

Mesozoic Stratigraphy

Jurassic Period

The Jurassic rocks are exposed as isolated patches at some eroded cores and limbs of anticlines in the High Folded, Imbricated and Thrust Zones of Northern Iraq. Jurassic formations are crops out in the Sirwan Valley, Surdash anticline, Shaure Valley (Rania), Rawandwz, Gara Mountain (Amadia), Banik (NE, Zakho), and partly in the Western Desert. In addition to their subsurface presence through (Kirkuk wells, Butmah, Alan Adaya Makhul, Thurthar, Awasil, Samawa, Ratawi, Ana, East Baghdad, Qalian, Khlesia and Najmah (fig. 1).

The Jurassic in Iraq represented by two sedimentary cycles which separated by ***Middle Kimmerian Orogenic Movements***:

- 1- Lower cycle (Upper Triassic – Middle Jurassic).
- 2- Upper cycle (Upper Jurassic – Lower Cretaceous).

The ***Lower Cycle*** begins with a great transgression of Neo-Tethyan Sea in an elongated form of NW-SE trends, which covers all Iraqi territory. During that time some unconformities are recorded in ***Stable*** shelves that indicate an uplifting. The western part of Iraq is characterized by dominating clastic facies. Central and Southern part represented by shallow marine to lacustrine sediments. While the Northern part covered by deep sea (Fig. 2). The ***Upper Cycle*** also begins with a great transgression that continuous to the Cretaceous. Some uplifting occurred within the Western part of Iraq. The facies distribution of this cycle is similar to previous cycle (Dominating clastic facies within western part, and gradient to deep sea to North and Northeast), (Fig. 3).

Exercise:

- 1- By using (Fig. 1), all tables and correlation chart of previous Lab., draw stratigraphic cross section for Jurassic period between points (A, B, C and D).
- 2- After drawing Stratigraphic sections for Triassic and Jurassic periods with correlation chart and your text book, answer the following questions:
 - a- What's the main similarity between (Ubaid & Muhawer), (Sargelu & Butmah) and (Zorhauran & Baluti) formations.
 - b- Which formations are hydrocarbon generations in Jurassic and which formation of Jurassic period containing Coal beds.
 - c- What are the characteristics of the Najmah, Chia gara and Naokelekan formations?
 - d- Draw Stratigraphic column for Jurassic period in Northern Iraq (Kurdistan), by using standard lithologic symbols for the formations.
- 3- Draw paleogeographic facies map for Jurassic period by using Figs. (2 & 3) and Figs. (4.6 & 4.7) in your text book (Regional geology of Iraq).

1. Sirwan Valley
2. Avrwman
3. Surdash
4. Rania
5. Rawanduz
6. Amadia
7. Bnavi
8. Butmah
9. Alan
10. Adayah
11. Najmah
12. Kirkuk
13. Makhul
14. Sammara
15. Thurthar
16. Ana
17. Awasil
18. Abu-jir
19. Mussaiab
20. Muhawir
21. Ubaid
22. Hussaynite
23. Sammawa
24. Ratawi
25. Nahr Ommer

