iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IX **Month of publication:** September 2026

DOI: https://doi.org/10.22214/ijraset.2026.84899

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

Petrography and Depositional Environment of Bathonian Callovian Sediments Exposed along Kuldhar River Section, Jaisalmer Basin, Western India

Ashish Jinjwadiya[1], Kailash Choudhary[2], Jitendra Kumar Sharma[3]
[1]*Department of Geology, Government Bangur College, Didwana – 341303*
[1, 2, 3]*Department of Geology, University of Rajasthan, Jaipur – 302004*

Abstract: ***This study investigates the petrography and depositional environment of the Bathonian Callovian sediments exposed along the Kuldhar River section represents the Bada Bag and Kuldhar members of the Jaisalmer Formation in the Jaisalmer basin.***
An integrated analysis of outcrop, microfacies and petrographic features were undertaken to interpret the depositional environment. Twenty **one** ***thin sections were prepared from carbonate beds for detailed petrographic study. The results indicate that the packstone beds are predominantly composed of ooids and bioclasts, with micrite forming the principal cementing material.***
The combined petrographic evidence and fossil assemblages suggest that these sediments deposited in a shallow-marine environment.
Keywords: ***Jaisalmer basin, Bathonian–Callovian, Kuldhar River section, petrography, micrite, depositional environment***

I. INTRODUCTION

The Jaisalmer basin a pericratonic shelf basin, well known for its well-exposed fossiliferous sedimentary successions of Mesozoic period (Pandey et al. 2022). The basin attracts considerable attention from geoscientists because of the diverse and well-preserved features of its Jurassic succession.

These include abundant marine fossils, well-developed sedimentary successions, well-preserved primary and secondary sedimentary structures, dinosaur footprints etc. (Kalia & Chowdhury l983; Pandey & Fürsich 1994; Mukherjee 2009, 2010, 2017; Pandey et al. 2009a, 2009b, 2014, 2018a; Sharma & Pandey 2016; Alberti et al. 2017).

The Mesozoic successions overlying the Precambrian basement rocks (Fig. 1.) of the Jaisalmer grouped into six formations (Lathi, Jaisalmer, Baisakhi, Bhadasar, Pariwar and Habur formations). Sediments of the Jaisalmer basin displays the variation in depositional environment, begin with non-marine fluvial, deltaic, and lacustrine deposits (representing the basal part of the Lathi Formation), followed by marginal marine sediments, and subsequently a sequence of alternating non-marine, marginal marine, and fully marine deposits ranging from terrestrial siliciclastic to marine carbonate deposits (Pareek 1984, Das Gupta, 1975, Mahendra & Banerji 1989, Fürsich et al. 1992, Pandey et al. 2005, 2006 a, b, c).

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

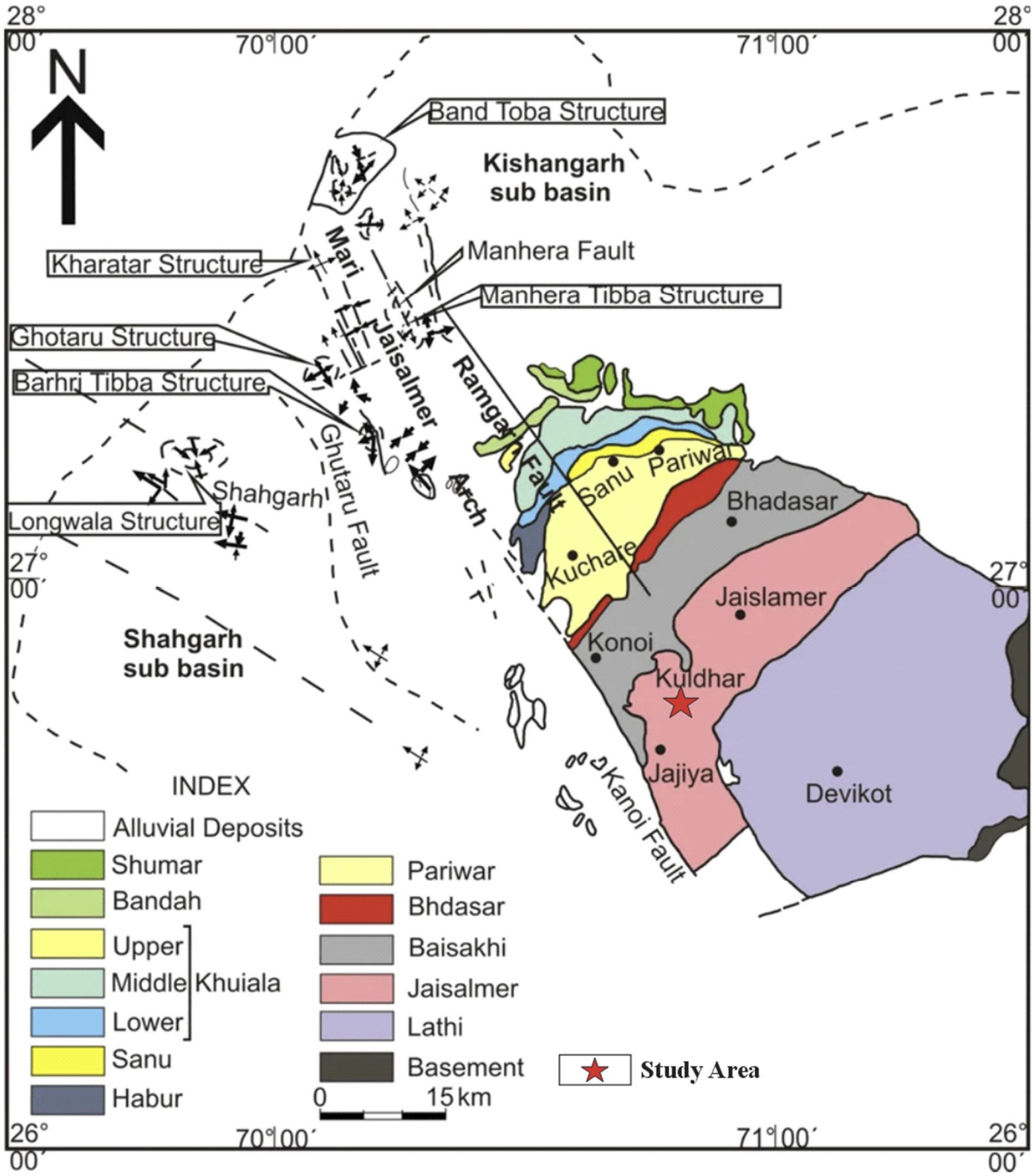


Fig. 1 Geological map of the Jaisalmer Basin (modified after Das Gupta 1975) and study area (★)

