



The Peten Itza Scientific Drilling Project: A 200-ka record of climate change in lowland Central America

D. HODELL (1), F. ANSELMETTI (2), D. ARIZTEGUI (3), M. BRENNER (1), J. CURTIS (1), J. ESCOBAR (1), A. GILLI (4), D. GRZESIK (1), S. KUTTEROLF (5), AND A. MÜLLER (4)

(1) Department of Geological Sciences and Land Use and Environmental Change Institute (LUECI), University of Florida, USA, (2) Swiss Federal Institute of Aquatic Science & Technology (Eawag), Switzerland, (3) Section of Earth Sciences, University of Geneva, Switzerland, (4) Geological Institute, ETH, Switzerland, (5) Leibniz Institute for Marine Sciences, IfM-Geomar, Germany

As part of an ICDP drilling campaign, 1327 m of lake sediment were recovered at seven sites in Lake Peten Itza, northern Guatemala. Sediments contain a record of terrestrial climate change from lowland Central America extending back to ~200 ka. Research has focused thus far on Site PI-6 at a water depth of 71 m where three holes were drilled to a maximum depth of 75.9 mblf (~85 ka). We found that Petén climate varied between wetter conditions during interstadials and a drier state during stadials of Marine Isotope Stage (MIS) 3. The most arid periods coincided with Heinrich Events in the North Atlantic and reductions in the strength of meridional overturning circulation. The pattern of clay-gypsum (wet-dry) oscillations during MIS 3 closely resembles the temperature record from Greenland ice cores and North Atlantic marine sediment cores and precipitation proxies from the Cariaco Basin. Contrary to previous findings, the Last Glacial Maximum (LGM) from ~23 to 18 ka was moist in the Petén lowlands and vegetation consisted of a temperate pine-oak forest. Greater moisture availability was likely related to increased winter precipitation associated with frequent polar outbreaks (i.e., cold fronts) or “*Nortes*” (northerly winds), which occasionally bring rain to northern Guatemala today during the dry season. At the end of the LGM, Petén climate switched from moist to arid conditions during the so-called “Mystery Period” from 18 to 14.7 ka. Moister conditions prevailed during the warmer

Bolling-Allerod (14.7 to 12.8 ka), with the exception of a brief return to dry conditions at ~ 13.8 ka. The onset of the Younger Dryas at 12.8 ka marked the return of dry conditions. Pollen assemblages indicate that a mesic forest had been largely established by ~ 11.3 ka, but sediment properties suggest that the lake continued to precipitate gypsum until ~ 10.35 ka. Our results support the hypothesis that summer precipitation was controlled by migrations in the meridional position of the Atlantic ITCZ during the MIS 3 and the last deglaciation. The ITCZ was located farther south during cold periods, especially during Heinrich Events, and arid conditions prevailed in the northern hemisphere Neotropics.