

## **The Study Of The Stratigraphy And Class Sequence Of Slaibat Depression In Southern Iraq (A Review)**

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### **Abstract**

The Slaibat depression covers rock formations extending from the Pliocene era in the late Triassic to the beginning of the Quaternary era in the Pleistocene and Holocene eras.

### **Introduction**

The depression is considered one of the most important natural features in Al-Muthanna Governorate, in addition to its agricultural importance, the use of the waters of the depression for irrigation, livestock grazing and fish farming. It is considered a strategic reservoir to store the torrential water coming from the valleys surrounding the depression, on the western side of the plateau, the groundwater, and the excess water from the thirsty river through the Amir River, which was established in 1993, and which is the main source of water in the depression.

The Slaibat depression suffers from a number of problems, the most important of which is the loss of large amounts of water by evaporation, due to its wide area, shallow water depth, high temperatures and high salinity values. The emergence of a number of other problems, including the use of environmentally harmful substances, such as chemical pesticides with a high content of heavy elements, that can be transmitted through the food chain by crustaceans, fish and waterfowl to humans, as well as the pollutants that are thrown into it, the most important of which is sewage water and the agricultural waste it contains, such as fertilizers, pesticides and sewage waste, and groundwater that leads to raising the salinity values in the waters of the depression.

### **Tertiary sediments:**

Studies indicate that the oldest exposed rocks in the study area, go back to the time, the formations of Dammam, Euphrates, Ghar and Dibdiba, it occupies the higher parts of the depression (Al-Shammari, 2006).

**Euphrates Formation:**

This formation is exposed to the northwest of the Slaibat depression (General Authority for Groundwater, Al-Muthanna Branch, 2016), its thickness ranges between 50 - 3 meters (Al-Shammari, 2006), this configuration is due to the lower Miocene, it consists of two layers, the upper layer consisting of marly limestone and clay, while the lower layer consists of calcareous aggregates containing gaps (Al- Rawiet al., 1983).

**Ghar Formation:**

This formation is exposed to the west and northwest of the depression (General Authority for Groundwater, Al-Muthanna Branch, 2016), its thickness ranges between 40-20 meters and dates back to the time of the Lower Miocene. It gradually turns into marly limestone to form the Euphrates (Al-Shammari, 2006), it consists of fine pebbles, coarse sand, crystals of gypsum and anhydrite, dams with lime or gypsum bonds, sandstone or clay (Buday, 1980).

**Dammam Formation:**

This formation is exposed to the west and southwest of the depression (General Authority for Groundwater, Al-Muthanna Branch, 2016), its thickness ranges between 150-100 meters, and it dates back to the middle and upper Eocene time (Al-Shammari, 2006). It generally consists of rammed limestone of gray color in its upper parts, it turns into chalk in its lower parts, consists of three units, the upper is of recrystallized limestone, and the middle is of adobe limestone and flint (AL-Rawiet al., 1983), as for the lower unit, it is represented by the Jil formation (Al-Khoury and Al-Droubi, 1990).

**Dibdiba Formation:**

This formation is exposed in the southeastern part of the Salibat depression (General Authority for Groundwater, Al-Muthanna Branch, 2016), be covered with unstable sand slabs, the age of this formation is due to the Upper Miocene and Early Pliocene. This composition consists of agglomerated materials such as sand, gravel, and rammings of igneous acidic origin, it was derived from the rocks of the Arabian Nubian Shield, and it also contains secondary gypsum crystals (Sadik, 1977), its thickness ranges between 9-2 meters and it is covered in non-harmonic Quaternary sediments (Dicran, 1997).

**Quaternary sediments:**

They are incompatible deposits that cover all the older geological formations, forming an irregular surface cover, and are divided into the Pleistocene deposits and the Holocene deposits (Issa, 1995).

**Pleistocene deposits:**

They were ancient sediments that include the deposits of rivers, lakes and winds, these deposits are thick and uneven, consists of fine gravel bound by sand and

gypsum. The mineral components of gravel are quartz, flint, carbonate and clay (1975, Hamza).