Lithostratigraphically, Jurassic sediments of the Jaisalmer Basin have been grouped into four formations: Lathi, Jaisalmer, Baisakhi, and Bhadasar (Fig. 2). The Jaisalmer Formation is a predominantly calcareous and highly fossiliferous Jurassic unit that contains diverse ammonites, brachiopods, bivalves, gastropods, echinoids, crinoids, bryozoans, and corals. The age of the Jaisalmer Formation ranges from the Bajocian to the Oxfordian, and it has long served as a key succession for both palaeontological and sedimentological studies, as well as for interbasinal correlation with the adjacent Kachchh Basin (Swaminathan et al., 1957; Pandey and Fürsich, 1994). Because of its rich fossil content and well-preserved stratigraphic record, the formation provides an excellent framework for studying depositional history, faunal succession, and marine transgressive events in western India. Within the Jaisalmer Formation, the Bathonian–Callovian interval is represented by the Fort, Bada Bag, and Kuldhar members. Bathonian Callovian sediments exposed along the kuldhar river section has been assigned bada bagh and kuldhar members.

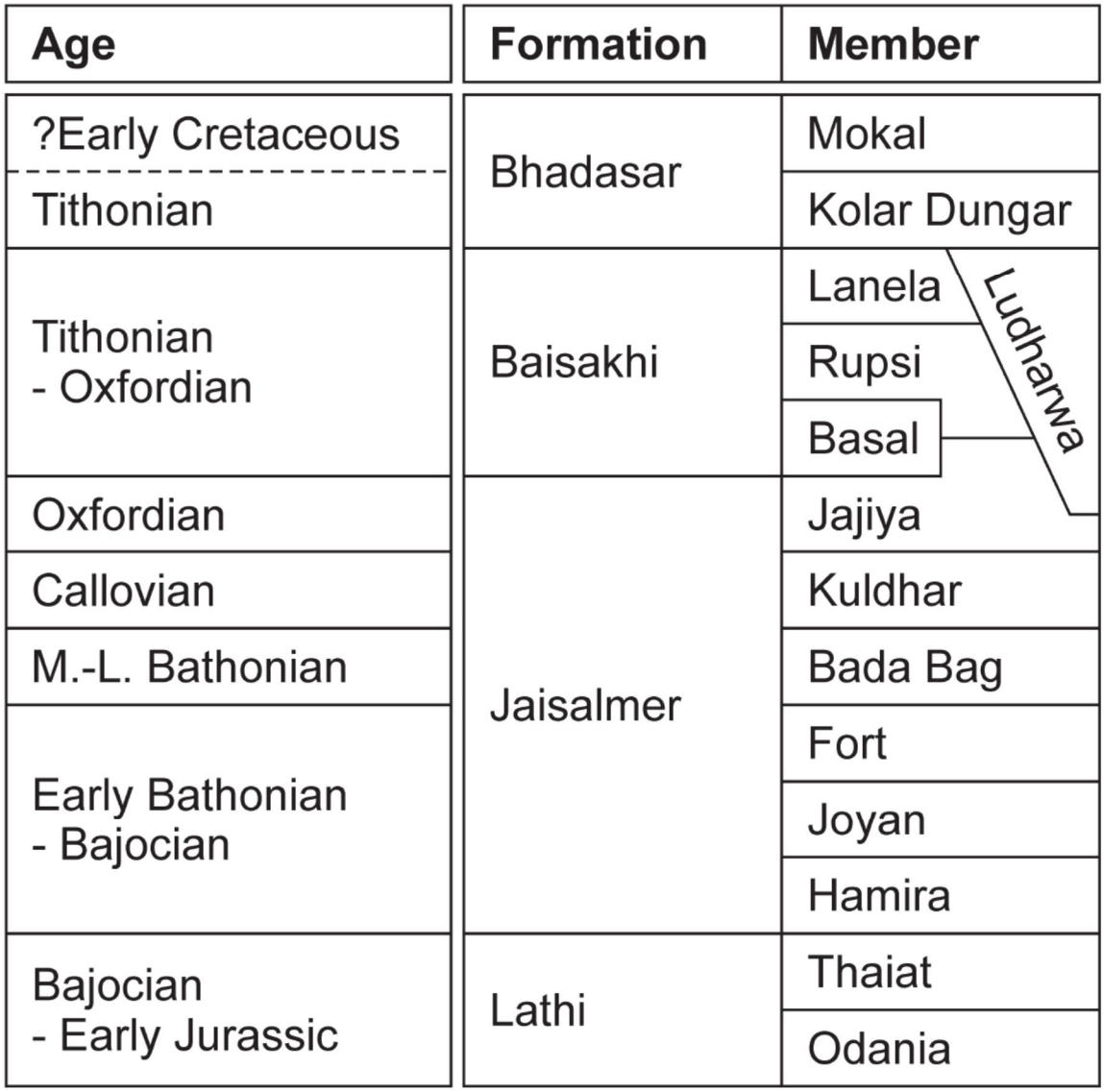


Fig. 2 Lithostratigraphic framework of the Jurassic strata of the Jaisalmer Basin (modified after Das Gupta, 1975; Alberti et al., 2017).

