

# **Role of Geological and Structural Controls in the Development of Karst Topography: A Study of Green Cave, Kanger Valley, Bastar Region, Chhattisgarh**

Dr. Swapna Gupta, Dr. P.K. Shrivastava

*Faculty, Department of Geology, Govt. Kaktiya PG College, Jagdalpur (C.G.), India, 494001,  
Professor, Department of Geology, Govt. V.Y.T. PG Autonomous College Durg (C.G.), India, 491001.*

---

## **Abstract**

*The Green Cave is a prominent karst structure that was produced within a structurally deformed carbonate landscape. It is situated in the Kanger Valley region of Bastar, Chhattisgarh, close to the Kanger Dhara Waterfall and Kotumsar Cave. The impact of geological features, including folds, faults, joints, striations, and Stylolites, on the formation and evolution of the cave system is investigated in this study. To comprehend the connection between tectonic deformation and karstification processes, extensive field research was conducted, including structural mapping and geomorphological observations. This specific cave's entrance is oriented in such a way that sunlight can enter the cave, because of this event, the cave has adapted to the particular natural conditions required to thrive in a cave, allowing algae, fungi, and several small plants to flourish there, giving it the appearance and name "Green Cave."*

**Keyword:** *Green Cave, Stylolites, Folds, Faults, Joints, Striations, Speleogenesis, Structural Deformation.*

Date of Submission: 21-03-2026

Date of Acceptance: 31-03-2026

---

## **I. Introduction**

One of the most unique geomorphic systems are karst landscapes, which are mostly created by the dissolution of soluble rocks like gypsum, dolomite, and limestone. Features like caves, sinkholes, subterranean drainage systems, and solution voids define these terrains. The development of karst systems is controlled not only by lithology and climate but also significantly influenced by geological structures, including folds, faults, joints, and other discontinuities that regulate groundwater movement and dissolution processes have a major impact on the development of karst systems.

The Kanger Valley region of Chhattisgarh, particularly the area surrounding Kanger Dhara Waterfall, represents an important karst terrain developed within carbonate rock sequences. Among its significant characteristics, Green Cave is a structurally controlled cave system that offers important insights into the relationship between karstification and tectonic deformation. Folding, faulting, jointing, striations, and stylolites are examples of the region's strong structural activity, suggesting several stages of deformation that have altered the rock fabric and affected secondary porosity. (Zabidi et al., 2016).

Despite the geological importance of the Kanger Valley caves, detailed studies focusing on the structural control of karst development in Green Cave and its surrounding area remain limited. Thus, the purpose of this study is to look into the connection between the region's karst processes and structural components. Analysis of how folds, faults, joints, striations, and stylolites influence speleogenesis, groundwater flow, and cave morphology is given particular attention. This research contributes to a broader understanding of karst evolution in tectonically active and structurally complex terrains and provides valuable insights for geological mapping, groundwater studies, and conservation of fragile cave ecosystems. (Brinkmann, & Garren, 2011).

## **II. Study area**

Green Cave is situated in Bastar, Chhattisgarh's Kanger Valley National Park. The cave is located at N18°52'7.2", E081°55'57.9" and is 558 meters above sea level. This cave has a total length of 93 meters. Green Cave is located 1140 meters southeast of the Kanger Dhara waterfall, The distance between Kotumsar Cave and Green Cave is 200m and situated at south of the Kotumsar cave. Green Cave belongs to Kanger formation of Indravati basin which cover toposheet no 65F/13.