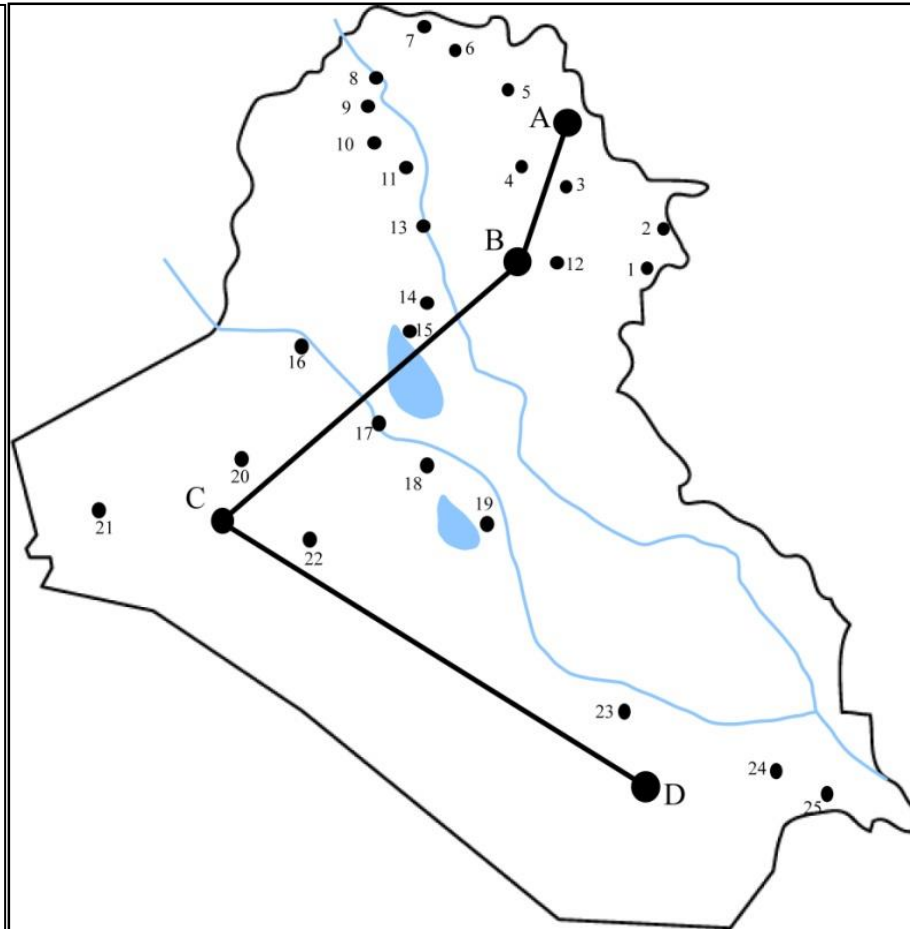
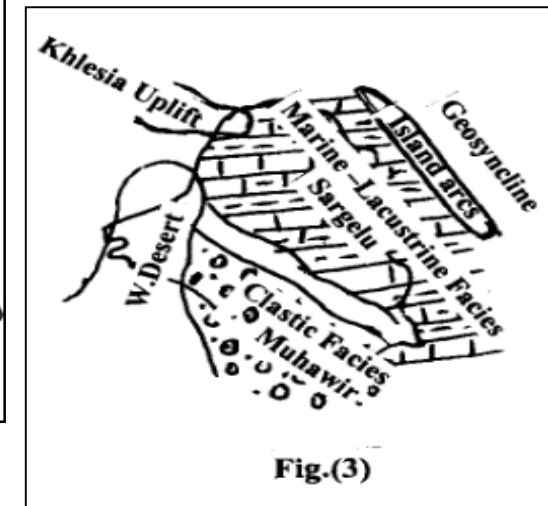
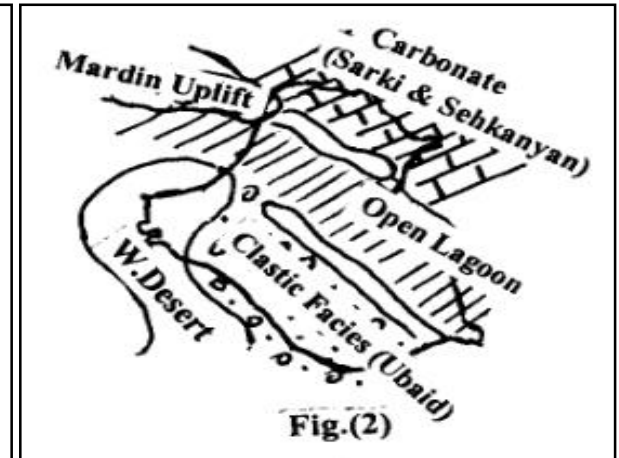


Fig. (1): Location Outcrops & Wells) map of Jurassic formations in Iraq.