In the present paper, twenty-one thin sections prepared which is collected from two locations at Kuldhar river section in the western part of the Jaisalmer basin. Carbonate succession examined in this study corresponds to the bada bag nad Kuldhar Member of the Jaisalmer Formation, deposited during the Middle Jurassic in the Jaisalmer Basin (Fig. 2).

II. MATERIAL AND METHODS

The Bathonian Callovian sediments exposed along kuldhar river section in the western part of Jaisamer basin, measured bed by bed at centimeter scale. After collection of rock samples thin section of well-cemented rocks were prepared in laboratory for petrographic study. Thin section of 21 thin samples have been prepared and studied. For the petrographic analysis, the classification schemes for carbonate rocks proposed by Folk (1959), Dunham (1962), Embry and Klovan (1971), and James (1984) were integrated and applied. For carbonate petrography, the classification proposed by Folk (1962) is considered appropriate, as it is based on the visual estimation of the relative proportions of allochems; therefore, it has been adopted in this study. For petrography of the thin sections was carried out using Nikon petrological microscope (Nikon Eclipse E200) and Nikon E8400.

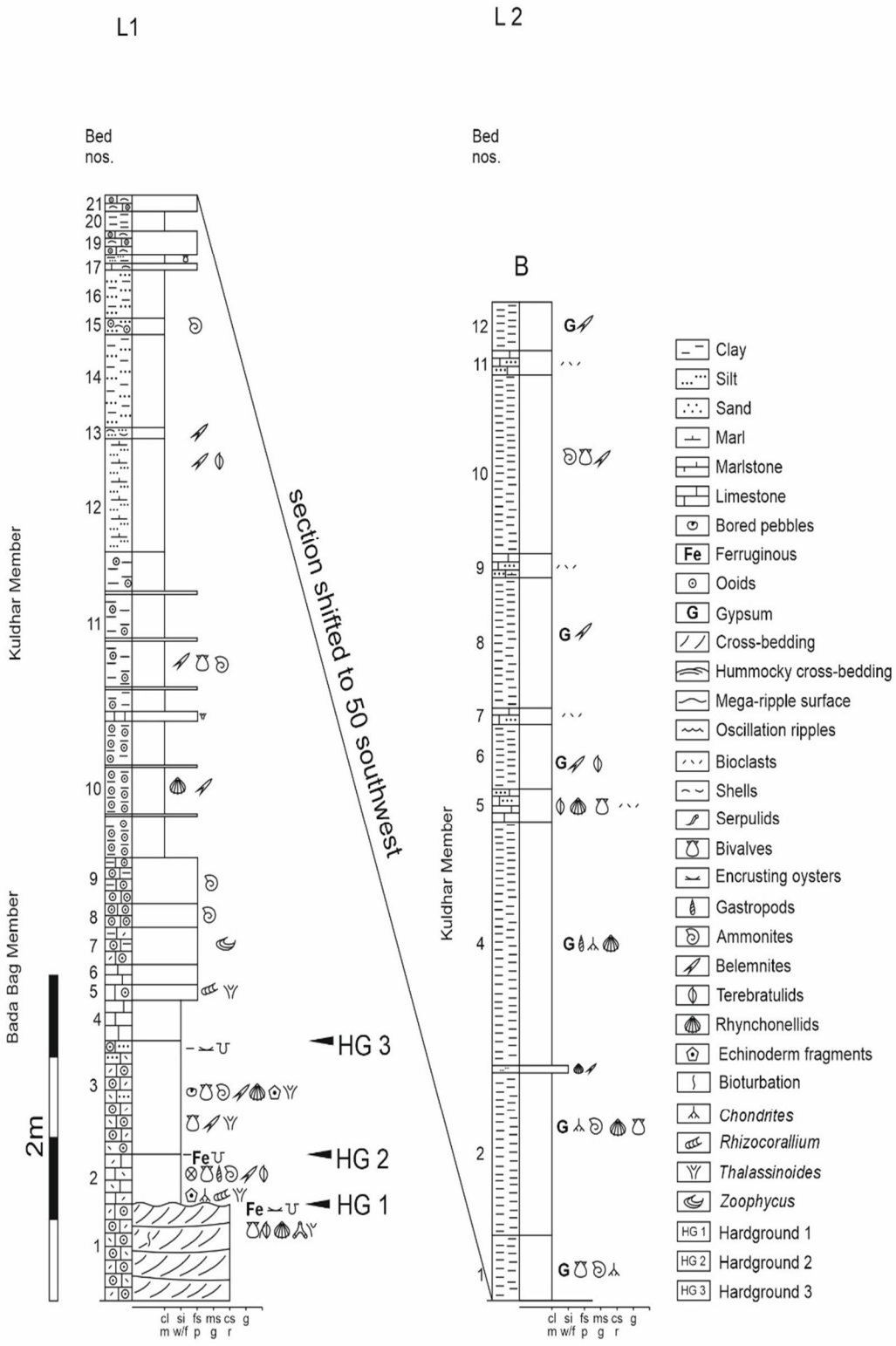


Fig. 3 Lithologs of the Bada Bag and Kuldhar members of the Jaisalmer Formation measured at Kuldhar River Section (KR), south of the village Kuldhar, Jaisalmer basin.

