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Palaeofloristic studies from the early Permian Barakar sediments of Singrauli Coalfield, Son Basin, India

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ABSTRACT

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The present study deals with the reconstruction of early Permian floral diversity, palaeoenvironment, palaeoclimate and depositional setting using a multiproxy approach involving morphotaxonomy, palynology and FTIR analysis of a coal bearing sequence of Jayant Colliery, Singrauli Coalfield, Son Basin, India. The megafloral assemblage is of low diversity is characterized with the presence of only two groups, i.e. *Glossopteridales* and *Equisetales*, represented by leaf forms of *Glossopteris,* scale leaf- *Pantolepis* and stem axes- *Paracalamites* respectively. The genus *Glossopteris* is represented by thirteen species namely *G. arberii*, *G. communis*, *G. emarginata*, *G. gigas*, *G. indica*, *G. major*, *G. mohudaensis*, *G. nautiyalii*, *G. recurva*, *G. spatulata*, *G. stenoneura*, *G. tenuifolia* and *Glossopteris* sp. Most of these species have narrow to intermediate meshes which indicate prevalence of warm and humid climatic condition with sufficient sunlight. The palynological analysis has revealed only one assemblage, having the dominance of the non-striate bisaccate pollen *Scheuringipollenites* and the sub-dominance of the striate bisaccate pollen *Faunipollenites*; The assemblage is equated with *Scheuringipollenites barakarensis* palynoassemblage of the lower Barakar Formation. The palynocomposition have affinities with *Glossopteridales, Cordaitales* and *Coniferales*. The megafloral and palynofloral composition elucidates the biostratigraphical age as early Permian (Artinskian). The *Glossopteris* leaf of various size along with other floral entities from a terrestrial ecosystem suggest the preponderance of small to large size deciduous trees with annual leaf fall and providing organic detritus for peat formation during Artinskian age. The FTIR study also reveals that sediments contain quartz and clay minerals with some organics representing fluvial sedimentation during lower Permian.

Keywords: Megaflora, *Glossopteris*, palynology, Barakar Formation, Singrauli Coalfield, FTIR, Son Basin.

INTRODUCTION

Gondwana sedimentation in Peninsular India began after Permo-Carboniferous deglaciation following a prolonged hiatus since Proterozoic. This sedimentary record spans approximately 200 million years, from the ?latest Carboniferous to the Early Cretaceous and is primarily confined to five major Gondwana basins which includes; Damodar, Son-Mahanadi, Satpura, Rajmahal and Wardha-Godavari (Figure 1a). In addition to these basins, Gondwana sediments are also sporadically deposited in the extra Peninsular regions of India especially in northeast states (Arunachal Pradesh and Sikkim) and Kashmir region. In Peninsular India, the Permian deposits collectively referred to as the Lower Gondwana Group, are well developed