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Evidence of a 10 - 20 years old mass wasting event off Mauretania proved by pore water chemistry analyses

L. Schnieders, H.D. Schulz and M. Kölling

FB 5 Department of Geosciences, University of Bremen, P.O. Box 330440, 28334 Bremen, Germany

The Cap Timiris Channel system, discovered in 2003 during RV Meteor cruise M 58/1 off Mauretania, NW Africa, was subject of further studies on RV Meteor cruise M 65/2 in 2005. During this cruise the gravity core GeoB 9622-3, with a length of about 10 m, located in a bayou of this channel system, was recovered from 2881 m water depth. Pore waters were collected from the non opened core instantly after recovery by using rhizones as a fast, non-destructive and low maintenance sampling technique. The onboard analyses of ammonium, sulphate and alkalinity result in profiles, that indicate a very young mass wasting event with a thickness from the surface down to a sediment depth of about 4.5 m. At this depth a major shift in the concentration profiles of the measured parameters is detected. Above 4.5 m the pore water concentrations differ only little from the sea water concentration. Below this depth the profiles reveal a ‘normal’ steady state situation, in which the nearly linear gradients of both, alkalinity and ammonium, result in a change from a low seawater concentration in about 4.5 m to a high concentration in the deeper pore water. This is a characteristic pattern for a diffusive flux from deeper parts of the sediment to the sediment surface, or in this case to a former sediment surface. The sudden change in gradients from a zero gradient in the upper part of the sediment to a ‘normal’ gradient below 4.5 m depth, show a non steady state situation, indicating a very young slide event. The age of this young slide event was estimate to be of approximately 10 to 20 years, by geochemical modelling of the diffusion. If the event was older, the sharp kinks in the pore water profiles at 4.5 m sediment depth would have been smoothed much more. After opening the core onboard this geochemically detected slide event could not be found visually at the located depth of about 4.5 m. There was no obvious change in sediment material nor a visible glide plane, so that this mass wasting event would not have been

recognised. This shows that pore water analysis is a useful tool to detect especially young mass wasting events, defining the base of these events and estimating the age over geochemical modelling of the generated profiles.