and northeastern Brazil have attracted much attention due to their high biological and social vulnerabilities to climate change (i.e. considered climate change hotspots). Still, their future response to climate change remains uncertain. On precession timescale, it has been suggested that periods of decreased western Amazonian precipitation were accompanied by increased northeastern Brazilian precipitation and vice-versa, setting an east–west tropical South American precipitation dipole. However, the very existence of this precession-driven precipitation dipole remains unsettled given the scarcity of long and appropriate northeastern Brazilian records. Here we show that the precession-driven South American precipitation dipole has persisted over the last 113 ka as revealed by a northern northeastern Brazilian precipitation record obtained from quartz thermoluminescence sensitivity measured in marine sediment cores. Precession-induced austral summer insolation changes drove the precipitation dipole through the interhemispheric temperature gradient control over the regional Walker circulation and the Intertropical Convergence Zone seasonal migration range. Since modern global warming affects the interhemispheric temperature gradient, our study provides insights about possible future tropical South American hydroclimate responses.

Palavras-chave: South American hydroclimate; Precession; Quartz thermoluminescence sensitivity; Interhemispheric temperature gradient.