



Origin and magnitude of low latitude terrestrial precipitation and temperature anomalies during Heinrich events and deglaciation

T.H. Donders (1,2), H.J. de Boer (3), W. Finsinger (1), E.C. Grimm (4), S.C. Dekker (3), G.J. Reichart (5), and F. Wagner-Cremer (1)

(1) Laboratory of Palaeobotany and Palynology, Institute of Environmental Biology, Utrecht University, Utrecht, The Netherlands (timme.donders@tno.nl), (2) Geological Survey of the Netherlands, Geobiology Department, Utrecht, The Netherlands, (3) Department of Environmental Sciences, Copernicus Institute, Utrecht University, PO Box 80115, 3508 TC Utrecht, The Netherlands (h.deboer@geo.uu.nl), (4) Illinois State Museum, 1011 East Ash Street, Springfield, IL 62703 USA, (5) Geochemistry, Department of Earth Sciences, Faculty of Geosciences, Utrecht University P.O. Box 80021, 3508 TA Utrecht, The Netherlands

Repetitive phases of increased pine at Lake Tulane, Florida have previously been related to strong stadials terminated by so-called Heinrich events. The climatic significance of these pine phases has been interpreted in different ways. Using a pollen-climate inference model, we quantified the climate changes and consistently found mean summer precipitation (P_{JJA}) increases (0.5-0.9 mm/day) and mean November temperature increases (2.0-3.0°C) that are coeval with Heinrich events and the Younger Dryas. Comparison with marine sea surface temperature records point to a potential source for these heat and moisture anomalies in the Gulf of Mexico or the western tropical Atlantic. A climate model sensitivity analysis indicates that a positive heat anomaly in the Gulf of Mexico and equatorial Atlantic best approximates the pollen-inferred climate reconstructions from Lake Tulane during the Heinrich events and Younger Dryas. We explain the low latitude warming by an increased Loop Current facilitated by the persistence of the Atlantic Warm Pool during summer.