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Millennial-scale climate variability in the south-eastern North America and the subtropical North Atlantic during the last glacial period: a land-sea correlation derived from the pollen rich marine core MD99-2203

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Last glacial abrupt climate changes, defined as Dansgaard/Oeschger variability (D/O) and Heinrich events (HE), have been documented in ice cores, marine sediments and continental deposits, generally from the Northern Hemisphere (Voelker et al., 2002). While most North Atlantic paleoceanographic and paleoclimatic studies covering the last glacial period are centred in the northern and eastern part (Voelker et al., 2002), less attention has been paid to the western midlatitudes (López-Martínez et al., 2006; Vautravers et al., 2004). In particular last glacial eastern North American vegetation changes remain poorly unknown due to a lack of long continuous pollen records in this region. So far, only two pollen sequences from Lake Tulane (Florida) show significant and interesting vegetation changes during the last glacial period (Grimm et al., 1993 and 2006) which suggest warm and humid HE, contrasting with what is observed in the eastern part of the North Atlantic (Sánchez Goñi et al., 2000). In this work we present the first high resolution reconstruction of the vegetation changes derived from the analysis of a pollen-rich marine core located in the subtropical western North Atlantic (MD99-2203, 34º58'N, 75º12'W, 620 m water depth) during Marine Isotope Stage 3 (MIS3). A clear alternation between Picea and Quercus is showed by pollen data from core MD99-2203. In general, pollen assemblages indicate last glacial vegetation variations following a boreal forest/mesic-Quercus forest pattern that could be associated with the D/O variability. A preliminary age model based on radiocarbon ages suggests an increase of temperate forest accompanied by a reduction of the boreal forest during Greenland interstadials (López-Martínez et al., in preparation). Comparison with other proxies measured in the same core (d18O and alkenone and planktonic foraminifera derived sea surface temperature) and with published high resolution marine pollen records from the eastern subtropical region (Sánchez Goñi et al., 2000; Naughton et al., submitted) provide better understanding of the impact of millennial scale climate variability over the last glacial period in the subtropical North Atlantic. The pollen sequence from core MD99-2203 shows, for the first time, that changes in forest formations associated with last glacial abrupt climate changes were smoother in south-eastern North America than in the Iberian Peninsula (López-Martínez et al., in preparation)

Grimm et al., 1993. Science, 261: 198-200. Grimm et al., 2006. Quat. Sci. Rev., 25: 2197-2211. López-Martínez et al., 2006. Paleoceanography, 21: PA4215, doi:10.1029/2006PA001275. Naughton et al., Earth Planet. Sci. Lett., submitted. Sánchez Goñi et al., 2000. Quat. Res., 54: 394-403. Vautravers et al., 2004. Paleoceanography, 19(PA2011): doi:10.1029/2003PA000966. Voelker et al., 2002. Quat. Sci. Rev., 21: 1185-1212.