

Original article

Proterozoic carbonaceous remains from the Chorhat Sandstone: oldest fossils of the Vindhyan Supergroup, Central India

Restes carbonés protérozoïques des Grès de Chorhat : les plus anciens fossiles du Super-groupe de Vindhyan, Inde Centrale

Purnima Srivastava*, Rameshwar Bali

Department of Geology, Lucknow University, 226007 Lucknow, India

Received 4 March 2005; accepted 10 February 2006

Available online 04 October 2006

Abstract

According to new radiometric determinations, the Chorhat Sandstone (Kheinjua Formation, Semri Group) is much older (1628 and 1632 Ma) than previously thought. This makes the carbonaceous fossils here described not only the oldest, but also the only reliably dated fossil record of the Vindhyan Supergroup, India. The new fossils represent a *Chuarina-Tawuia* assemblage with other carbonaceous remains of uncertain biologic affinities. Their size range (0.02–3.5 mm) indicates a transitional phase in the evolution from micro- to megascopic organisms. Alternatively, low oxygen levels may have induced small size.

© 2006 Elsevier Masson SAS. All rights reserved.

Résumé

Selon des datations radiométriques récentes les Grès de Chorhat (Formation de Kheinjua, Groupe de Semri) sont beaucoup plus anciens (1628–1632 Ma) que l'on ne pensait. Ainsi, les fossiles carbonés décrits ici ne sont pas seulement les plus anciens mais constituent les seules données fossiles à datation fiable du Super-groupe de Vindhyan, Inde. Les nouveaux fossiles sont représentés par un assemblage à *Chuarina-Tawuia* parmi d'autres restes carbonés d'affinités biologiques incertaines. Leur gamme de taille (0,02–3,5 mm) indique une phase de transition dans l'évolution des organismes micro- à mégascopiques. Une autre possibilité est que leur petite taille ait pu être induite par des niveaux d'oxygène bas.

© 2006 Elsevier Masson SAS. All rights reserved.

Keywords: Proterozoic; Carbonaceous megafossils; Chorhat Sandstone; Vindhyan Supergroup; India

Mots clés : Protérozoïque ; Mégafossiles carbonifères ; Grès de Chorhat ; Supergroupe Vindhyan ; Inde

1. Introduction

Carbonaceous films are important elements of biotas in Middle to Late Proterozoic times, as they indicate the existence of megascopic organisms in the oceans of that remote past. Although the known fossil record contains limited direct evi-

dence of events occurring during that time period, but available data suggest that this time segment featured a series of highly significant evolutionary innovations such as the diversification of eukaryotes and the emergence of protistan heterotrophs. Transition from microscopic to megascopic organisation is one such innovation (Schopf and Klein, 1992; Schopf et al., 1973).

Many megafossils reported in the earlier literature world wide, as well as from the Vindhyan are unacceptable as their biogenicity and syngenicity has always been doubtful. The age

* Corresponding author.

E-mail address: purnimasrivastava_51@rediffmail.com (P. Srivastava).

of the fossiliferous horizons has also been a matter of debate, because direct dates were not available. In recent years, however a number of horizons in the Vindhyan Supergroup containing undoubted fossils have been documented. The Chorhat Sandstone (Semri Group, Lower Vindhyan) is the oldest fossiliferous unit of the entire Vindhyan Supergroup. This horizon has recently been in the news due to the controversial report of triploblastic animal traces (Seilacher et al., 1998). Controversies apart, Ray et al. (2002) and Rasmussen et al. (2002), gave radiometric dates for this horizon as 1632 and 1628 Ma, respectively, and thus extended the traditional age of Vindhyan sedimentation by almost 250 million years. As the age is now fixed, the carbonaceous remains found in this horizon gain a general interest in the context of evolutionary palaeobiology.

