Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06374, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06374
EGU General Assembly 2008

Hydrological changes in the southeastern African tropics during the deglaciation and Holocene

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Hydrological changes in Africa are intensively coupled to the positions of the Intertropical Convergence Zone (ITCZ). Seasonal migrations as well as the mean latitudinal positions of these boundary conditions determine precipitation patterns on the African continent. Many paleoclimatic reconstructions reveal dry conditions in tropical central and northern Africa during the last glacial maximum (LGM) and wetter phases during the Holocene. Unfortunately, only few climatic records are available from South Africa. Currently there is a lack of information on the transition zone between the modern wet tropical belt and the drier southeastern African climate. Here we report on a 6.51 m long sediment core (GeoB 9307-3) off the Zambezi river (18˚33.90´S, 37˚22.80´E) in 542 m water depth, which was retrieved during R/V METEOR Cruise M63/1.

The age model is based on 20 ^{14}C-AMS dates, calibrated after Stuiver and Reimer 1993 assuming a reservoir age of 137 years using the SW Indian Ocean Mean after Southon et al., 2002. The core has max. age of about 16800 cal. years B.P. and shows high sedimentation rates (about 100 cm/kyr) from 14 to 11 kyrs and lower values ($<$20 cm/kyr) for the last 11 kyrs.

The Fe intensities measured with the XRF Core Scanner high values during the deglacial and after a transition from 12 to 8 kyrs significantly lower values for the rest of the Holocene. High Fe intensities and sedimentation rates during the deglacial im-

ply high river runoff and enhanced precipitation in the catchment area of the Zambezi. The Younger Dryas (YD) appears as distinct wet phase in the record. Driest conditions were reached between 6,000 and 8,000 years before present. This record reveals an opposite pattern of wetter and drier conditions derived from sediments of Lake Malawi, which is located about 5° north of the Zambezi. Recent model results indicate that the mean latitudinal position of the ITCZ is affected by the interhemispheric temperature gradients and that the ITCZ is shifted towards the warmer hemisphere. Thus, during cooler periods in the northern hemisphere the ITCZ is shifted southward. Our results are consistent with these model results and give proof for the southward migration of the ITCZ during the LGM and the YD. A striking similarity occurs with the ice core methane records from Antarctica and Greenland, which have also been postulated as an indicator for tropical wetness. Until about 11 kyr BP an in-phase relationship occurs with the Zambezi record. Afterwards an out-of-phase relationship established and persisted through the entire Holocene.