

## Southern Iraq formations

### 1- Hammar Formation **تكوين الحمّار**

This formation was first identified in al-Zubair well-31 and thickness -7 m. it's contains mud and sand rocks. Some of the modern fossils were identified in this formation, and also found in some wells of the West Qurna and Nahr Omar .

### 2- Dibdibba Formation **تكوين الدبدبة**

It contains sand, gravel, clay and clay with some sandy and limestone, which are located under clay and modern clay to Hammar formation. The maximum thickness of the unit is (315 m) at the well of Sayba-1.

### 3- Lower Fars Formation **تكوين فارس الاسفل**

This unit was first known in the Nahr Omar well and was considered as a basis for the area of southern Iraq, where it was found in thickness of 306 m. The maximum thickness of the formation is 400 m in the area of the well Majnoon - 1 and then gradually decreasing towards the south - west, where it ends completely in the approved area east of the wells Samawah - 1, Shawia - 1, Obaid - 1, Abo khima - 1. This formation contains layers More than limestone towards the north and on the layers of the rock of shale and anhydrite eastward and on the rocks of shale and lime to the west and south.

### 4- Ghar Formation **تكوين الغار**

This unit was defined in Zubair well -3 and thickness (129 m). This formation was determined with beginning of the layers containing the clastic transported from sand and gravel, which is located under mud rocks, anhydrite and lime to form the lower fars. It contains coarse sand, gravel and some limestone sandstone. The highest thickness of it (175 m).

### 5- Dammam Formation **تكوين الدمام**

The region of the example for this formation in Saudi Arabia , but the Zubair well -3 was selected as an additional example of thickness (225 m) and was found to be surrounded by unconformity surface of Ghar formation. The highest formation was seen when limestone or dolomite rocks appeared under the Ghar rocks, this unit contains gray limestone As well as dolomite rocks with soft and coarse crystals with fissures in them.

### 6- Rus Formation **تكوين الرس**

This unit was first discovered in Saudi Arabia and was later identified as the Zubair well -3 as an additional example site where it reached thickness (100 m). This unit contains overlapping layers of white anhydrite rocks and dolomite

rocks. Thickness reached to (230 m) and then suddenly decreases to the north where disappears at the wells Nahr Omar field.

#### 7- Umm Er-Radhuma Formation **تكوين ام رضة**

The thickness (458 m) it was determined with the formation of layers of lime rocks that under the last thick layers of the anhydrite in Rus formation. The formation contains layers of dolomite rocks, which are characterized by high porosity with a few layers of limestone and anhydrite. The highest thickness of it is (514 m) in the area of the well Seba-3 and then suddenly decreases towards the north where ends at Majnoon well -1.

#### 8- Tayarat Formation **تكوين طيارات**

This rock unit was known as a surface geological section of mountain Tayarat (western Iraq), the highest was selected with the beginning of layers of heavy oil saturated (bituminous). This formation contains layers of dolomite rocks with medium and coarse crystals with the presence of some of the lime layers and the maximum thickness of it is (350 m). This formation appears on the surface of the earth in the western region of Iraq and has a Highest rate of Limestone .

#### 9- Shiranish Formation **تكوين شيرانش**

The village of Shiranish (northern Iraq) is the area of the example of this formation, where he was first known there and was later selected Zubair well -3 as a reference to it. Where the thickness reaches (118 m). The formation contains layers of brittle gray shale and fragile limestone rocks and the maximum thickness of it is (180 m) in the Shawia well – 1.

#### 10- Hartha Formation **تكوين الهارثة**

This rock unit was first identified in the well of Zubair-3 and thickness (29 m) and covered with shiranish formation rocks, which are separated by an unconformity as evidenced by sudden change from the very deep Facies of shirans to the shallow Facies form the hertha.

#### 11- Saadi Formation **تكوين السدي**

The example area for this rock unit is Zubair well -3 and thickness (270 m) and is covered with formation of the Haretha. The highest unit is layers of limestone that are under the mud limestone rocks and shale for Hartha formation.

**12- Tanuma Formation** تكوين التنومة

The area chosen for this rock unit is the Zubair well -3 and thickness (38 m) where the formation was selected with the beginning of shale under the mud limestone rocks of Saadi, it has been found contain layers of black rock shale with some of the transferable and oolitic limestone rocks. The maximum thickness of the formation is (70 m) in the area of Sabah well-2 and then decrease in all directions.

**13- Khasib Formation** تكوين الخصب

The best area for this rock unit is the Zubair well -3 and thickness (55 m), where the highest was selected with the beginning of layers of mud limestone with some of shale, the maximum thickness of it is (110 m) in the area of the well Siba -1.

**14- Mishrif Formation** تكوين المشرف

This rock unit was known in the example area at the well Zubair-3 and with a thickness of (130 m). The highest formation was chosen with the appearance of layers of white limestone and rose limestone which sometimes contain limonite minerals. These are located under the layers of the limestone rocks for Khasib. This unit contains layers of sold limestone and limestone - porosity. The maximum thickness of the formation reaches (400 m) in the north of Majnoon well.

**15- Rumaila Formation** تكوين الرميلا

The example area for this rock unit is the Zubair well-3 area, with a (134 m), and maximum thickness of the formation is (115 m) in the area of the Ratawi well - 1 and then gradually decrease until to (20 m) in the area of Majnoon well .

**16- Ahmadi Formation** تكوين الاحمدي

The location of the example in the Zubair well -3 and thickness (136 m). It consists of overlapping layers of gray and green shale rock, mud limestone and gray limestone with little transferable limestone rocks and shale rocks.

**17- Muddud Formation** تكوين مودود

It was first known in the Dukhan well -1 (in Qatar) and was later selected as Zubair-3 as an additional site with a thickness of 138 m. It was covered with layers of Ahmadi formation .

