



A multidisciplinary study on Palaeozoic rocks of southern Libya

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Southern Libya is dominated by the intracratonic Murzuq and Kufra basins, separated by the Tibesti Massif. The Murzuq Basin, located in southwest Libya, extends into northwestern Chad, northern Niger and eastern Algeria and has been the focus of great interest for gas and oil exploration in recent years since the discovery of the El Sharara and the NC-174 (Elephant) fields in the western Murzuq Basin. Based on these discoveries, recent focus has shifted to the Kufra Basin, in southeast Libya, which extends into northern Chad, northwestern Sudan and straddles the border with Egypt. Although, the centre of the Murzuq Basin has been relatively well investigated by drilling and seismic profiles, the basin margins, however, lack a detailed geological investigation. In comparison, the Kufra Basin is underexplored with few boreholes drilled.

Our studies focus on the eastern margin of the Murzuq Basin and the northern, eastern and western flanks of the Kufra Basin. Siliciclastic sediments of Infracambrian to Carboniferous age dominate the studied areas. Our objectives were to characterise the Infracambrian–Lower Palaeozoic stratigraphy, deduce the structural evolution of each study area, and to collect samples for follow-up analyses including provenance studies and biostratigraphy. In addition to outcrop-based fieldwork shallow boreholes up to 50 m depth were successfully drilled in the Silurian Tanezzuft Formation: a major hydrocarbon source rock unit in North Africa. The unweathered mudstones retrieved from one of the boreholes are rich in organic matter and have been used for biostratigraphical and geochemical investigations. The provenance study of the sandstone succession with heavy mineral analysis together with U–Pb zircon dating provides, for the first time, an understanding of the ancient source areas. Moreover, it is a useful test of the stratigraphic framework where biostratigraphic data are scarce. New data from this study are expected to lead to new stratigraphic concepts for the Palaeozoic in southern Libya and thus will shed light on the geological history of hydrocarbon-bearing basins in this part of North Africa.