



## **Uplift, exhumation and erosion along the Angolan continental margin: an integrated approach**

Heike R. Gröger (1), Vladimir Machado (2), and Giuseppe Di Pinto (3)

(1) Statoil ASA, Exploration Research, Stavanger, Norway (heigr@statoil.com), (2) Sonangol P&P, Luanda, Angola, (3) KADME AS, Stavanger, Norway

The topographical development along the SW African margin is not exclusively rift-related. In addition to the onset of rifting in the Early Cretaceous, additional Late Cretaceous and Cenozoic events of uplift, exhumation and erosion are discussed. Thermochronology has proven to be a valuable tool to constrain phases of exhumation in passive continental margins. For South Africa and Namibia a large number of thermochronological data are available. Angola on the other hand is still scarcely investigated. This study is based on thermochronological data from onshore Angola, integrated with quantitative morphotectonic analysis and the on- and offshore stratigraphic record.

In South Africa and Namibia published thermochronological data document pronounced Early and Late Cretaceous cooling events, which can be related to 2.5-3.5 km of removed section during the Cretaceous. An additional 1-2 km of removed section are estimated during the Cenozoic. In Angola predominantly Permo-Triassic apatite fission track ages indicate significantly less Cretaceous to Cenozoic erosion (< 2.5 km). The apatite fission track data do not provide high resolution constraints on the syn-post rift topographical development along the Angolan margin. However, thermal modelling points to a pronounced Miocene final cooling event.

River bed topography upstream the Angolan escarpment is in equilibrium, while the escarpment itself forms a major knick zone. Downstream the main knick point towards the coast, river long-profiles are characterised by convex reaches which are the evidence of an immature, non steady-state topography. Estimation from knick point migration reveals about 1 km uplift within the Cenozoic (< 57 Ma).

Published basin reconstructions offshore South Africa and Namibia confirm the general picture of pronounced Cretaceous erosion in the offshore sedimentary record of the basins south of the Walvis ridge (Walvis, Lüderitz and Orange basin). More pronounced Cenozoic erosion in Angola (Kwanza basin) is corroborated by enhanced Oligocene and Miocene sedimentation offshore.

Thus the on- and offshore geological record in Angola appear directly linked. Cenozoic erosion onshore is mirrored by enhanced Oligocene to Miocene sedimentation offshore. The geomorphological information as well as the stratigraphic record are compatible with the Cenozoic cooling and exhumation as suggested by thermal modelling of apatite fission track data. Although direct indicators for Cretaceous cooling and erosion are missing in Angola, minor amounts of Cretaceous erosion may be disguised by the Miocene final event.