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3D subsidence analysis in the Orange Basin – what does it tell us about the basin history?

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Investigations have been carried out in the Orange Basin on the south-west African continental margin for the purpose of revealing the basin's history. To address the dynamics of margin evolution backstripping/subsidence analysis was undertaken to identify the tectonic driving forces and quantify their magnitude and timing. From this it is possible to determine the influence of loading-induced versus tectonic subsidence of the margin.

Our results indicate that basin evolution is intimately related to onshore denudation processes and sediment supply, such that only a holistic approach allows the correct assessment of the driving forces. Phases of uplift could be identified, affecting the entire margin in a regional movement as well as uplift restricted to the inner shelf domain representing a local movement of the margin. Onshore observations show that the latter correlates with a phase of increased denudation. Furthermore phases of strong subsidence occur, hardly to explain with thermal cooling. We present rifting models that explain the observed tectonic subsidence. To provide the link to heat flow modelling is envisaged.