The Pleistocene deposits in the Salibatdepression include the sedimentation of flood fans, as a result of the presence of valleys sloping from the west towards the depression due to the slope difference, these are Wadi Al-Ghar, Al-Sadeer, Abu Gwer, Al-Khail, Al-Ash'ali and Al-Kisir (Abd, 2011), it was considered a transitional zone between the alluvial plain and the western plateau, the slope of the earth's surface is towards the sedimentary plain, these deposits consist of pieces of carbonate rocks and loose gravel, which mix with sand and gypsum crust, and the thickness of these deposits is unknown (1995, Duraid).

### **Holocene deposits:**

The Holocene era began from the end of the last glacial period of the Pleistocene era and extends to the present, it started with a period with a dry climate that gradually changed to a humid one, after that, it became a desert climate in central and southern Iraq, especially the Salibat depression (Sabah and Barwary, 2002).

Holocene deposits include valley sediments, continental marshes, aerodynamic deposits, and floodplains, these deposits consist of clastic materials of sizes ranging from coarse gravel to fine sand, as in the deposits of valleys, or it consists of sand, silt and clay, as in the sediments of floodplains (Al-Rawi,1977), they were generally softer than Pleistocene deposits.

It is characterized by containing a significant amount of water, which was close to the surface, especially in areas near rivers (Parsons,1957), the following types of Holocene deposits have been distinguished in the Slaibat depression:

#### **1. Flood plain deposits:**

These sediments cover large areas of Slaibatdepression, it includes sand, mud and silt, it was formed as a result of the rivers flooding and then their tyranny over the neighboring lands. Sedimentation of the sediments it carries on a periodic and continuous basis for long periods of time (Al-Ghurairi, 2000).

#### **2. Depression fill deposits:**

These sediments were found in the western and southern parts of the Slaibat depression, its thickness reaches more than 3 meters in the sedimentary plain from the lowlands and less than 3 meters in the desert region (Dicran, 1997), it includes fine sediments consisting of sand, clay and silt. The product of rock weathering and erosion processes by torrents and winds (Al-Ghanimi, 2015), the depressions filled deposits also contain pieces of modern shells (Kamel, 2014).

#### **3. Sabkho deposits:**

These sediments are found in the northwestern parts of the depression that the ancient Euphrates River traverses, as for the nature of its components, it is alluvial clay deposits derived from more than one source, transported by river water, the ancient marine waters mixed with groundwater filtered from top to bottom have a great impact on the process of salinization of sediments (Semaan, 1985; Al-Ani, 1987).

#### **4. Aeolian deposits:**

These sediments form a belt extending from the northwest to the southeast of the Slaibat depression, its direction indicates the direction of the prevailing winds, covering sediments filling depressions, floodplains, and formation of bears (Dicran, 1997), there are two types of deposits in the region; **The first type**, was Burkhan sand dunes consisting of silica or calcareous sand grains. **The Second type**, it was in the form of sand slabs, the thickness of which does not exceed 3 cm, with a rocky structure similar to sand dunes (Al-Ghurairi, 2000).

#### **5. Marsh deposits:**

These sediments consist of silt and sand, with colors ranging from greenish and bluish to black and with different moisture levels, as well as the shells of modern composition, with a thickness of not more than 3 meters (Abd, 2011). Marsh deposits are distinguished from depression deposits by the presence of an upper horizon, consists of organic materials of dark or black color. The color of this horizon changes downward to dull gray or greenish-gray and there is a noticeable decrease in the organic matter (Dicran and Mahdi, 1994).

#### **6. Shallow Depression deposits:**

These deposits are located in the north-central and eastern parts of the Slaibat depression, by the form of flood basins in which water is permanent or temporary, consists of soft-textured friable materials consisting of clay, sand, silt and alluvial clay, it was brown or greenish-gray (Al-Khafaji, 2008).

#### **7. Anthrop gene deposits:**

These sediments are located on both sides of the ancient Euphrates River which crosses the Slaibat depression to the west of its current course, Sediments resulting from the remains of ancient settlements and archaeological hills, it was characterized by the presence of pieces of bricks and pottery mixed with fine crumbs (Abd, 2011).

#### **8. Crevasse Splay deposits:**

These sediments consist of coarse clastic materials compared to the sediments of the flood plain, consists of a high percentage of sand and silt and a small percentage of clay, increases towards the sedimentary basin and is the result of the collapse of the cliffs of the rivers during the floods (Duraid, 1995).

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