

AAPG HEDBERG CONFERENCE
"The Paleozoic and Triassic Petroleum Systems in North Africa"
February 18-20, 2003, Algiers, Algeria

Alluvial sequence stratigraphy and reservoir architecture of the TAG-I

D. Pilling², P. Turner¹, D. Lawton³

1.) School of Geography, Earth and Environmental Science, The University of Birmingham, Birmingham B15 2TT
e-mail: P.Turner@bham.ac.uk, Fax : +44 121 414 4942

2.) PM Geos, 24 Market Street, Aberdeen

3.) BHPBilliton, Neathouse Place, Victoria, London SW1V 1LH

This paper reviews the alluvial sequence stratigraphy and sedimentology of the Upper Triassic (TAG-I) in the Berkine Basin. Previous interpretations (Turner et al. 2001) are updated on the basis of development drilling in the ROD field area and the merits of different sedimentological models are discussed.

The TAG-I sits unconformably on Palaeozoic basement rocks and with the basal Lower Carbonate comprises a laterally and vertically variable sequence which has been sub-divided into four depositional sequences:

- ◆ Sequence 1, an unconformity-bounded, ephemeral fluvial interval that fills palaeorelief on the Hercynian unconformity;
- ◆ Sequence 2, an initially upward-fining, and subsequently upward-coarsening package of perennial fluvial sandstones and floodbasin shales with thin crevasse splay elements and interfluvial palaeosols;
- ◆ Sequence 3, an erosively based, fluvio-lacustrine section characterized by fluvial sandstones with associated crevasse sandstones and floodbasin/lacustrine shales. This sequence is the main hydrocarbon reservoir section and is divided into two main packages, 3A and 3B; the base of 3B is distinguished by basin-wide fluvial incision and widespread channel sand deposition;
- ◆ Sequence 4 (Lower Carbonate) is a coastal plain and shallow marine system comprising shales, sabkha-type evaporites and bay-fill sandstones.

The TAG-I is interpreted as three distinctive fluvial systems, each with an independent architecture and planform geometry and separated by significant breaks in sedimentation represented as unconformities, disconformities or stable geomorphic surfaces (palaeosols). Reservoir architecture is controlled by a variety of factors that vary upwards throughout the TAG-I. These include inherited relief at the Hercynian unconformity, rifting and magnitude of transgression. Effective TAG-I reservoir development is terminated by the ravinement surface at the base of Sequence 4.

The main reservoir comprises the two major fluvial sand packages of Sequence 3a and 3b that overlie and are contained within thick floodbasin/interfluvial intervals of non-reservoir siltstones with common palaeosol development. Recent drilling and coring, including the innovative sinusoidal well of ROD-6, has provided further insight into the complex and evolving geometries of these fluvial sand-bodies and improved the stratigraphic confidence in many of the techniques utilised in this palynologically barren reservoir.