Location	Formation	Environment	Thic.	Lithologic Description
A	Chia Gara	Open Sea	230 m.	Thin bedded Limestone and calcareous shale, upper part consists of limestone and marls interbedded with shales.
	Barsarin	Lagoonal-evaporite	20 m.	Laminated limestone, with dolomitic, cherty-brecciated limestone, showing shaly, marly & anhydritic admixture.
	Naokelekan	Euxinic-slightly subc	14 m.	Interbeds of bituminous limestone, dolomitic limestone, fossiliferous limestone and shale.
	Sargelu	Euxinic-Marine	115 m.	Thin to medium bedded black bituminous Lst., dolomitic Lst., shale and thin chert beds in upper parts.
	Sehkanian	Neritic Lagoonal	180	The upper (51)m. dark dolomites & cherty dolomitic Lst. The middle (44)m. Organic, fossiliferous limestone, and dolomitic limestone. The lower (85)m. dark dolomites & dolomitic Lst. With some breccia.
	Sarki	Lagoonal Evaporite	300	The upper (180)m. alternation of dolomites, cherty dolomites, with some shales & marls. The lower (120)m. cherty dolomitic Lst. Alternating with some breccia,

Location	Formation	Environment	Thic.	Lithologic Description
B	Chia Gara	Open Sea	120 m.	Same as in A, with conglomeratic beds at the base.
	Karimia	Narrow euxinic basin	610 m.	Dark calcareous mudstone, some marl bands at upper part.
	Makhul	Shallow water near shore	470 m.	Arg. Lst. & calcareous mudstone with pseudo oolitic Lst. & nodules of anhydrite.
	Najmah	Neretic Lagoonal	330 m.	Alternation of recrystallized Lst. & oolitic Lst. & shales.
	Gotnia Anhydrite	Supersaline Lagoon	200 m.	Bedded anhydrite with iron calcareous shale & bituminous black shale & recrystallized oolitic Lst.
	Sargelu	Euxinic Marine	370 m.	Same as in A, with higher percentage of shale & sand admixture.
	Alan Anhydrite	Lagoonal Evaporite	60 m.	Bedded anhydrite with pseudo oolitic limestone.
	Mus Limestone	Neritic	55 m.	L. part: Dolomitic Lst. Alternating with marly Lst. & calcareous shale and some anhydrite. U. part: recrystallized & dolomitized Lst. With marly Lst.
	Adaiyah Anhydrite	Lagoonal	90 m.	Bedded anhydrite with intercalations of Lst. & black calcareous shale & greenish marls, both with anhydritic nodules.
Butmah	Lagoonal shallow water	500	U. part (200)m. Oolitic, partly detrital Lst. With shaly&argillaceous interbeds&anhydrites. M. part (180)m. Dominetly Lst., some times oolitic,, sand and shale admixture. L. part (120)m. Limestone with some bedded anhydrites at the top.	

Location	Formation	Environment	Thic.	Lithologic Description
C	Muhaiwir	Neritic nonmal salinity	50m.	U. part: Well bedded limestone and marly limestone. M. part: Sandstone and marly limestone. L. part: Sandy oolitic limestone.
	Ubaid	Shallow littoral lagoon	75m.	U. part: Recrystallized, oolitic sandy Lst. With chert beds at bottom, some times with shales. L. part: Calcareous & clayey sandstone with marl interbedded & iron ore lenses.

Location	Formation	Environment	Thic.	Lithologic Description
D	Sulaiya	Neritic	240 m.	Detrital, some oolitic, recrystallized Lst., rare interbeds of shales.
	Najmah	As in B	220 m.	Dolomitized chalcky Lst. ,peletal anhydritic Lst.
	Gotnia	As in B	14 m.	As in B + Rock salt
	Muhaiwir	As in C	50 m.	Same as in C
	Alan	As in B	60m.	Same as in B
	Mus	As in B	55 m.	Same as in B
	Adaiyah	As in B	90 m.	Same as in B
Butmah	As in B	60 m.	Marl, silt, shale & hematitic sandstone.	