

Integrated Structural and Geomorphological Analysis of Gupteswar Cave Surroundings, Bastar, Chhattisgarh, India

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Abstract

The area around Gupteswar Cave, which is situated along the Eastern Ghats, has a variety of structural and geomorphological characteristics that provide insight into the formation of karst and the evolution of the landscape. The systematic analysis of surface geological features, such as joints, faults, bedding planes, sedimentary dykes, potholes, stromatolitic structures, and characteristic weathering patterns like crocodile-skin textures, is the main emphasis of this study. The results emphasize the Gupteswar region's importance as a Geoheritage site with potential for more geological and geomorphological research and advance knowledge of the link between structural geology and geomorphology.

Keyword: *Geomorphology, Joints, Faults, Stromatolites, Potholes, Paleoenvironment*

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I. Introduction

The Gupteswar cave is at the bank of the Kolab River. Here, certain structural indicators were noted, including well-jointed rock formations and strongly inclined dolomite rocks. There is stromatolitic dolomite in the Gupteswar-Tiriya-Machkote region. Few caves have formed in this dolostone. Dolomite is exposed to the surface in this region. The terrain of this region was formed by highly jointed, weathered, and faulted dolostone. N18°54.260' E082°10.685' is the GPS location of a noticeable fault that is trending NE.-SW. in Tiriya village. A few striated shale bed outcrops can be observed. Very well-jointed Jagdalpur shale can be seen along the riverbank in the Tiriya region, close to Gupteswar Cave. The intense and tightly jointed nature of this shale makes it extremely vulnerable to weathering and erosion. Furthermore, sedimentary dykes have been found in the Tiriya-Machkote-Gupteswar region. (Gautam, 2015)

II. Study Area

Gupteswar Cave is situated in the Koraput District, some 55 miles from Jaypore, and 15 kilometers from the Kanger Valley region. It is a dolomite cave, and its main attraction is the gigantic Shiva. Gupteswar Cave's coordinates are N18°54'15.6", E82°10'41.1," and it is situated 698.96 meters above mean sea level. Near the Gupteswar-Mchkote-Tiriya region, the River Kolab forms the border between the states of Chhattisgarh and Orissa. The geological composition consists primarily of Indravati group rocks, includes, limestone, shales, and dolostone and covers the toposheet no. 65J/1. (Dutt, 1963, Das et al., 2021).

III. Methodology

This study's technique included methodical fieldwork in the Indravati basin area around Gupteswar Cave. In addition to geomorphological and sedimentary phenomena including potholes, stromatolites, sedimentary dykes, and weathering patterns like crocodile-skin textures, detailed traverses were carried out to detect and record structural elements like joints, faults, and bedding planes. A Brunton compass and GPS were used to record structural data, such as strike and dip, and location and observations were recorded. For appropriate representation, the gathered data was plotted by rose diagram and accompanied by field sketches and photos. To comprehend the impact of lithology and structural discontinuities on landform formation, the spatial distribution and connections of geological features were examined. In order to deduce potential karst development in the region and to create links between structural controls and geomorphological processes, such as surface weathering and river activity, the data were further analyzed. (Gupta et al., 2021).