

Contribution of Palynology in the Understanding of the Stratigraphic Development of the Cambrian-Ordovician Successions in the Subsurface of Central Saudi Arabia

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ABSTRACT

In the subsurface of central Arabia, Lower Paleozoic rocks are represented by predominantly sandstone-dominated units up to 2,000 ft thick, which are overlain by either Silurian or Permian strata. The age-dating of these units, and correlation with stratigraphically equivalent Lower Paleozoic formations exposed in northwest Saudi Arabia has proven problematical due to the paucity of fossil-bearing strata such as, for example, graptolites, which have been historically used to identify the Hanadir and Ra'an members of the Qasim Formation in their type areas. A previous comprehensive palynological study by Molyneux and Al-Hajri (2000) demonstrated the effectiveness of acritarch and chitinozoan biostratigraphy for the precise dating and correlation of the Lower Paleozoic successions in central Arabia, suggesting a much wider age range than previously thought for these rock units, from Early - Middle Cambrian through early Silurian. Recent and current investigations of newly penetrated subsurface sections southwest and west of Ghawar Field and northern Rub Al-Khali confirmed the value of palynology as a powerful tool for constraining the age and resolving the complex stratigraphic architecture of the encountered Cambrian-Ordovician successions. In this paper, a review of the current state of knowledge of the palynostratigraphy of the Cambrian-Ordovician strata in central Saudi Arabia and its applicability in elucidating their stratigraphic development, geometry and depositional environments, is presented. A total of 10 palynozones have been defined within the Cambrian and Ordovician successions, showing a variable degree of stratigraphic resolution. The present study shows that the Middle to Late Ordovician Qasim Formation is significantly eroded or non-deposited in the study area, and, as a consequence, the Upper Ordovician Sarah Formation is most often found in direct unconformable contact with the Upper Cambrian to Lower Ordovician Saq Formation. Reference: Molyneux, S.G., Al-Hajri, S. (2000). Palynology of a problematic Lower Palaeozoic lithofacies in central Saudi Arabia. In: Al-Hajri, S. and Owens, B. (Eds.), Stratigraphic Palynology of the Paleozoic of Saudi Arabia. Gulf Petrolink, Manama.