

## **Petrographic Characteristics and Reservoir Quality of Paleozoic-Mesozoic Formations of the An Chau Basin, Onshore North Vietnam**

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### **ABSTRACT**

The An Chau basin is located onshore North Vietnam and covers an area of about 10,000km<sup>2</sup> and is filled with Devonian to Permian carbonates and Triassic to Jurassic siliciclastic deposits. The basin is still in an early phase of exploration, and information is mostly derived from hydrogeological wells and outcrops. Some wells that penetrated the basin have demonstrated potential Triassic source rocks (TOC:1-3 wt.%) and two main types of reservoirs: Paleozoic carbonate basement and Mesozoic clastic rocks. This presentation will review the conducted studies and provide an overview of the petrography and reservoir quality in the basin and encourage further exploration in this area. Fifty-two samples were selected for petrographic analysis in order to determine their reservoir potential. The sublitharenite, feldspathic litharenite and lithic arkose sandstones aged Triassic and Jurassic were classified after Folk, 1974. The grain sizes of analyzed samples are variable ranging from very fine-grained (0.063-0.1mm) to fine-grained (0.1-0.25mm) to coarse-grained sandstones (0.5-2.0mm). The grain shape is predominantly of sub-angular to sub-round, whereas the grain sorting is mainly medium to good. The grain contacts are mainly of concavo/convex and stylonite types, indicating the strong compaction of the rocks. Most of the samples contain high amount of cements (average of 22%). Clay minerals are composed of abundant Illite, Chlorite, common Illite-Smectite and lesser amount of Kaolinite. The primary intergranular pores are small, while larger amount of intragranular secondary pores were created. The pore connectivity is poor in general; except for few samples contain more than 10% of total porosity. The source materials of early-late Jurassic and early Triassic sediments were come from metamorphic rock fragments, volcano-plutonic rocks and ancient carbonate massifs. The carbonates contain large amount of skeletal fragments (34-80%). The matrix of packstone samples ranges from 5.4% to 20.4%, while it reaches up to 51.2% in wackstone. The results of the petrographic analyses suggest the carbonates to have formed in a deep marine environment and free from terrestrial sediment input. The integrated results indicate that the reservoir quality varies from poor to good for sandstones, and poor to fair for carbonate rocks. Strong compaction and cementation are the most significant factors that influenced the porosity of the potential clastic reservoirs.