



## **Influence of crustal fluids on formation of fractured-cavernous-porous collectors on great depths**

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Origin of fractured-cavernous or fractured-cavernous-porous collectors is related to tectonophysical phenomena and secondary (post-magmatic) processes. We believe that oil-saturated magmatic rocks should be considered as a specific type of collector rocks which form, together with adjacent and overlying sedimentary rock masses, a regional oil- and gas-bearing sedimentary-magmatic complex. The granitic rocks might be formed not only as a result of acidic magma crystallization, but also due to a strong metasomatic alteration of primary sedimentary and sedimentary-volcanic rock masses. This hypothesis, although confirmed by many evidence, is still disputable up to date.

The model of generation of hydrocarbon deposits in the presence of carboniferous structures in collision zones of lithospheric plates is first developed by the authors. The most challenging problem is exploration of unconventional hydrocarbon deposits with multiple sources of hydrocarbon entry related usually to fractured zones occurring at depth of the sediment basin. The most striking example of successful development of such a new object for oil geology is exploration and development of oil deposits in fractured granitoid flanges of late Mesozoic basement of the South Vietnam.

Oil and gas potential of the Vietnam shelf attracts a special attention of geologists, first of all due to discovery and exploitation of the «White Tiger» deposit, where main oil reserves are concentrated within the granitoid basement. Today, commercial rates are obtained from magmatic rocks of the crystalline basement on several rises within

the Mekong OGB (*Dragon*, Rangdong, Tamdau, *Ruby*, Dongnai and other), as well as from igneous rocks of the South-Konshon depression (*Daihung*). Oil production and apparent evidence of oil and gas shows are fixed from Permian-Carboniferous and Devonian carbonate rocks constituting the «basement» of Cenozoic Bakbo basin, in Shong, Hong, and Hanoi depressions (Bakbo basin). These weakly metamorphosed fractured and cavernous Pre-Cenozoic rocks represent perfect collectors. We believe that these basins may be attributed to the «transitional» paracratonic complex of Cenozoic basins. It is assumed in this context that hydrocarbons might be generated practically synchronously with formation of the «granitic layer» of Sunda shelf crust. If so, the oil pool in granitic rocks appears "in situ" at the expense of organic matter resources of primary sediments.

The described mechanism does not disclaim the commonly accepted scheme of oil deposits formation in ledges of fractured rocks owing to a lateral hydrocarbons migration from surrounding terrigenous rocks, but embellishes it, and broadens possibilities of oil accumulation in the basement.

Exploration of these high-yield deposits with wells production exceeding 1500 tons per day covered more than 80% of oil production in Vietnam and became a precursor of the new prospective direction of hydrocarbons exploration which is capable of fundamental change of existing concept of oil-and-gas bearing systems as a whole. Nowadays thanks to bringing oil deposits of crystal basement into service the oil production in Vietnam reached 16 million tons per year and, in a short space of time, Vietnam became one of the leading oil and gas producing countries in the Pacific region.