

A new concept for paleohydrological evolution of the Younger Dryas in NE Brazil

Ilham Bouimetarhan (1), Matthias Prange (1), Catalina Gonzalez (2), and Lydie Dupont (1)

(1) University of Bremen, Department of Geosciences, Bremen, Germany (bouimetarhan@uni-bremen.de), (2) Departamento de Ciencias Biológicas, Universidad de los Andes, Bogotá, Colombia

The late deglacial interval from approximately 13 to 11 kyr BP contains some of the best documented abrupt climate changes in the Past, the Younger Dryas (YD). It is also an interval when the bipolar climatic signature of millennial-scale changes in the Atlantic meridional overturning circulation (AMOC) is well expressed. Here we present a high-resolution palynological record from core GeoB16205-4 (1°21.11'N, 43°05.80'W), retrieved off the Parnaíba River mouth, southeast of the Amazon River (~1955 m water depth). Pollen and organic-walled dinoflagellate cyst assemblages indicate a predominantly wet climate during the YD in the nowadays semi-arid Nordeste, whereby a second phase between ~12.3 and 11.7 kyr BP is wetter than the period before. This is recorded by a strong increase in the concentrations of river plume dinoflagellate cyst assemblages indicative of a stratified surface water column and reduced salinity environments, as well as a drop in grass pollen and microcharcoal particle concentrations along with strong fluctuations in the representation of rain forest, gallery forest and tree ferns suggesting year-round humid conditions. This shift from a relatively wet first phase to a much wetter second phase is in agreement with the transient TRACE-21k coupled climate model simulation which shows a first pluvial Parnaíba stage from ~12.8 to 12.3 kyr BP and a second stronger pluvial stage between ~12.3 and 11.7 kyr BP to be related to a very weak AMOC due to meltwater pulses in the North Atlantic. The AMOC variation induces a steep temperature gradient between the Southern and the Northern Hemisphere which forces a southward shift of the Intertropical Convergence Zone (ITCZ) and its associated rainfall. The two-step hydroclimatic and environmental evolution during the Younger Dryas has not been documented previously in this region.