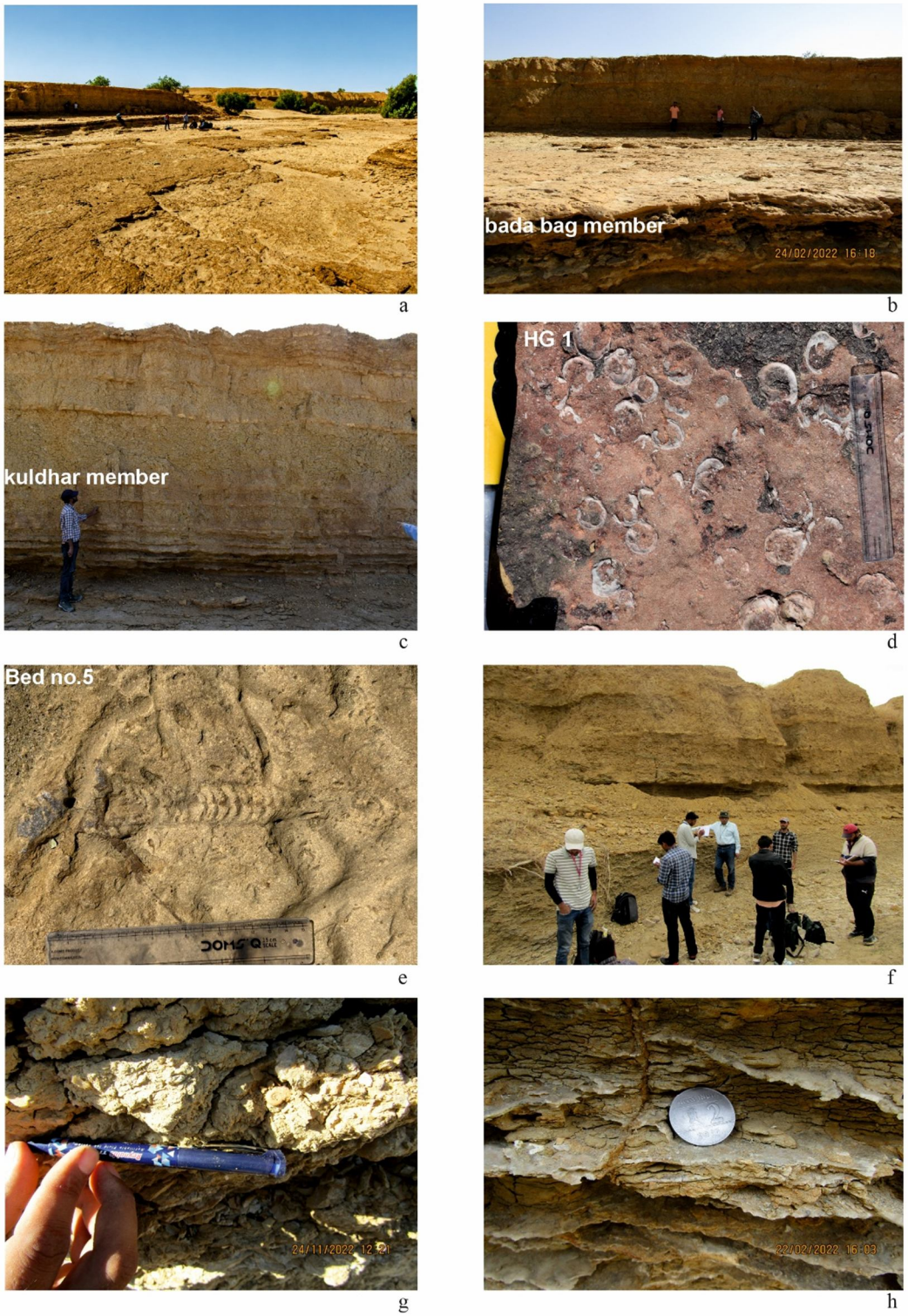


Fig.4 field photographs plate

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

III. RESULTS AND DISCUSSION

A. Lithostratigraphy of Bathonian Callovian sediments exposed along kuldhar river section:

The exposed succession belongs to the Bada Bagh and Kuldhar members of the Jaisalmer Formation. It is approximately 6.8 m thick and comprises 21 beds, including three prominent hardgrounds. Beds 1 to 3 represent the three hardgrounds, they consist mainly of rudstone and wackestone and contain abundant bivalves, oysters, brachiopods, gastropods, ammonites, belemnites, and trace fossils such as *Thalassinoides*, *Rhizocorallium*, *Chondrites*, and *Planolites*. The hardground surfaces show megaripples, borings, encrustation, reworked concretions, iron crusts, and stromatolitic crust. Beds 4 to 9 Comprise reddish wackestone, oolitic packstone, clayey oo-packstone, and ooid-rich packstone. These beds contain trace fossils including *Taenidium*, *Rhizocorallium*, *Thalassinoides*, and *Zoophycos* and ammonites. From bed 10 to 21 is 4.2m thick ooid bearing silty marl unit intercalated with packstone beds. Belemnites, ammonites, oysters, terebratulids, large *Kutchithyris*, rhynchonellid brachiopods and crinoid ossicles are present. The other section which located around 100 m south west is 6m thick and made up of mainly gypsiferous clay intercalated with silty mudstone beds contains the fossils of brachiopods, bivalves, tiny ammonites and belemnites, trace fossils (*Chondrites)*, plant debris etc (Figure 3 & 4).

B. Petrographic description of Bathonian-Callovian sediments exposed along kuldhar river section:

Petrographic analysis of Bathonian Callovian sediments of kuldhar river section revealed that these carbonate sediments are characterized by fine to medium grain size and poorly and moderately to well cemented. These Carbonates mainly consist of skeletal grains (bioclasts), Ooids, embedded in micritic, and ferruginous cement. Ooids have nucleus of bioclasts and quartz grains. In bioclasts abundant echinoid plates, echinoid spines and shell fragments present. Bioclast outlined by micrite coatings (Table 1 & 2, Figure 5).

TABLE I
PETROGRAPHIC DESCRIPTION OF THE SELECTIVE BEDS OF THE L1 - STRATIGRAPHIC SUCCESSION OF THE BADA BAGH AND KULDHAR MEMBERS EXPOSED IN THE MIDDLE PART ALONG THE KULDHAR RIVER SECTION, SOUTH OF KULDHAR VILLAGE, JAISALMER BASIN. CO-ORDINATES: N 26° 51′55.68″ E 70° 47′8,15″.

