

Abstract

The Vindhyan Supergroup, named after "Vindhyan Mountains" in Central India represents stratified sedimentary rocks belonging to Upper Purana age (Late Proterozoic). The Vindhyan sediments are exposed in the states of Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan covering an area of about 1,04,000 sq. km (Prasad, 1984). In the subsurface Vindhyan rocks occur below the Indo-gangetic alluvium and Deccan trap (Cretaceous to Oligocene) covering an estimated area of about 78,000 sq. km. The entire Vindhyan basin is bounded by sub-Himalayan foothill zone to the north, Delhi-Aravalli Orogenic belt to the west and Son-Narmada lineament to the south.

A complete stratigraphic succession of Vindhyan rocks occur in Son valley i.e. in Bihar, M.P. & U.P. and is considered as type area of Vindhyan Supergroup. The Western most limit of Vindhyan basin is present near Chittaurgarh in Rajasthan, the area of present investigation. The pioneering work on Vindhyan stratigraphy in Rajasthan is after Heron (1922, 1932 and 1936). A detailed account of stratigraphy, structure and age of Vindhyan rocks and Pre-Vindhyan rocks is provided by Heron (op. cit.).

Mallet (1869) first proposed a two fold subdivision of the Vindhyan rocks. The Lower Vindhyan (Semri Group) and Upper Vindhyan (Kaimur, Rewa & Bhandar Group). After Heron (1936) significant contribution on regional stratigraphy of Vindhyan rocks is made by Rao & Mahajan (1965); Rao et al. (1972); Prasad (1972 & 1984), Srinivasan (1982) and others.

In the present area the work is mainly based on the stratigraphy propo

sed by Srinivasan (1982) and Prasad (1984). Based on detailed field mapping around Chittaurgarh, present author has suggested only some minor modifications of the stratigraphy suggested by Srinivasan (1982) and Prasad (1984).

Seven lithostratigraphic units are reproduced below could be established from the present area. Of these seven lithostratigraphic units two are carbonate, three sandstone and two shale units.

Upper Vindhyan	Kaimur Group	Chittaur Fort Sandstone (Kaimur Sandstone)
	Gradational contact	
Lower Vindhyan	Semri Group	Suket Shale Nimbahera Limestone Binota Shale Sawa Sandstone Bhagwanpura Limestone Khardcola Sandstone
Pre-Vindhyan Berach Granite & meta sediments		

The lowermost carbonate unit i.e. Bhagwanpura Limestone is stromatolite bearing whereas the upper carbonate unit i.e., Nimbahera Limestone contains only cryptalgal laminae.

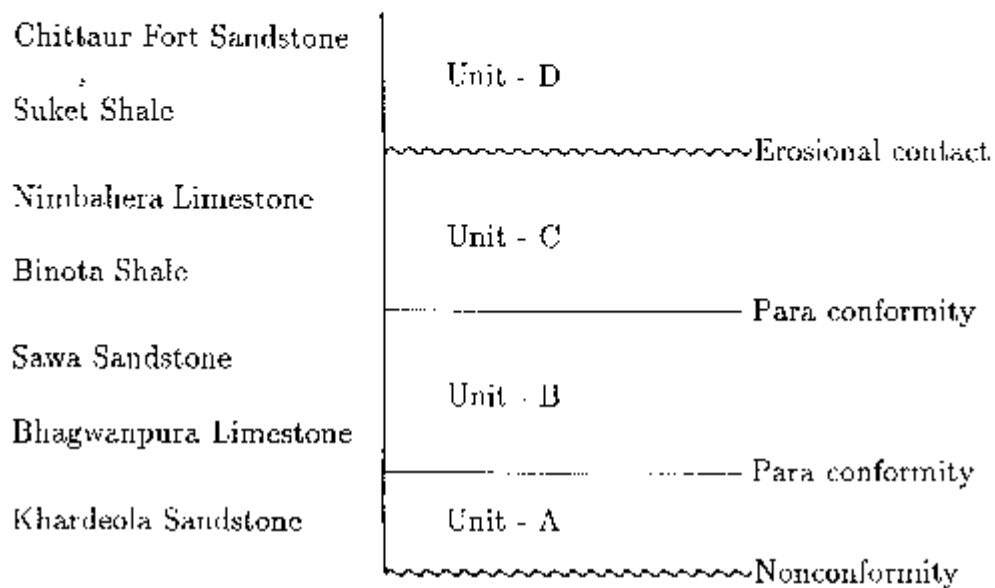
The present work is aimed mainly to study the depositional history of the Vindhyan sediments from various field data and laboratory data like; thin section petrologic study, XRD, XRF study, SEM & EDX study of carbonate rocks.

The study suggests that the Vindhyan rocks in area are the product of barrier bar-lagoon tidal flat setup. Both regressive and transgressive cycles are identified in the area. The Chittaur Fort Sandstone & Suket Shale together represent the youngest cycle which was a transgressive cycle. Two regressive cycles identified are Nimbahera Limestone-Binota Shale cycle and Sawa Sandstone-Bhagwanpura Limestone cycle.

The regressive Vindhyan sea in the area initially prograded to the east-south east direction with Sawa Sandstone as barrier and Bhagwanpura Limestone and Khardeola Sandstone as lagoon-tidal flat and mainland beach respectively to the landward side. The second phase of regression is represented by Upper Nimbahera Limestone (barrier-island), Binota Shale & Lower Nimbahera Limestone (lagoon-tidal flat). After these two regressive phases the lagoon-tidal flats were filled up by sediments and remained emergent for some time and was subjected to erosion. At a later stage there was a rise in sea level when barrier beaches developed in the head lands of the channels emerging from eroded Nimbahera Limestone and lagoon formed in the Valleys.

Finally with the gradual filling up of the intervening area as part of lagoon the barriers were completely detached from the land. The older prograding barrier beach-lagoon-tidal flat-system was finally overlain by a transgressive barrier beach (Chittaur Fort Sandstone) and lagoon-tidal flat (Suket Shale) system.

The geological history of the Vindhyan basin in the present area suggests that some of the lithostratigraphic units formed simultaneously and are time equivalent. These are A-Khardeola Sandstone; B-Bhagwanpura Limestone and Sawa Sandstone; C-Binota Shale and Nimbahera Limestone and D-Suket Shale and Chittaur Fort Sandstone. This definitely calls for a fresh look into the Vindhyan stratigraphy and a tentative depositional package of sequence may be suggested as follows:



Pre-Vindhyan Berach Granite and meta sediments