

"Hot" Shales and Microfossils: Applications of Palynology in Palaeozoic Hydrocarbon Exploration

Anthony Butcher¹, David Loydell¹

¹SEES, University of Portsmouth, Portsmouth, United Kingdom.

ABSTRACT

Organic-rich Silurian 'hot' shales are important hydrocarbon source rocks, accounting for 80-90% of Palaeozoic-sourced hydrocarbons in North Africa, and account for c.9% of global petroleum reserves (Lüning et al. 2000). The shales are referred to as 'hot' due to their high gamma-ray values in well logs, reflecting the high authigenic uranium content of the sediments. As an indicator of anoxic conditions, this uranium forms in conditions conducive to high preservation potential for organic material, and indeed 'hot' shales have been recorded with up to 17% total organic carbon. Research projects undertaken by the authors on core material through 'hot' shale intervals from the Silurian of North Africa and the Middle East, have combined integrated high-resolution biostratigraphy (chitinozoans and graptolites), carbon isotope data, and morphological variability in acritarchs to both constrain the age of lower Silurian organic-rich 'hot' shales, and lead to the proposal of a new depositional model for some of these globally-important source rocks. The presentation will emphasise the value of palynology and high-resolution biostratigraphy in hydrocarbon exploration by introducing the techniques employed, presenting results from published case studies in Libya and Jordan, and introduce current projects being undertaken.