Article

Early Permian (Sakmarian-Artinskian) vegetation diversity and dynamics inferred from a coal-bearing sequence of Kurasia Colliery, Chirimiri Coalfield, Son Basin, India: Biostratigraphical and palaeoenvironmental implications

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Abstract

The present study deals with the reconstruction of Early Permian floral diversity, palaeoenvironment, and depositional setting using a multiproxy approach involving morphotaxonomy, palynology and palynofacies analyses of a coal-bearing sequence of Kurasia Colliery, Chirimiri Coalfield, Son Basin, India. The megafloral assemblage is of moderate diversity and is characterised by the presence of three groups, that is, Cordaitales, Glossopteridales and Equisetales. Macrofloristically, Cordaitales are represented by a single leaf fossil genus, that is, *Noeggerathiopsis* (*N. elongata*, *N. hislopi*, *N. minor* and *Noeggerathiopsis* sp.) and two seed genera, namely *Cordaicarpus karharbariensis* and *Samaropsis ganjrensis*. Glossopteridales are represented by three genera- *Gangamopteris*, *Glossopteris* and a seed genus *Alatocarpus*. *Gangamopteris* is represented by five species, namely, *G. angustifolia*, *G. cyclopteroides*, *G. major, G. rajaensis* and *Gangamopteris* sp.; *Glossopteris* is represented by seven species- *G. communis, G. decipiens, G. major, G. nautiyalii, G. raniganjensis, G. spatulata,* and *Glossopteris* sp. Equisetales are represented by two genera- *Paracalamites* (*Paracalamites* sp.) and *Raniganjia* (*R. bengalensis*). The palynological analysis has revealed only one assemblage, dominated by the monosaccate genus *Parasaccites*, followed by *Plicatipollenites* and the bisaccate *Scheuringipollenites*, along with other marker taxa such as *Crucisaccites* and *Callumispora*. This palynoassemblage is well correlated with the *Parasaccites-Scheuringipollenites* palynoassemblage of the Upper Karharbari Formation of the Godavari Basin. The palynocomposition has affinities with Cordaitales, Glossopteridales, Coniferales and Filicales. The megafloral and palynofloral composition suggests that the studied section represents Upper Karharbari-Lower Barakar transitional vegetation. The presence of large leaves in these sediments supports the existence of warm, temperate, and humid climatic conditions conducive to coal formation. The palynofacies study shows the dominance of structured phytoclasts, suggesting that the studied sediments were deposited in low-energy, suboxic-dysoxic forest swamp settings.

Keywords

Karharbari/Barakar formation, Chirimiri Coalfield, *Gangamopteris, Glossopteris*, *Noeggerathiopsis*, Permian

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