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Subtle / Complex Trapping in Carbonates: Definition, Classification and Guidelines for Exploration

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ABSTRACT

With over than 10.000 exploratory wells already drilled, the Middle East is considered as a mature area. Until recently, conventional exploration was mainly focused on very prolific traditional structural traps. Rejuvenation of the Middle East portfolio now requires a different approach in exploration including a better understanding of subtle / complex trapping. Major exploration companies operating in the area already understand the need to provide a framework to investigate stratigraphic and more generally to subtle trapping mechanisms. However, to date, few studies have been published on this topic and none dedicated specifically to carbonate deposition settings.

This work consists of an innovative approach proposing definitions, classifications and guidelines for exploration of subtle and complex traps adapted to carbonates. The study consists of detailed post-mortems of carbonate fields all over the world, based on published and internal data. The goal is to identify the different trapping components of each field in order to be able to propose a clear definition, a detailed classification and robust guidelines for identifying subtle / complex traps.

In order to enable more accurate identification of subtle traps in carbonate depositional systems the following aims have been completed:

a. An improved classification of all trapping processes in carbonate depositional systems including definitions and example fields in which the defined mechanism is the primary and subsidiary trap type

b. A concise diagrammatic representation of trapping processes, particularly combination traps,

c. A database of all trap types, as defined in the classification, providing a wealth of information and diagrams on the depositional setting, field geometry and reserves in which certain trap types occur

d. A statistical study on the global occurrence of each trap type based on the data compiled from the database

e. A set of guidelines to accurately and efficiently identify each individual trap type, which includes key points to consider for each trap type, defining features, essential data and common trap localities as well as a generalized workflow.