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Forcing mechanisms of paleo-hydrological variability in Northwest Africa during the last glacial-interglacial cycle: A comparison of proxy data and model results

Rik Tjallingii (1), Martin Claussen (2-3), Jens Fohlmeister (4), Alexandera Jahn (5), Jan-Berend Stuut (1), Torsten Bickert (1), Ursula Röhl (1)

(1) University of Bremen, DFG Research Center for Ocean Margins, Leobener Strasse, Bremen, Germany, (2) Max Planck Institute for Meteorology, Hamburg, Germany, (3) Meterological Institute, University of Hamburg, Germany, (4) Heidelberg Academy of Science, Heidelberg, Germany, (5) Department of Atmospheric and Oceanic Sciences, McGill University, Montreal, Canada

End-member modeling of the grain-size distributions of the terrigenous sediment fraction (fraction free of carbonate, organic matter, and biogenic opal) characterizes three end members in marine sediment core GeoB7920 off Cape Blanc, Northwest Africa. The mud- sized end member is interpreted as hemipelagic component predominantly related with fluvial transported material and, hence, as a proxy of continental humidity. The benthic (*Cibicides wuellerstorfi*) δ^{18}O and δ^{13}C records of sediment core GeoB7920 were used to reconstruct global ice volume and North Atlantic Deep Water (NADW) ventilation variations, respectively. The continental paleo-humidity record based on proportional variations of the fluvial end member indicates that precessional forced-humid periods similar to the Holocen African humid period are a reoccurring feature during marine isotopic stage 5. These precession-forced humidity variations are punctuated by abrupt millennial-scale arid events associated with North Atlantic ice rafting events and reduced NADW ventilation. Our paleo-humidity reconstructions are highly consistent with simulation results of the global Atmosphere-Ocean-Vegetation model CLIMBER-2 for Northwest Africa. The model accurately predicts interglacial humid periods in the Sahara region, as found in the geological data. Dansgaard-Oeschger (D-O) climate variations are not reproduced in the modeling results of the Sahara, but the simulated variations in the Sahel region closely follow the observed D-O and Heinrich signals as reconstructed from marine sediments. Both

the proxy data and model results show that the rather gradual orbital-paced climate variations are punctuated by abrupt dry events associated with North Atlantic ice rafting events.