

DISCUSSION

Comment

(A comment on the paper, 'Dhosa Oolite – A Transgressive Condensation Horizon of Oxfordian in Kachchh, Western India' by Indra Bir Singh, published in the Journal of the Geological Society of India, Vol. 34, No. 2, 1989, pp. 152-162).

The paper entitled, 'Dhosa Oolite – A Transgressive Condensation Horizon of Oxfordian in Kachchh, Western India' by I. B. Singh, with quasi-modern approach, is welcome. Singh, besides highlighting the sedimentological characteristics and genesis of Dhosa Oolite, has made some stratigraphic observations of wide stratigraphic concern. Involved as I have been with high resolution Jurassic stratigraphy and sedimentation in Kachchh, I wish to make a few comments with regard to the stratigraphic part with a view to putting Singh's observations in appropriate spatial and temporal perspective.

1. Dhosa Oolite is not the only, but, yes, one of the key beds in the Kachchh Mesozoic stratigraphic set-up. Other examples may be cited particularly of the Glauconitic/Oolitic unit or Bivalve-bearing Sandstone unit at the base or in early part of the Umia Formation (Stoliczka in Waagen, 1873-75). These have larger or at least equally large spatial extent in the Mainland Kachchh. Being relatively harder and more resistant, the Bivalve-bearing Sandstone always stands out majestically all over Kachchh in the form of a high ridge from west to east inclusive even of Wagad in the far east beyond the Mainland. It is recognisable even from considerable distance which is exactly not the case with less resistant Dhosa Oolite.

2. Dhosa Oolite is only relatively synchronous throughout the Mainland Kachchh. In fact, its upper age limit near Lakhapur and Jumara domes in the west is younger than in the east (for example Ler) at least by one full ammonoid zone (coeval of the Submediterranean Plicatilis Zone or the Subboreal Transversarium Zone). The unit in none of the sections represents complete Oxfordian. There is a definite stratigraphic break between Dhosa Oolite and overlying Katrol Formation of several ammonoid zones from top of Plicatilis Zone to top of Hypselocyclum Zone (Krishna and Pathak 1989 and in press). There is also every probability either of a break at its lower boundary of the equivalent of upper part of the late Upper Callovian Lamberti Subzone or the same being represented in Dhosa Oolite. Sometimes the impression of mixing up of successive ammonoid zonal assemblages is because of their confinement in extraordinarily reduced thickness. However, at least three successive assemblages are easily discernible at Jumara and Lakhapur sections (Krishna, 1987) from equal or more separate oolitic beds. Careful precision collection and knowledge of the Tethyan Oxfordian ammonoid successions in other parts of the Tethyan realm should, in future, even lead to greater resolution and differentiation, for example, as in Northern Switzerland (Fischer and Gygi, 1989) or Southern Germany (Callomon 1988) in similar situations with Oxfordian sediments being only about 1 m thick.

3. Divesian and Argovian time units are without precise definition, redundant and out of use at least for over two decades, and preferably need be avoided in precision chronostratigraphic discussion.

4. *Taramelliceras* is rare. Only one species, based on a single specimen has been described from the Oxfordian of Kachchh. The genus is long-ranging through 3 successive stages of the Jurassic from Callovian to Kimmeridgian, and so, at genus level, it cannot indicate an ammonoid zone. *Lithacoceras* also as it is presently understood is not at all known from anywhere in the world from Oxfordian. It seems all this faunal information has been taken from some secondary obsolete work without objective scrutiny. The question of *Lithacoceras* representing an Oxfordian ammonoid zone obviously also does not arise.

5. Author's use of 2 different lithostratigraphic schemes in his correlation table and facies distribution is rather inconsistent, although in the text he has advocated for the older scheme after Krishna (1983). Stoliczka's original units otherwise also have better boundary demarcation on physical criteria compared to units of Biswas (1977), particularly, the Katrol/Umia unit boundary is easily recognisable at the base of Umia Glauconite-Oolite and in its absence by the Bivalve-bearing Sandstone than the Jhuran/Bhuj boundary defined on subjective non-physical criteria (also see Krishna, 1983).