**18- Nahr Umr Formation** تكوين نهر عمر

This unit was known at the example site at the well of Nahr Umr-2, where the thickness (193 m). The maximum thickness of the formation is (366 m) at Abo khima well -1. It consists from black shale with layers of limestone followed by layers of soft, medium, granular and porous sandy rocks.

**19- Shuaiba Formation** تكوين الشعيبية

As is known in the region, a limestone is not layered. It may be a clay limestone, pervade with layers of quartz and silts. In some cases, the content crystallized Dolomite layers.

**20- Zubair Formation** تكوين الزبير

This important formation, which is the main reservoir of oil and gas in the fields of south and central Iraq, consists of rock, shale, sand and salts rocks overlapping and mutually.

The formation of Zubair is a Tidal environment that may be in some parts a deltaic environment, which is the result of the erosion of the Arabian Shield and the stable shelf which risen during the Jurassic period .

This stratigraphy unit was divided into five parts in the typical area:

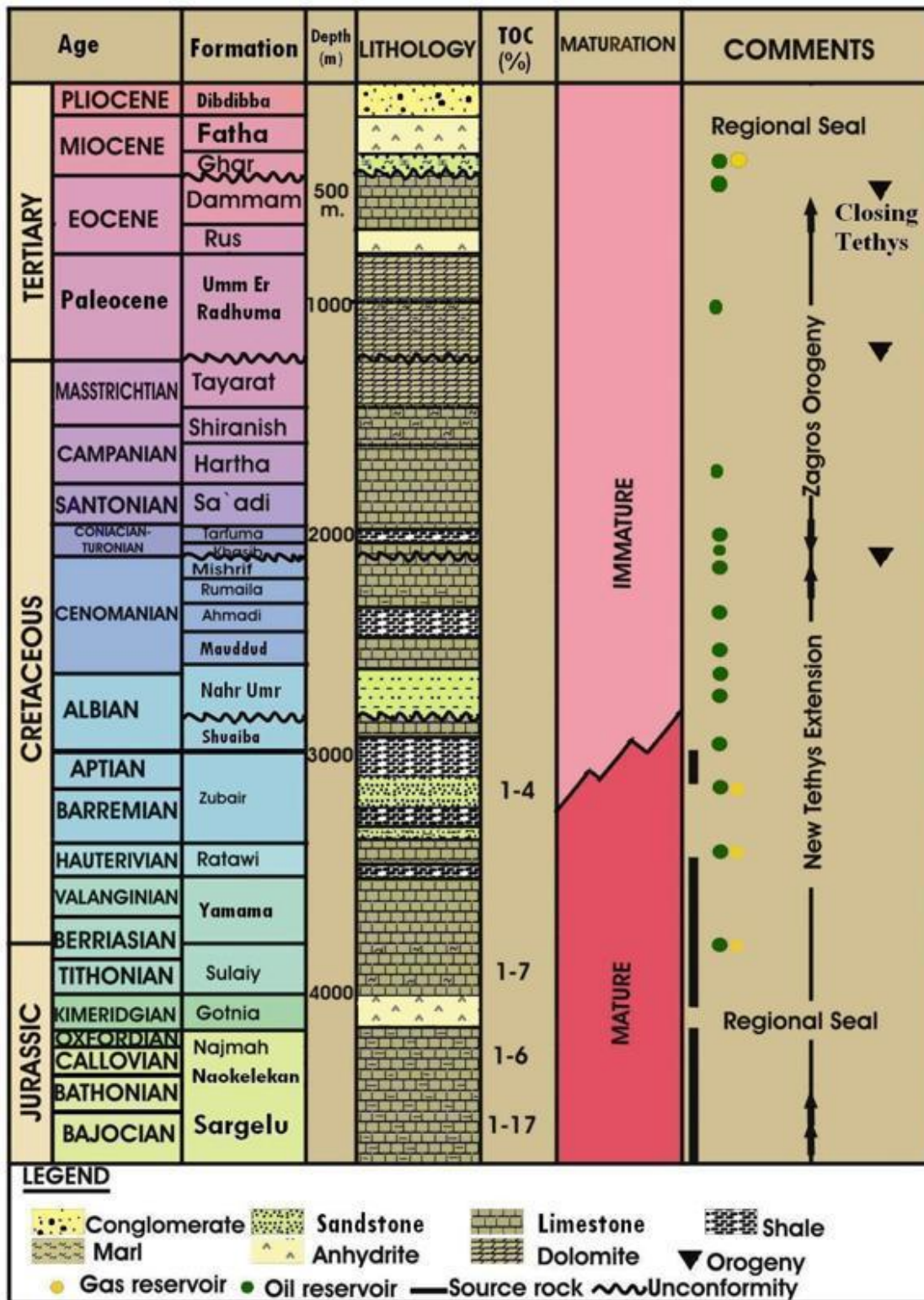
- a. Shale with two units of sand and a little silt.
- b. Sand with a few shale and silt.
- c. A black or greenish shale with a little sand.
- d. Sand often with secondary layers of silt.
- e. A greenish black shale with sandy silt.

**21- Ratawi Formation** تكوين رطاوي

This rock unit was known at the example site in the Ratawi well -1 thickness (351 m), the formation consists of solid limestone and overlapping with shale rock. The maximum thickness is (700 m).

**22- Yammama Formation** تكوين يمامة

This unit is known as a surface section in Saudi Arabia, The section of the Yamamah contains layers of transferred , porous limestone and reservoir limestone. The maximum thickness of the formation is (365 m) in the Zubair well-42.



Stratigraphic column of South Iraq, Basrah region (Rumaila and Zubair oil fields), showing key source rocks, seals, and structural events (Al-Ameri, 2011)