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Hydrologic changes across western and eastern Amazon during the late Holocene recorded in sediments from the Xingu Ria

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The Xingu River is a major tributary of the Amazon. It is a clearwater river with low sedimentary load, unique biodiversity and great socioeconomic relevance for the eastern Amazonia. The lower valley of the Xingu River was flooded after the last glacial maximum and became a lake-like channel known as Xingu Ria. Sedimentation in the Xingu Ria is under tidal influence and is mainly controlled by backwater effects related to the timing difference between the peak stages of the Xingu and the Amazon rivers. This condition allows the input and deposition of sediments of the Amazon River in the downstream sector of the Xingu Ria. This particular sedimentary dynamic records the relative sediment supplies derived from the Amazon and Xingu rivers. Thus, the sediments accumulated in the downstream sector of the Xingu Ria testimony relative shifts between the water discharges of the Amazon and Xingu catchments during the late Holocene, when major physiographic changes were absent. We obtained a 3.7 m long sediment core at the confluence of both rivers and sampled it at every 2 cm for inorganic geochemistry, diatom and magnetic susceptibility analyses. Ages of sediment deposition were constrained by optically stimulated luminescence (OSL) and radiocarbon dating. OSL dating was carried out using a single aliquot regeneration dose (SAR) protocol applied to quartz in fine silt and fine sand grain sizes. The equivalent doses ranged from 0.3 to 3.1 Gy (Central Age Model) and the dose rate values were approximately 2.5 Gy/ka, giving ages from 118±81 (10 cm depth) to 1251±211 (363 cm depth) years. Samples of suspended sediments show that Fe/K and Ti/K ratios increase during the wet season of the Xingu River. Additionally, sediments of the Xingu River have higher Fe/K and Ti/K ratios compared to sediments of the Amazon River. Preliminary results indicate positive anomalies in the relative percentages of Fe and Ti from 700 to 300 years ago. This is interpreted as a relative increase in the water discharge of the Xingu River. We expect to reconstruct past hydrological changes by estimating the relative proportions of Amazon River sediments within the Xingu Ria through endmember unmixing model analysis. The comparison of geochemical results with variations in diatom and magnetic susceptibility analyses allows the understanding of the impact of past multidecadal hydrologic changes in the water discharge of the Amazon and Xingu Rivers.