Sample no., Bed no.	Allochems: intra/pel/oo/bio	Fossils	Texture: Packing/ contact	Cement	Structure,Remarks	Rock type
2025/02/18/16 (bed 21) Bioclastic packstone	Bioclast	Echinoderm plates, Skeletal grains	Moderately packed	Micritic	Bioclast altered, Quartz present	Silty Bio-micrite
2025/02/18/15 (bed 19) Oolitic bioclastic packstone	Peloids, Bioclast	Echinoderm plates, Skeletal grains	Moderately packed	Micritic	Bioclast altered	Oo Bio-micrite
2025/02/18/14 (bed 17) Shell bearing oolitic packstone	Bioclast	Echinoderm plates abundant	Densely packed	Micritic	Bioclast altered, Abundant echinoderm plates and some quartz present	Bio-micrite
2025/02/18/13 (bed 15) Oolitic shell bearing calcareous siltstone	Bioclast	Echinoderm plates, Skeletal grains	Moderately packed	Micritic	Bioclast altered	Bio-micrite
2025/02/18/12 (bed 13) Shell bearing calcareous siltstone	Bioclast	Echinoderm plates	Moderately packed	Micritic	Bioclast altered	Bio-micrite
2025/02/18/10 (bed 11)	Bioclast, Peloids	Echinoderm plates abundant	Densely packed	Micritic	Bioclast altered, Superficial ooids	Bio-micrite

oolitic packstone					and echinoderm plates forms the nucleous of ooids	
2025/02/18/17 (bed 10 a) Packstone	Bioclast	Echinoderm plates, Skeletal grains	Moderately packed	Micritic	Bioclast altered, Quartz present	Bio-micrite
2025/02/18/09 (bed 10) oolitic packstone	Peloids, bioclast	Skeletal grains	Moderately packed	Micritic	Bioclast altered, Bioclast forms the nucleous of ooids, some quartz present	Bio oo-micrite
2025/02/18/08 (bed 09) Oo-Packstone	Peloids, bioclast	Echinoderm plates	Densely packed	Micritic	Bioclast altered, Echinodermm plate forms nucleous of some ooids	Oo bio-micrite
2025/02/18/07 (bed 08) Ooid rich Packstone	Bioclast, peloids	Echinoderm plates, Skeletal grains	Densely packed	Micritic	Bioclast altered, Mostly bioclast (echinoderm plates) forms the nucleous of ooids	Oo bio-micrite
2025/02/18/06 (bed 07) Oo-packstone	Bioclast, peloids	Echinoderm plates, Skeletal grains	Moderately packed	Micritic	Bioclast altered	Oo bio-micrite
2025/02/18/05 (bed 06) Packstone	Bioclast, peloids	Echinoderm plates, Skeletal grains	Moderately packed	Micritic, ferruginous	Bioclast altered, Echinodermm plate forms nucleous of some ooids, few quartz grains occur	Oo bio--micrite
2025/02/18/04 (bed 05) Oolitic packstone	Bioclast	Echinoderm plates and echinoderm spine	Densely packed	Micritic	Bioclast altered, Echinoderm plates abundant and echinoderm spine with hollow center in micrite	Bio-micrite
2025/02/18/02 (bed 04) Wackestone	Bioclast	Echinoderm plates and echinoderm spine	Moderately packed	Micritic	Echinoderm plates abundant and echinoderm spine with hollow center in micrite, Bioclast altered	Bio-micrite
2025/02/18/HG 3 (Bed HG 3) Wackestone	Bioclast	Skeletal grains, echinoderm plates	floating	micritic	Bioclast altered	Bio-micrite
2025/02/18/HG 2 (Bed HG 2) Wackestone	Bioclast	Skeletal grains, echinoderm plates	Floating	Micritic, ferruginous	Bioclast altered, Bioclast in mud supported framework	Bio-micrite
2025/02/18/HG 1 (Bed HG 1) Bio-rudstone	Ooids, peloids, bioclasts,	Echinoderm plates, skeletal grains	Densely packed	Micritic, ferruginous	Bioclast altered, Quartz and bioclast form the nucleous of ooids	Oo bio-micrite

TABLE IIIII

PETROGRAPHIC DESCRIPTION OF THE SELECTIVE BEDS OF (L2) ROCKS OF THE KULDHAR MEMBER EXPOSED WEST OF L1 ALONG KULDHAR RIVER SECTION SOUTH OF THE KULDHAR VILLAGE, JAISALMER BASIN. CO-ORDINATES N 260 51'55.70" E 700 47'4.46".

Sample no./bed no.	Allochems: intra/pel/oo/bio	Fossils	Texture: Packing/ contact	Cement	Structure, Remarks	Rock type
2025/02/19/07 (bed 11) Silty mudstone	Bioclast	Echinoderm plates	Moderately packed	Micritic	Quartz present	Clayey bio-micrite
2025/02/19/05 (bed 09) Silty mudstone	Bioclast	Echinoderm plates abundant	Densely packed	Micritic	Quartz present	Clayey bio-micrite
2025/02/19/04 (bed 07) Fossiliferou silty mudstone	Bioclast	Echinoderm plates	Moderately packed	Micritic	Quartz present	Clayey bio-micrite
2025/02/19/03 (bed 05) Fossiliferou silty mudstone	Bioclast	Echinoderm plates	Moderately packed	Micritic	Quartz present	Clayey bio-micrite