Department of Geology
Banaras Hindu University
Varanasi

JAI KRISHNA

References

- BISWAS, S. K. (1977) Mesozoic rock-stratigraphy of Kutch. Quar. Jour. Geol. Min. Met. Soc. India, v. 49, (3 and 4), pp. 1-52.
- (1981) Basin framework, palaeoenvironment and depositional history of the Mesozoic sediments of Kutch basin, Western India, Quar. Jour. Geol. Min. Met. Soc. India, v. 53, (1 and 2), pp. 56-85.
- CALLOMON, J. H. (1988) The Ammonoid stratigraphy and Subzones of the Transversarium Zone in the Submediterranean Middle Oxfordian, 2nd Internat. Symp. Jour. Stratigr., Lisbon, v. 1, pp. 433-444.
- FISCHER, H. and GYGI, R. (1989) Numerical and biological time scales correlated at the ammonoid subzone level; K-Ar, Rb-Sr ages and Sr, Nd and Pb sea water isotopes in an Oxfordian (late Jurassic) succession of northern Switzerland, Geol. Soc. Amer. Bull., v. 101, pp. 1584-97.
- KRISHNA, J. (1983) Callovian-Albian ammonoid stratigraphy and palaeobiogeography in the Indian subcontinent with special reference to the Tethys Himalaya, Him. Geol., v. 11, pp. 43-72.
- (1987) An overview of the Mesozoic stratigraphy of Kachchh and Jaisalmer, Jour. Pal. Soc. India, v. 32, pp. 136-49.
- KRISHNA, J. and PATHAK, D. B. (1989) Kimmeridgian in Ler-Katrol Area of Kachchh, western India: ammonoid systematics and biochronology, 28th Internat. Geol. Congr., Washington (abstr.), v. 2 (2), pp. 228-229.
- WAAGEN, W. (1873-75) Jurassic fauna of Kach, the cephalopoda, Paleont. India, 9 (1), pp. 1-247.

Reply

Jai Krishna wants to say that my approach is quasi-modern. I don't know what it is. My approach is based on logic, existing data base and my own observations.

Following are my answers to the points raised.

1. My paper deals exclusively with Dhosa Oolite and it is a marker bed in Kachchh, to which he agrees.

The other beds, glauconite-oolite or bivalve beds are present only in western Kachchh, and absent in eastern Kachchh. Bivalve bed of Wagad is certainly of a different age. Significance of these beds is different than that of Dhosa Oolite. Work on significance of these beds and sequence stratigraphy is in progress.

2. Jai Krishna is giving unpublished information or information in form of abstracts about the Oxfordian zonation. For assigning an Oxfordian age, I have used the published information available at the time of writing of the paper. It may be pointed out that identification of a condensation horizon is based on sedimentological and stratigraphic criteria ; but the time represented by the horizon can be ascertained only by precise biostratigraphic zonation. It has been a major handicap in my work in Kachchh that no detailed ammonoid zonations are available for different sections.

I would like to emphasize here again that there is no field evidence of subaerial erosion at the base and top of Dhosa Oolite. There may be submarine hiatuses.

3. I know this. I have not used obsolete terms myself ; but used them as original quotes.

4. No relevance to this paper. I have never claimed to have identified ammonoids. Let us hope Jai Krishna soon publishes an uptodate ammonoid zonation and revision.

5. No relevance to the theme of the paper. In the facies distribution (Fig. 2) I have retained the names of Jhuran and Bhuj as I have used the data of Biswas. Jhuran is not completely equivalent to Katrol. The terms Patcham and Chari were changed for Jhurio and Jumara, as they are almost equivalent. These problems would remain until we agree to standard stratigraphic names, which is not yet the case in Kachchh Mesozoic. The Katrol/Umia boundary is not marked by glauconite-oolite beds in Eastern Kachchh. These horizons are locally developed in Western Kachchh and cannot be used as regional markers.

*Department of Geology
Lucknow University
Lucknow 226 007*

INDRA BIR SINGH