2. Geological setting

The sedimentary rocks of the Vindhyan Supergroup attain huge thicknesses in Central India and in parts of Rajasthan. The Kheinjua Formation belonging to the Semri Group (Lower Vindhyan) is well exposed in the Son Valley, Central India (Table 1). The Chorhat Sandstone, a member of the Kheinjua Formation, is exposed near Govindgarh, Rewa District, M.P. (Fig. 1). It is overlain by the Rampur Shale and underlain by the Koldaha Shale (Table 1). Its lithology is generally dominated by sandstone with intercalations of shale (Fig. 2). For the present study, shale samples have been collected from a 1.5-m thick khaki or olive green shale bed exposed along the road east and west of Chorhat village near

Table 1
Stratigraphic succession of the Vindhyan Supergroup (modified after Auden, 1933) in Central India

	Group	Formation/member	Lithology
Upper Vindhyan	Bhander Group		Carbonate, Shale and Sandstone
	Rewa Group		Sandstone and Shale
	Kaimur Group		Sandstone and Shale
Lower Vindhyan	Semri Group		Unconformity
		Rohtas Formation	Limestone and Shale
		Kheinjua Formation	Chorhat Sandstone Koldaha Shale
		Porcellanite Formation	Porcellanites
		Basal Formation	Kajrahat Limestone Basal Conglomerate
		Unconformity	
	Bijawar Group	Phyllites	

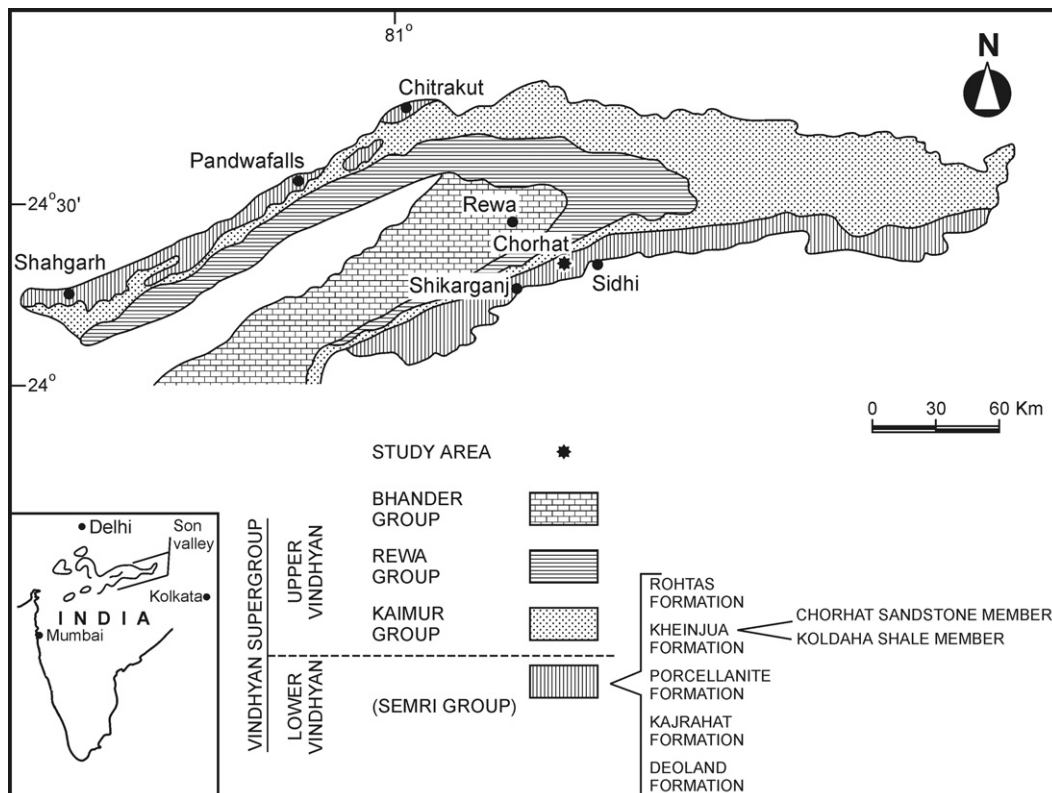


Fig. 1. Geological Map of the Vindhyan Supergroup, Son Valley with study area (modified after Bose et al., 1997).

Download English Version:

<https://daneshyari.com/en/article/4748629>

Download Persian Version:

<https://daneshyari.com/article/4748629>

[Daneshyari.com](https://daneshyari.com)