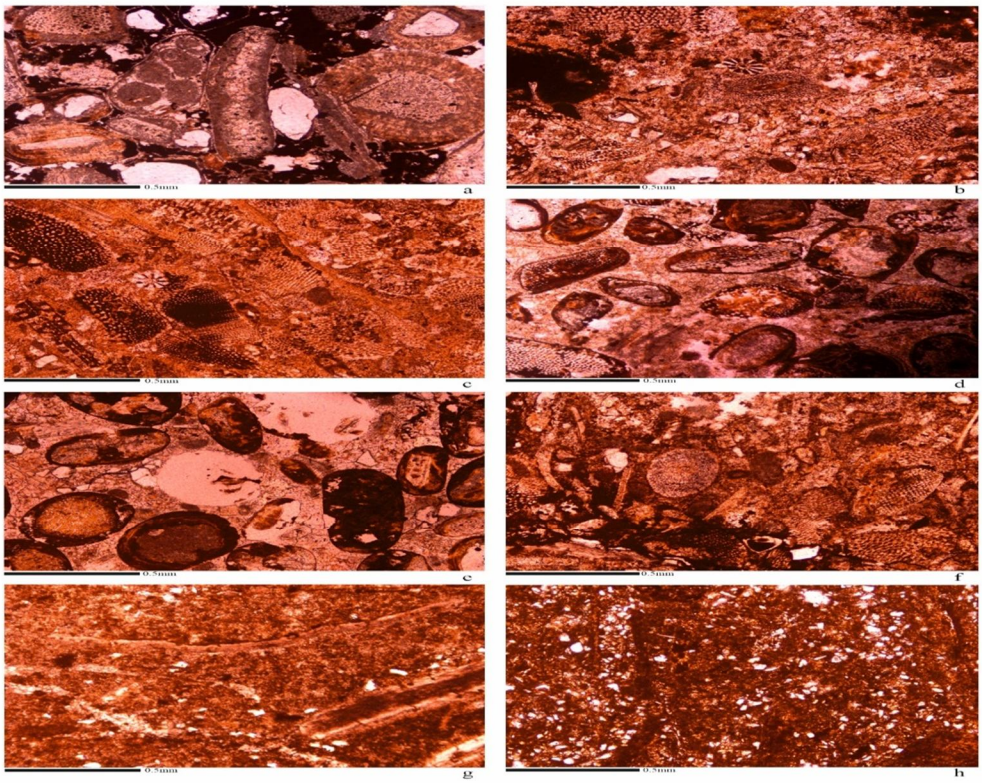


Fig.**5** Petrographic plate

Explanation of fig. 5

Fig. 5a Photomicrograph of a thin section of reddish, well cemented, ferruginous bio-rudstone (bed no. 1 of L1) sample no. 2025/02/18/HG 1 showing bioclast, ooids with radial fibrous calcite with quartz and bioclast in nucleus and ferruginous micrite cement. Scale bar: 0.5mm

Fig. 5b Photomicrograph of a thin section of reddish, moderately cemented Wackestone (bed no. 4 of L1) sample no. 2025/02/18/02 echinoderm spine, plate abundant. Scale bar: 0.5mm

Fig. 5c Photomicrograph of a thin section of yellowish brown, well cemented, Oolitic packstone (bed no. 5 of L1) sample no. 2025/02/18/04 showing echinoderm plates abundant, cross section of echinoderm spine with hollow center in micrite. Scale bar: 0.5mm

Fig. 5d Photomicrograph of a thin section of Brownish, well cemented, Ooid rich packstone (bed no. 8 of L1) sample no. 2025/02/18/07 showing ooids with bioclast of echinoderm plates in the nucleus. Micrite cement. Scale bar: 0.5mm

Fig. 5e Photomicrograph of a thin section of well cemented, oolitic packstone (bed no. 10 of L1) sample no. 2025/02/18/09 showing ooids with bioclast in nucleus in micrite cement with some quartz garins. Scale bar: 0.5mm

Fig. 5f Photomicrograph of a thin section of brownish, well cemented, shell bearing oolitic packstone (bed no. 17 of L1) sample no. 2025/02/18/14 showing bioclasts of echinoderm plates and micrite, ferruginous cement. Scale bar: 0.5mm

Fig. 5g Photomicrograph of a thin section of yellowish, well cemented, Fossiliferous silty mudstone (bed no. 5 of L2) sample no. 2025/02/19/03 showing large micritized echinoderm plates and bioclasts with some quartz grains. Scale bar: 0.5mm

Fig. 5h Photomicrograph of a thin section of yellowish, well cemented, silty mudstone (bed no. 11 of L2) sample no. 2025/02/19/07 showing abundant quartz grains and echinoderm plates. Scale bar: 0.5mm

IV. CONCLUSION

Sediments have abundant fossils record and composed of various skeletal grains such as echinoderms, brachiopods, crinoids, bivalves, gastropods, corals, foraminifera, and bryozoans. Ooids and peloids are main inorganic substances which is poorly to well sorted. Based on field observations, fossils assemblage and petrography, it has been inferred that Bathonian Callovian sediments of Kuldhar River section were deposited in open marine environments during fluctuating sea level in high energy shallow depth to deep marine environment.

V. ACKNOWLEDGEMENT

The authors are grateful to the Head of the Department of Geology, University of Rajasthan, Jaipur, for providing the necessary administrative facilities and support to carry out the present study.

REFERENCES

[1] Alberti, M., Pandey, D. K., Sharma, J. K., Swami, N. K. & Uchman, A. (2017): Slumping in the upper Jurassic Baisakhi formation of the Jaisalmer Basin, western India: Sign of synsedimentary tectonics? – Journal of Palaeogeography, 6(4): 321–332. https://doi.org/10.1016/j.jop. 2017.08.001.

[2] Asjad, S., Ahmad, A.H.M., Quasim, M.A. *et al.* Provenance, palaeoweathering and tectonic setting of the Kuldhar Member Shale (Callovian–Oxfordian), Jaisalmer Formation, western Rajasthan. *J. Sediment. Environ.* 6, 585–602 (2021).

