

## **PALYNOLOGY IN HYDROCARBONS EXPLORATION: CORRELATION AND DEPOSITIONAL ENVIRONMENTS OF LOWER PALAEOZOIC SANDSTONES IN CENTRAL SAUDI ARABIA**

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The subsurface Lower Palaeozoic succession in central Saudi Arabia includes a sandstone-dominated unit, up to 2000 ft thick, overlain by either Silurian or Permian strata. Correlation of the sandstones with the exposed Lower Palaeozoic succession in northwest Saudi Arabia is problematical, partly because graptolite-bearing shales of the latter, have not been identified in central Saudi Arabian wells. Based on Formation Microscanner (FMS) images, the succession in central Saudi Arabia was considered to be entirely of late Ordovician age (late Caradoc to Ashgill), cutting down through underlying Ordovician and Cambrian strata to rest unconformably on Precambrian igneous basement. In contrast, palynological evidence presented here shows the sandstone-dominated unit to range in age from Early or Middle Cambrian, through early, middle and late Ordovician, to early Silurian. The palynological evidence suggests correlation with a substantial part of the Cambro-Ordovician succession at outcrop in northwest Saudi Arabia, rather than with just the upper Ordovician. The palynological study also provides evidence for the depositional environments of the sandstone unit. Assemblages are generally of low diversity, and may be indicative of nearshore, marginal marine conditions. Infrequent occurrences of more diverse assemblages suggest open marine shelf sea environments for strata at some levels. Recognition of the latter has implications for stratigraphic modelling of the central Arabian succession, and might relate to episodes of coastal onlap recognized in the Llanvirn and lower Caradoc of northwest Saudi Arabia.