

## **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 located onshore North Vietnam and covers an area of about 10,000 km<sup>2</sup>. The basin is still in an early exploration phase with hydrogeological wells and outcrop investigations. Recent exploration efforts through new wells penetrated basement of the basin have demonstrated potential source rocks (TOC:1-3 wt.%) and two main types of reservoirs: Paleozoic carbonate basement and Mesozoic clastic rocks. The 52 selected samples from new investigation were recently carried out for reservoir estimation in term of petrographic analysis. The sublitharenite, feldspathic litharenite and lithic arkose sandstones were classified after R.L. 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 of most studied samples are concavo/convex and stylonite types, indicating the strong compaction of the rocks. Most of the studied 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 studied 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 wackestone. These platform carbonates were formed in deep marine conditions and uninfluenced by terrestrial sediment supply. The integrated results indicate the variation of reservoir quality from poor to good for sandstones, and poor to fair for carbonate rocks. Most significant factors that influence the porosity of the potential clastic reservoirs are the strong compaction and cementation processes. The presentation will review the conducted studies targeting to contribute in understanding the petrography and reservoir quality of the rocks and encouraging the exploration activities in this area.