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Origin of Lingshan Island and geotectonic significance

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Lingshan Island, with a height of 513.6 metres above sea level, is the highest island in Northern China. It's located in the Yellow Sea, from the southeast of Huangdao District, Qingdao, Shandong Province, China. The island is among the Sulu Orogenic Belt between the South China Block and North China Block. Therefore, the island is very important on the regional tectonics; and some studies about structural and sedimentary characteristics of the island have been reported, but its origin characteristics and type are seldom shown so far in the geological literatures. Through field geological investigation, the whole lithostratigraphy in the Lingshan Island belonged to the distal turbidites, inter-bedded with multiple periods of volcano clastic rocks. Zircon U-Pb dating of rhyolite sample in Lingshan Island showed that the ages concentrated into 108~126 Ma, in the Early Cretaceous of the Mesozoic. It was originally formed when the North China plate and the Yangtze plate collided. In the later stage, it has been under the influence of interaction between the Pacific plate and Philippine plate and their movement against the Eurasia. From the viewpoint of geodynamics, it is revealed that the Lingshan Island was formed by multiple dynamic processes including tectonism and magmatism (both volcanism and intrusion). The results are helpful to the understanding of formation and sedimentation as well as hydrocarbon generation and accumulation in the adjacent basins.

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Stratigraphic and structural relationship between the "Continental Intercalaire" aquifer and the shale gas reservoir in Southern Chotts Basin of Tunisia

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The hydrocarbon demand is incessantly growing that makes the need to vary the energy sources inevitable. For this reason we tried to put highlight on the unconventional resources, and because of the controversies it has raised and especially the fact that this industry could damage aquifers, we chose to focus our work on the relation between the lower cretaceous "Continental Intercalaire" aquifer and the Silurian hot shales in the southern Chotts basin of Tunisia, being based on the seismic and well data. The term continental intercalaire refers to the continental episode located between two cycles of marine sedimentation. It is characterized by normal to low energetic deposition that facilitates the deposits of massive sandstones and sand beds with some intercalations of siltstones and shales. The lowermost part of this formation is marked by the presence of interbeds of dolomite and anhydrite. The Jurassic Sebaia Evaporites formation is dominated by massive anhydrite and shale beds with some sandstone intercalations. As seen in the seismic, Sebaia Evaporites layers have high energy that made it easy to recognize. The Silurian hot shales are highly faulted. The lowermost part of the Silurian is marked by the presence of the "Hot Shales" representing the major source rock of the Sahara platform. This unit consists of dark grey to black shale. A regional study of the southern Chotts basin showed that the evaporites layers are present in the whole study area. These layers, which represent a protection for the aquifer, and constitute a separation between the two reservoirs (water and hydrocarbons), have an average thickness of 450 m in the petroleum wells of the area. So there is no clear contact between the continental intercalaire and the Silurian hot shales, if the faults which reach the two targets are sealed. An FMI can be done to detect the sealing of these faults. We used 4 wells in our study; only one well reaches the Silurian hot shale formation. For that reason, a lithostratigraphic and wire line logging correlation between wells has been established to see the extension and continuity of the hot shale formation. The resulting stress fields evolved through the Pan African and Paleozoic events within this area recorded poly-phase deformations since the Cambrian time to the present day, resulting on the structuring of the area in NW-SE and ESE-WNW faults. Geophysical evaluation highlights that some of the identified faults pass through the "Continental Intercalaire" aquifer reservoir and reach the Silurian hot shale. In those places, even the Jurassic evaporites series are affected by those faults, but they don't present a high throw.

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