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Environmental change in subtropical southern Africa since the Last Glacial Maximum: a case study from Etosha Pan

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Millennial-scale climate shifts described by Heinrich Events and Dansgard-Oeschger Cycles occurred in the Northern and Southern Hemispheres asynchronously. It has been suggested that combined influence of the oceanic bipolar seesaw and the southward displacement of the south hemisphere (SH) westerlies, both linked to northern stadials, allowed the high southern latitudes to warm as a result of melting and collapse of NH ice sheets (Denton et al. 2010). For tropical southern Africa most terrestrial records delivering observational data for such climate scenario are derived from east African rift valley lakes (e.g. Olaka et al., 2010) but further to the west data are sparse. Here we report about a palaeoclimate proxy extracted from Etosha Pan, a vast endorheic plain in southern west Africa. It is situated at the southern border of tropical Africa, at the eastern border of the coastal area influenced by the Benguela current and at the western border of inland Africa influenced by the Indian Ocean. It is therefore supposed to be sensitive to climate change and provides the opportunity to link its lake record with the drastic hydrological changes that occurred in east African rift-valley lakes during deglaciation.

Using OSL dating and sediment analysis to constrain lake shorelines of perennial lakes in time and space, we found high lake levels during the late Pleistocene and a drastic drop shortly after 10 ka. This lake water-level reconstruction is not in line with the histories of ITCZ migration and strength of Benguela current upwelling. We confirm that the linkages between the evolution of the Etosha Pan and the climate mechanisms driving hydrological changes in subtropical southwest Africa are poorly resolved and need further investigation. The paper discusses these findings in the context of SH palaeoclimate records.