[3] Asjad, S., Khan, K.F., Quasim, M.A. *et al.* Geochemistry of Kuldhar Member Limestone (Callovian–Oxfordian), Jaisalmer Basin, western Rajasthan, India: implications on depositional conditions and sources of rare earth elements. *J. Sediment. Environ.* 8, 545–561 (2023). https://doi.org/10.1007/s43217-023-00152-8

[4] Asjad, S., Khan, K.F., Quasim, M.A., Sachan, H.K., & Javed, A. (2023). Microfacies and stable isotope analysis of Kuldhar Member Limestone (Callovian–Oxfordian), Jaisalmer Basin, western Rajasthan: implications for depositional environment and diagenetic evolution. *Carbonates and Evaporites, 38*, 1-29.

[5] Das Gupta, S. K. (1975): A revision of Mesozoic–Tertiary stratigraphy. – Indian Journal of Earth Sciences, 2: 77–94. Douvillé, H. (1890): Sur la classification des Cératites de la Craie. – Bulletin de la Société Géologique de France, 3(18): 275–292.

[6] Dave, A. and Chatterjee, T. K. 1996. Integrated Foraminiferal and Ammoniod Biostratigraphy of Jurassic Sediments in Jaisalmer Basin, Rajasthan. *Journal of the Geological Society of India*, 47: 477-490.

[7] Flugel, E., 1982. Microfacies Analysis of Limestones. Springer-Verlang, Berlin, Heidelberg, pp.1–633.

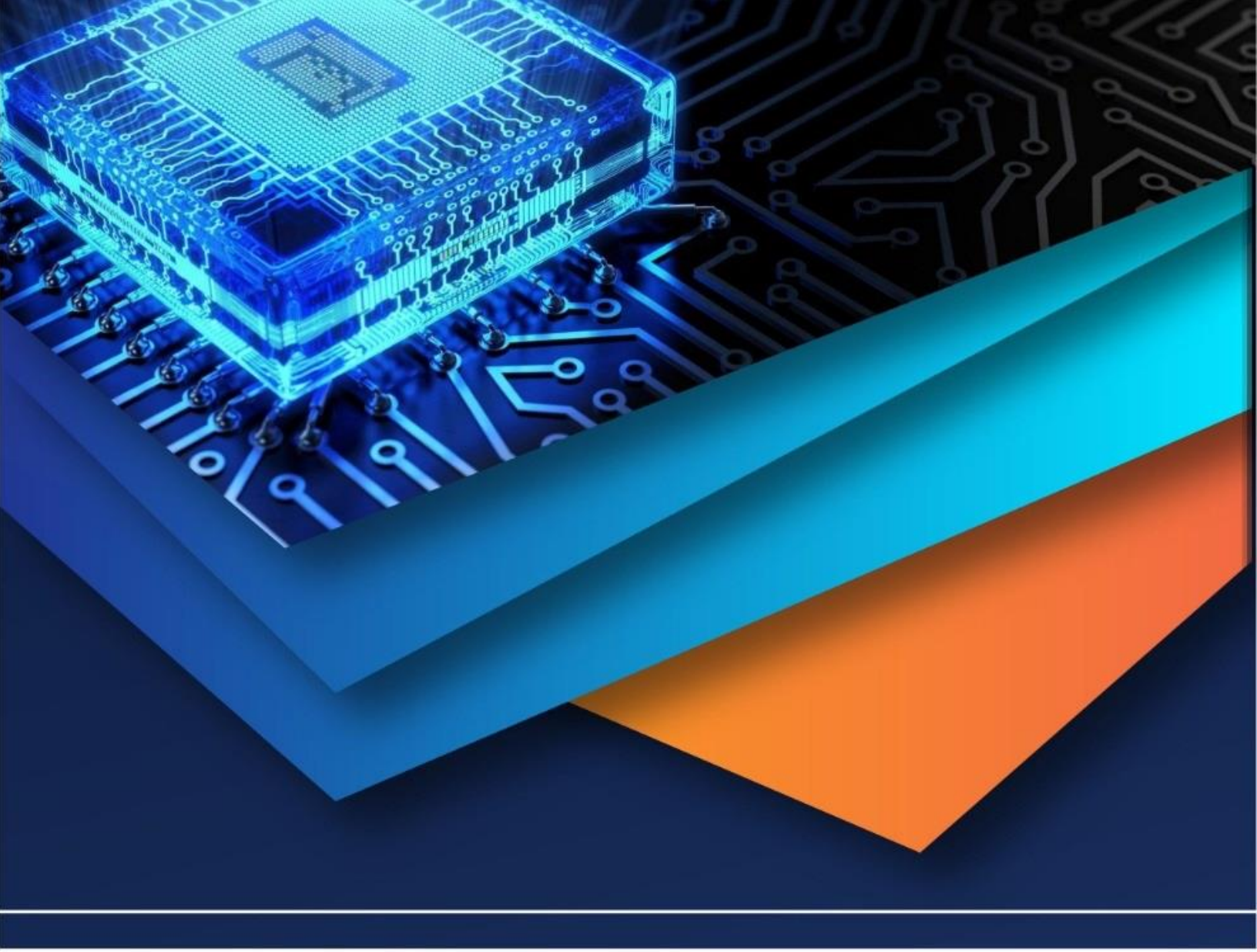
[8] Folk, R.L., 1974. The natural history of crystalline calcium carbonate: effect of magnesium content and salinity. Journal of Sedimentary Petrology 44, 40–53.

[9] Jain, S. 2007. The Bathonian-Callovian Boundary in the Middle Jurassic Sediments of Jaisalmer Basin, Western Rajasthan (India). *Journal of Geological Society of India*, 69: 79-89.

[10] Kachhara, R. P. & Jodhawat, R. L. (1981): On the age of Jaisalmer Formation, Rajasthan, India. – Indian Colloquium of Micropaleontology and Stratigraphy: 247.

[11] Kalia, P. and Chowdhury, S. l983. Foraminiferal biostratigraphy, biogeography and environment of the Callovian sequence, Rajasthan, northwestern India. *Micropalaeontology* 29: 223- 254.

