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# Sediment transport within canyons and open-slope systems off Mauritania

**S. Krastel** (1), A.A. Antobreh (1), R.B. Wynn (2), T. Hanebuth (1), R. Henrich (1), H.D. Schulz (1), M. Kölling (1), C. Holz (1), K. Wien (1.)

(1) Research Center of Ocean Margins, Bremen University, Germany, (2) Southampton Oceanography Centre, Southampton, UK (skrastel@uni-bremen.de / Fax: +49 421 218 7179

The continental margin off Mauritania is characterized by local upwelling and high sedimentation rates on the shelf and the upper slope. Such rapidly deposited sediments are prone to failure and subsequent transportation into the deep sea by turbidity currents, debris flows, and/or sediment slides. We investigated sediment transport processes off Mauritania during Meteor-Cruise M58/1 (summer 2003) by means of geophysical, sedimentological and geochemical methods. High-resolution seismic and hydroacoustic (Parasound, Hydrosweep) measurements were used to study the areal extent and internal structure of redeposited sediments. Based on these measurements sediment cores were taken for sedimentological and geochemical analyses.

The only indication for large scale sediment transport on the margin was found between 17˚00' and 18˚30'N, the area of the so called Mauritania Slide Complex. A large debris flow covering an area of some 34,000 km$^2$ is clearly imaged by a narrow beam echosounder. The main reason for the large dimension of the debris flow is that it originated as a multiple event, as indicated by a series of up to 100m high stepped headwalls mapped in $\sim$800m water depth. The character of the slide scar is highly variable, with areas of relatively intact slide blocks interspersed with layers of blocky slide debris and thin sheet-like debris flows. The lower part of the debris flow in water depth $>$2000m is characterized by a thick tongue-shaped deposit. Cores recovered at the edge of the uppermost unit of the Mauritania Slide Complex show that the uppermost debrite sheet is overlain by a 50cm thick normal siliciclastic turbidite that again is covered by thin ($<$50cm) hemipelagic deposits. Multichannel seismic images indicate that the continental slope in this area is characterized by stacked deposits of mass wasting events, revealing that this part of the continental margin has been unstable for

a long period of time.

Numerous upper slope canyons and gullies indicate the importance of channelized sediment transport in the survey area. The most remarkable canyon is the Cap Timiris Canyon, which was discovered during the Meteor-Cruise M58/1. This canyon runs westwards from the shelf break to a depth of at least 4000 m and is over 400 km long. The dominantly V-shaped and deeply entrenched canyon exhibits many fluvial features including dendritic, meander and braiding patterns, a cut-off loop and terraces, and is presently incising. Distal meander patterns, confined within a narrow fault-controlled corridor, show several stages of evolution, the latest of which is dominated by a down-system meander-loop migration. Terraces exhibit a variety of internal structures suggesting they originated through different processes including sliding/slumping, uplift-induced incision and lateral accretion. The evolution of the Cap Timiris Canyon has been controlled by the erosive action of powerful turbidity currents as they were successively transported downslope. The presently active canyon system appears to be sustained by mass wasting and high productivity generated by upwelling.