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Arabian Plate and Surroundings: Geology, Sedimentary Basins and Georesources

Springer

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Preface

This book focuses on the Arabian Plate and its surroundings, including some key areas from Saudi Arabia, Lebanon in the east, to Egypt and Tunisia in Northern side of the African plate. It comprises a set of 10 papers combined into three different themes, dealing successively with the (I) Sedimentary basins, petroleum resources and reservoirs in the Arabian plate, (II) Geophysics and structural styles, (III) Hydrology, hydrogeology and water resources of the Arabian plate in the Kingdom of Saudi Arabia.

Part I: Sedimentary Basins, Petroleum Resources and Reservoirs in the Arabian Plate

Part I is made up of a very comprehensive set of three original papers.

The first paper by N. AL-Ghamdi and M. Pope deals with the Stratigraphic architectures, facies anatomies of the Lower Cretaceous Biyadh and Shu'aiba formations, and their implications on platform evolution and global correlation in Saudi Arabia, providing an updated data base on the sedimentary facies variations of the lower Cretaceous reservoirs in the eastern province.

The second paper by Gabor Tari et al., with an in-depth review of The Lower Cretaceous Chouf Sandstone of Lebanon which is a regional reservoir level in the Levant, northern Arabian plate, Lebanon. The authors discuss a model of a wide-rift style extensional episode for northern Lebanon during the Early Cretaceous (Valanginian to Barremian), which provided the accommodation space for the deposition of the Chouf Sandstone Formation. They present also some future exploration concepts.

The third paper by M. Bédir and M. Issaoui deals with a comprehensive view of the Seismic tectono-stratigraphy and hydrocarbon prospectivity of the deep marine Oligo-Miocene siliciclastic reservoirs lowstands in the Northern Levant Basin based on detailed interpretations of seismic sections and subsurface data in the offshore Lebanon.

The fourth paper by S. Rohais and R. Delphine is dealing with Source-to-sink analysis of the Plio-Pleistocene deposits in the Suez rift (Egypt). The authors present a study of the Plio-Pleistocene deposits in the Suez rift (Egypt) using stratigraphic records and quantitative geomorphology analysis. They constrain relief evolution in a rift setting from a high-resolution database at basin-scale including, digital elevation model, outcrops and subsurface data. They present five main stages ranging from rift initiation to tectonic quiescence (Oligo-Miocene) as well as a post-rift stage (Plio-Pleistocene).

Part II: Geophysics and Structural Styles

This part is mad up of three chapters.

The first paper by Gharbi et al., deals with The Southern Atlas front in southern Tunisia: Regional-scale geometry and structural evolution. It is based on presentation and discussions

of balanced cross section in the Southern Atlas front in the southern Atlas of Tunisia, including some insights from outcropping structures.

The second paper by H. Harbi is a review on the use of U-Pb zircon geochronology and geochemistry for some plutonic rocks from the Afif terrane of Saudi Arabia along the Arabian Shield. The author integrates the analyses in a big regional view and discusses the implications of the results for the crustal evolution in the Arabian shield.

The third paper by Al Garni et al. is about aeromagnetic data investigation of Al-Shamiyya area, northeast of Makkah quadrangle, Saudi Arabia. The authors integrate aeromagnetic data interpretations to underline and interpret the structural lineaments and framework in Al Shamiyya terranes, a key area and part of the Arabian shield.

Part III: Hydrology, Hydrogeology and Water Resources

The first paper by S. Bajabaa deals with groundwater contamination in the Wadi Haliy area, southwestern Arabian Shield, Saudi Arabia. The author shows a set of important analyses and interpretations in term of water pollution by heavy metals in an area with huge needs for good water resources in the Arabian shield.

The second paper by N. S. Al-Amri, and A. M. Subyani, treats the analysis of rainfall, missing data, frequency and PMP in Al-Madinah area, Western Saudi Arabia. The authors discuss deeply the estimation of rainfall variability, especially in arid regions, and major elements for flood prediction and water resources development design works. Such approach presents a major challenge to water resources management in arid regions due to the extreme random and erratic nature of rainfall events, which is further compounded by climate change impact.

The third paper by H. A. Saleem, M. O. Alharbi and A. M. Subyani discusses and presents the hydrochemical assessment of groundwater within the lower Wadi Ranyah, Western Saudi Arabia, using multivariate statistical technique. In fact, Wadi Ranyah is located in an arid region of the western mountains of Saudi Arabia, which is a highly potential resource for both surface and groundwater. This shallow aquifer is highly demanding and it is subjected to intense exploitation due to the influence of human activities.

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