Seismo-Stratigraphy and Basin Analysis, Reggane Basin (Paleozoic, Southern Algeria)

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The study focuses on the basin development and HC systems of the Reggane Basin in southern Algeria. Deposition took place on the northern Gondwana passive margin. The Late Cretaceous and Cenozoic basin fill has been preserved at the basin margins and in structural lows. The basin extends over two plate-tectonic domains, the West-African Craton (WAC) and the Hoggar (Touareg) Shield (HS). Stratigrapic intervals (Top Ordovician to Base Tertiary) have been correlated on a basin-wide scale based on 2D seismic and well log data. The numerical modeling includes reverse basin modeling on a proximal to distal transect and represents a deterministic approach starting from the recent basin fill and architecture. This modeling provides genetic subsidence/uplift rates and sediment flux.

The results allow to compare the basin development at the resolution of time layers on the WAC and the HS which was comparable during the Ordovician to Frasnian. Subordinate uplift occurred during the Gedinnian to Pragian all over the basin. On the WAC, subsidence peaks existed in the Frasnian and in the Famennian to Visean. On the HS just in the Famennian. Since the Famennian the Reggane Basin experienced significant compartmentalization. The burial and paleotemperature history was controlled by several regional basement blocks with different subsidence/uplift in the latest Devonian and Carboniferous. In the northeastern part of the Reggane Basin two erosional unconformities of syn- and post-Hercynian age exist. On the WAC, peak sediment flux appeared in the Siegenian and Famennian and on the HS, additionally in the Visean. Compared to the HS, sediment flux on the WAC is generally lower throughout the Silurian to Early Carboniferous which reflects the larger distance to the source areas. In general, the sediment flux is higher throughout the Silurian to Early Carboniferous reflecting a more proximal position to the southeastern source areas. The Paleozoic, Ordovician to Early Carboniferous, northern margin of Gondwanna represents a primarily depostional shelf with only subordinate bypass and erosion. The sedimentary architecture of the Paleozoic is characterized by low-angle geometries and structures characteristic of wide clastic ramp margins. Stratigraphic analyses show trangressive/regressive trends in combination with well log and organofacies analyses. A sequence stratigraphic model of the Lower to Middle Devonian at reservoir scale will be presented.