Session: North Africa and Middle East
Middle East and North Africa: overview

J. REDFERN\(^1\) and J. CRAIG\(^2\)

\(^1\)University of Manchester, School of Earth, Atmospheric and Environmental Sciences, Basin Analysis and Petroleum Geoscience Group, Williamson Building, Oxford Road, Manchester M13 9PL, UK
\(^2\)Eni Exploration & Production Division, Via Emilia 1, 20097 San Donato Milanese, Milan, Italy
\(\text{(e-mail: jonathan.craig@eni.com)}\)

North Africa and the Middle East hold huge reserves and resources of oil and gas and are some of the most important regions for future hydrocarbon production. Recent drilling successes onshore Algeria and offshore Egypt, and renewed industry interest in Libya have re-invigorated exploration in North Africa. The Middle East holds the majority of the world’s remaining oil and gas and offers a showcase for new research into the major plays and recent exploration/production advances. The North Africa and Middle East session at the 7th Petroleum Geology Conference brought together 12 papers ranging from keynotes on regional play evaluation to detailed field studies. Ten of those papers are published in this volume.

Craig et al. provide a regional perspective that spans North Africa and the Middle East. The paper examines the entire stratigraphic interval and highlights the more challenging, older and deeper plays and higher risk, but more conventional, plays in under-explored frontier areas. It offers some thoughts on the potential to develop new play concepts and to extend known producing plays into new areas. Focusing on North Africa, Eschard et al. discuss the timing of uplift of palaeohighs and how they have influenced the Palaeozoic petroleum systems in terms of reservoir and source rock development and trapping configuration. They document how the interplay of tectonics, eustasy and subsidence rate produce complex stratigraphic wedge geometries which have important exploration significance. The paper by Lubeseder et al. concentrates on the early Carboniferous (Tournaisian to Visean) interval in North Africa, an alternating series of widespread shallow marine and more discrete fluvial reservoirs with interbedded offshore mudstone seals. It examines the glacio-eustatic controls of facies patterns along the stable continental margin, and identifies four potential stratigraphic trap types, using selected outcrop examples placed into a regional sequence stratigraphic context. Dixon et al. provide a case study of an integrated petroleum systems and play fairway analysis of the Ghadames Basin. Pulling together a large regional dataset and linking this to published work, the results offer insight into the timing of hydrocarbon charge and prospectivity of the basin. Luening et al. examine the frontier Kufra Basin in SE Libya. This basin is the subject of a current exploration campaign by several companies, hoping to unlock its as yet unproven potential. This paper provides information on the recent well, A1-NC198, drilled by RWE. Despite being dry and lacking hydrocarbon shows, the well still provides important data to improve the understanding of the regional petroleum play.

Moving east, two papers cover important petroleum plays in Egypt. Dancer et al. review the Gulf of Suez Basin, a classic extensional rift basin of Miocene age, with both syn-rift and pre-rift hydrocarbon plays. Exploration has been carried out here since the late 1800s, with over 10 billion barrels discovered to date, but poor seismic quality has hindered the identification of deep targets, such as the key pre-rift Nubia Sandstone reservoir. The paper highlights improvements in seismic data acquisition, using 3D ocean bottom cable (OBC) to enhance imaging. The authors present models of the tectonically controlled sedimentation that characterizes the syn-rift section, and show how this approach can re-invigorate exploration. Gordon et al. present recent work by a multi-disciplinary team evaluating the prospectivity of the North Red Sea. A new regional biostratigraphic and environmental analysis is presented from North to South through the Gulf of Suez and into the Red Sea, placing the Nubian sequences into a regional chronostratigraphic framework. Again, recent reprocessing and newly acquired seismic data has produced a step change improvement in imaging of the prospective pre-rift section. The authors suggest that all the key elements of the Gulf of Suez petroleum system exist in the North Red Sea, thereby high grading the prospectivity of the area.

Finally, three papers on the Middle East, the first by Fraser, uses an analysis of the prolific Upper Jurassic ‘Arab’ play fairway of the Middle East, and the application of play fairway risk mapping techniques, to demonstrate the play systems and assess remaining prospectivity. Ismail et al. present a short paper on analysis of the Late Cretaceous Shiranish Fm, in the Central Euphrates Graben of Syria. Detailed analyses characterize this potentially important source rock that is within the oil window in many areas. Finally, Garland et al. describe a detailed study of the appraisal of the Taq Taq Field, located within an anticline in the gently folded zone of the Zagros mountains, northeastern Iraq. This paper reviews the main reservoirs and the importance of characterizing the pervasive fracture system, which provides the reservoir connectivity and deliverability. The authors describe modelling of the fractures using data from core and image logs, and their critical role in a dual-media dynamic model used for field development planning.