



Obliquity-controlled soil moisture fluctuations recorded in Saharan dust deposits on Lanzarote (Canary Islands) during the last 180 ka

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On Lanzarote (Canary Islands), dust-borne sediments trapped in valleys dammed by volcanic material were investigated in order to reveal environmental changes during the Late Quaternary. Clay content and frequency dependent magnetic susceptibility are used as proxies of pedogenesis and trace back changes of palaeo-soil moisture during the last 180 ka, showing a pattern of generally enhanced soil moisture during glacials and stadials and more arid conditions during warm periods. These results are compared with proxies from local palaeoclimate studies, showing that there is a positive correlation with proxies of trade wind strength off NW Africa and sea surface temperatures in the NE-Atlantic, and an inverse correlation with the extent of mediterranean vegetation. Possible causes for the observed pattern include a glacial enhancement of precipitation from westerly cyclones, an occasional influence of the African summer monsoon and a relative humidity change triggered by fluctuating air temperatures. Although no clear differentiation between the influences of these factors is possible yet, it is clear that the first and the last one must have dominated during most of the time. These results are the first quasi continuous terrestrial data testifying to environmental changes in the NW African coastal area for the last 180 ka, and complement the abundant data derived from marine cores of the region. The results from this study demonstrate a dominant influence of high latitude dynamics in this area intermediated by North Atlantic sea surface temperatures. This influence is supported by a negative correlation of our proxies with the orbital obliquity cycle, including a time lag of about 10 ka similar to that recorded from North Atlantic sea surface temperatures.