[12] Kalita, K.D. (2015). New report of Isocrinid crinoid Chariocrinus from the Jurassic of Jaisalmer, Rajasthan, India. Journal of the Geological Society of India, 86, 597-604.
[13] Mahendra, K. & Banerji, R.K. 1989. Textural study and depositional environment of sand grains from rocks of Jaisalmer Formation, Jaisalmer District, Rajasthan, India. – Journal of the Geological Society of India 33 (3): 228–242.
[14] Mahendra, K. & Banerji, R.K. 1990. Petrography, diagenesis and depositional environment of Middle Jurassic Jaisalmer carbonates, Rajasthan, India. – Indian Journal of Earth Sciences 17 (3-4): 194–207.
[15] Pandey, D. K. and Choudhary, S. 2007. Sequence stratigraphic framework of Lower to lower Middle Jurassic sediments of the Jaisalmer Basin, India. Beringeria 37: 121-131.
[16] Pandey, D. K. 1983. A Biostratigraphical and Palaeoecological studies of the Bathonian-Callovian rocks in Khavda-Sadhara area Pachchham island (Kachchh, Gujarat) Unpubl. Ph.D thesis, Banaras Hindu University, pt. I, II: 1-576.
[17] Pandey, D. K., Sha, J. and Choudhary, S. 2006a. Depositional history of the early part of the Jurassic succession on the Rajasthan shelf, western India. Progress in Natural Science 16: 176-185.
[18] Pandey, D. K., Sha, J. and Choudhary, S. 2006b. Depositional environment of Bathonian sediments of the Jaisalmer Basin, Rajasthan, Western India. Progress in Natural Science, 16: 163-175.
[19] Pandey, D. K. and Choudhary, S. 2007. Sequence stratigraphic framework of Lower to lower Middle Jurassic sediments of the Jaisalmer Basin, India. Beringeria 37: 121-131.
[20] Pandey, D. K., Fürsich, F. T. and Sha, J. 2009. Intrabasinal marker intervals - A case study from the Jurassic basin of Kachchh and Jaisalmer, western India. Science in China Series D- Earth Science 52: 1924-1931.
[21] Pandey, D. K., Sha, J. and Choudhary, S. 2010. Sedimentary cycles in the Callovian-Oxfordian of the Jaisalmer Basin, Rajasthan, Western India. Volumina Jurassica 53: 131-162.
[22] Pandey, D. K., Swami, N., Sharma, J. and Choudhary, S. 2011. Occurrence of sediment starved intervals during Oxfordian in the Jaisalmer Basin, Rajasthan. Abstract volume, National Conference on Stratigraphy, Palaeontology & Palaeoenvironment: 33-34.
[23] Pandey, D. K. Choudhary, S., Bahadur, T., Swami, N. and Sha, J. 2012. A review of the Lower – lowermost Upper Jurassic lithostratigraphy of the Jaisalmer Basin, western Rajasthan, India - an implication on biostratigraphy. Volumina Jurassica 10: 61-82.
[24] Pandey, D. K., Fürsich, F. T., and Alberti, M. 2014. Stratigraphy and palaeoenvironments of the Jurassic rocks of the Jaisalmer Basin - Field Guide. Beringeria, Special Issue 9: 1-111.
[25] Pieńkowski, G., Brański, P., Pandey, D. K., Schlögl, J., Alberti, M. and Fürsich, F.T. 2015. Dinosaur footprints from the Thaiat ridge and their palaeoenvironmental background, Jaisalmer Basin, Rajasthan, India. Volumina Jurassica 13: 17-26.
[26] Prasad, S. 2006. Ammonite biostratigraphy of Middle to Late Jurassic rocks of Jaisalmer Basin, Rajasthan, India. Palaeontologica Indica 52: 1-146.
[27] Rai, J. and Garg, R. 2007. Early Callovian nannofossils from the Kuldhar section, Jaisalmer, Rajasthan. *Current Science*, 92: 816-820.
[28] Reinecke, J. C. M. 1818 - Maris protogaei Nautilus et Argonautas vulgo cornua ammonis in Agro Coburgico et vicino reperiundos. Ex Officina et in Commissis L.C.A. Ahlii, Coburgi: 90 p.
[29] Sharma, J. K. and Pandey, D. K. 2016. Taxonomy of Late Bathonian - Oxfordian ammonites from the Jaisalmer Basin: implications for intrabasinal litho- and biostratigraphic correlations. *Journal of the Palaeontological Society of India* 61: 249-266.
[30] Sharma, J. K., Jinjwadiya, A., Pandey, D. K., Alberti, M., Salunkhe, Kulkarni., K. G., 2025. Mass occurrence of limonitized nuclei of ammonites in the Middle to Upper Callovian strata (Middle Jurassic) of the Jaisalmer Basin, western India. *Journal of N. Jb. Geol. Paläont. Abh. 315/3 (2025), 311–333*
[31] Subbotina, N.N., Datta, A.K. & Srivastava, B.N. 1960. Foraminifera from the Upper Jurassic deposits of Rajasthan (Jaisalmer) and Kachchh, India. – Bulletin of the Geological, Mining and Metallurgical Society of India 23: 1–48.
[32] Swami, N. (2013): Depositional environment and sequence stratigraphy of Jurassic sediments in northeastern part of the Jaisalmer Basin. – Ph. D. Thesis, University of Rajasthan, Jaipur.
[33] Swaminathan, J., Shukla, B.N., Krishna, M.J.G. & Verma, K.K. 1957. Progress report of the Geological Survey in the Jaisalmer District and adjacent areas of Rajasthan. - Unpublished report, Geological Survey of India.
[34] Swaminathan, J., Krinshnamurthy, J.G., Verma, K.K. & Chandiak, G. J. 1959. General geology of Jaisalmer area, Rajasthan. - Proceedings of the Symposium of Development in Petroleum Resources of Asia and the Far East. Mineral Resources Development Series (10); Bangkok (ECAFE, UN).



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY