TWO-PHASED AMAZONIAN PRECIPITATION ANOMALY OVERRIDES THE BIPOLAR SEESAW SALINITY SIGNAL DURING HEINRICH STADIAL 1

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The internal structure of changes in Amazonian hydroclimate during Heinrich Stadial 1 (HS1) (ca. 18-14.9 cal ka BP) is poorly resolved. Here we present multiple records based on isotope, inorganic and organic geochemistry from a marine sediment core collected under the influence of the Amazon River discharge. Our records offer for the first time a detailed and integrated picture of the changes in Amazonian hydroclimate during HS1. The results indicate two distinct hydrological phases within HS1 (HS1a and HS1b). During HS1a (ca. 18 – 16.9 cal ka BP) we register a first sudden increase in sea surface temperatures (SST) and in the delivery of inorganic and organic terrestrial materials. During HS1b (ca. 16.9 – 14.9 cal ka BP) we register a decrease in the terrestrial input that was, however, associated with a marked drop in sea surface salinities (SSS). A number of records also collected within the influence of the North Brazil Current indicate increased SST and SSS as a result of the decreased strength of the Atlantic meridional overturning circulation during HS1. Our results suggest that the expected increase in SSS due to the bipolar seesaw was overridden by a two-phased positive precipitation anomaly in Amazonian hydroclimate. The transition between HS1a and HS1b is marked by an even stronger positive precipitation anomaly over Amazonia, aligned with extreme drought in northernmost South America, due to the southernmost shift of the tropical rain belt and deepest monsoon penetration. Moreover, the coincidence of progressively lower discharge of terrestrial materials and a decrease in SSS during HS1b suggests a transition in the spatial distribution of precipitation over equatorial South America, toward regions less affected by erosion (i.e. from the Amazonian Andes towards the Amazonian lowland).

Keywords: paleoceanography, equatorial Atlantic, water isotopes

Acknowledgements: FAPESP 2012/17517-3, 2013/22521-2; CAPES 1976/2014, 564/2015