



High resolution palynostratigraphy of late Neoproterozoic through Silurian stratal sequences of peri-Gondwana

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Since its assembly during late Neoproterozoic times (600-550 m.y.), the Gondwana mega-continent existed as a single entity during the entire Palaeozoic (542-251 m.y.), being almost entirely located in the southern palaeo-hemisphere during Early Palaeozoic times (542-416 m.y.: Cambrian through Silurian). Thick sedimentary sequences of late Neoproterozoic – Silurian age are developed in many localities all around the periphery of Gondwana (“peri-Gondwana”), locking in their sedimentary record the history of the main evolutionary events and global changes that have shaped Earth’s bio-geosphere as we know it today. These ancient sediments have also a major economic importance being the host of among the world’s largest hydrocarbon deposits and potentially hosting huge but yet undiscovered oil and gas reserves. Precise stratigraphic subdivision and correlation is essential in order to reconstruct the temporal succession of biological and physical events which may occur across large areas, and are at the very base of any interpretative geological and/or biological evolutive models. The recognition and description of stratigraphic and geometric organization of rock strata are also essential in mineral and oil exploration. Dating of sedimentary rock bodies and their correlation over long distance are achieved principally by biostratigraphic analyses. In this talk we demonstrate the importance and practical utility of palynology for high-resolution biostratigraphy in the late Neoproterozoic through

Silurian sedimentary sequences over a vast area extending from south America, across North Africa and the Middle East, into Pakistan and northern India, and finally into China (peri-Gondwana). Our study is a synthesis of the enormous wealth of data which have been produced in the last 15 years on the application of acritarchs (organic-walled microphytoplankton), chitinozoans (organic-walled microfossils of uncertain affinity), and miospores (dispersal propagules of early land plants) not only to stratigraphy but also to palaeoenvironmental reconstructions. Several case-studies will be illustrated and discussed where palynomorphs have been used to the solving of stratigraphic problems, including -but not limited to- the late Neoproterozoic of North Africa; Middle and Late Cambrian of Algeria, Libya, and Iran; global correlation of the Cambrian-Ordovician boundary; the current Ordovician acritarch and chitinozoan zonation in North Africa and the Middle East; the palynology of glacial-related sediments Late Ordovician age across Gondwana; and the palynological signature of the Early Silurian source rocks ("hot shales") in the Sahara Platform.