Some new insights into palaeoenvironmental dynamics and Holocene landscape evolution in the Nigrian Central Sahara (Ténéré, Erg of Ténéré, Erg of Fachi-Bilma)

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With 4 figures

Abstract: Palaeoecological studies of terminal Pleistocene and Holocene deposits in the Central Sahara allow some new insights of the palaeoenvironmental development of the vast Ténéré sand plain, Erg of Fachi-Bilma and Erg of Ténéré region of Central Sahara, NE-Niger. The environmental changes are deduced from geomorphological, sedimentological and biological remains as well as from palaeolimnological and prehistoric evidence. Comparing the lacustrine sediments, three stages of water bodies with different conditions can be distinguished. Topographical factors, geomorphological evidence and biological remains (e.g. *Lates niloticus*) suggest that from 11.5 ka cal BP onwards a widespread lacustrine landscape existed with perennial deep-water lakes changing in size, water level and water balance. Following a change between 7.5 ka cal BP and 6.8 ka cal BP in the northern and central parts of Ténéré, and 6.5 ka cal BP in the southern part of the region studied, desiccation of the by now shallow permanent freshwater lakes began, coinciding with the establishment of seasonal ponds characterized by low water level and high pH. From 6.0 ka cal BP onwards in the north and 5 ka cal BP onwards in the south a more swampy environment developed finally. Concerning the Early Holocene, and towards the Mid-Holocene, the findings suggest an increasingly steep precipitation gradient from SW to NE as well as a more pronounced seasonality, indicating a weakening contact between the summer monsoon front and the westerlies.

Key words: Global change, palaeoenvironment, palaeolakes, Central Sahara, Holocene

1. Introduction

During the past ten years, research on the palaeoenvironments of tropical and northern subtropical Africa has progressed, mainly based on lake (e.g. Guo et al. 2000, Gasse 2000, Hoelzmann et al. 2004, Pachur 2001, Pachur & Altmann 2006, Russel & Johnson 2005, Kuper & Kröpelin 2006), fluvial (e.g. Gumnior 2008, Lespez et al. 2011) and marine records (e.g. Lézine et al. 2005, Haslett & Smart 2006, Marret et al. 2006), which provide evidence of the high degree of climatic variability during the Holocene (e.g. Gasse 2000, Hoelzmann et al. 2004). Nevertheless research activities on the palaeoenvironments are rare in the Central Sahara. The few comparable studies were accomplished during the 1970s and 1980s.

This paper presents a synthesis of the research conducted on the lake system changes in the extensive flat landscapes of the central and eastern Niger part of Central Sahara. It is partly based on already published data (e.g. Baumhauer 2004, Baumhauer et al. 2009) completed by new investigations on the diatom flora of