

# News and Notes

## Occurrences of Columnar Basalt Near Dudiyal Village, Sangareddy District, Telangana: A Geological and Educational Landmark

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The Deccan Volcanic Province (DVP) of central and western India, formed between approximately 68 to 60 Ma, represents one of the most extensive flood basalt provinces on Earth (Schoene *et al.*, 2015; Sprain *et al.*, 2019; Ray *et al.*, 2021). Encompassing nearly one-sixth of India's landmass (~500,000 sq. km), it exhibits a diverse range of geomorphological features that are of considerable geological significance (West, 1959; Bose, 1972; Shirke *et al.*, 2018; Kaur *et al.*, 2019). The DVP has long been a critical area for studying volcanic processes, landscape evolution, and geoheritage conservation.

The recent identification of well-preserved columnar basalt in the north of Dudiyal village (Dudala village in Survey of India Toposheet No. 56G/13) (17°56'09.77" N and 77°52'13.02"E) in the Sangareddy district of Telangana, India represents a noteworthy geological discovery (Fig. 1). It was first identified during geochemical mapping (Sahoo *et al.*, 2023). The area lies approximately 45 km north of Sangareddy district headquarters and is positioned near the boundary of Sangareddy and Medak districts.

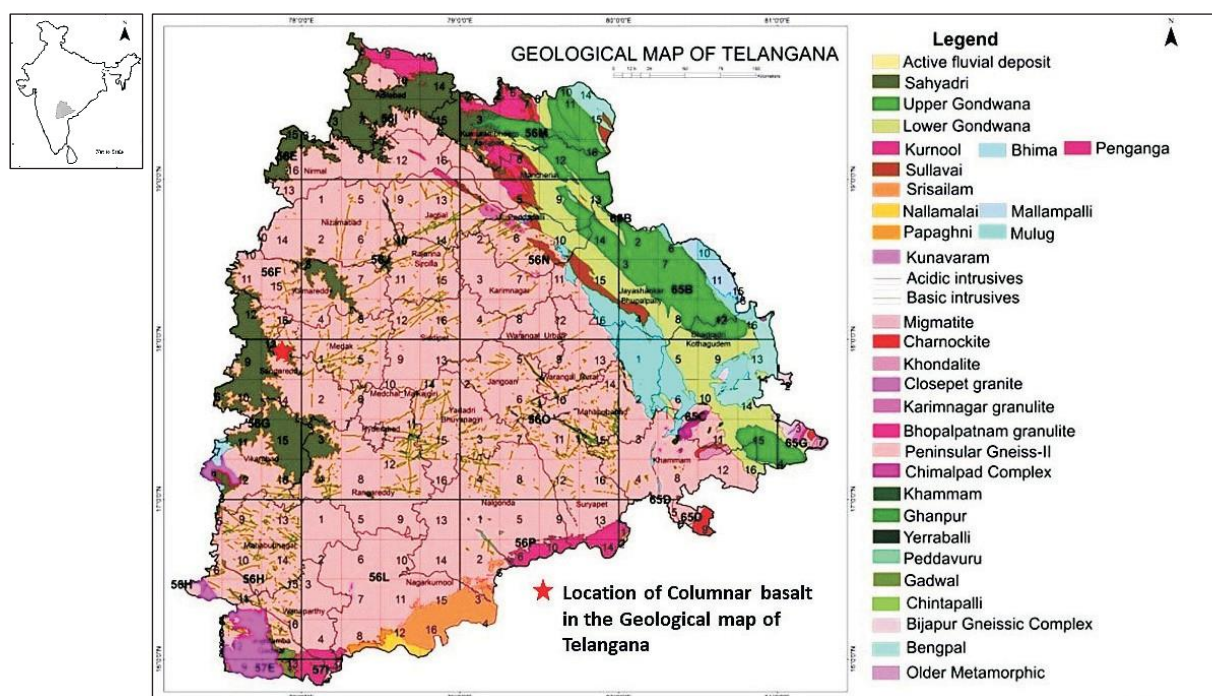
The regional topography comprises NNE-SSW trending low ridge, approximately 575 meters above mean sea level (MSL), capped by lateritic duricrusts. The underlying basalt flow is inferred to belong to the early Palaeocene, making this site significant for understanding the stratigraphy and cooling mechanisms of the

Deccan basalts (Shirke *et al.*, 2018; Sahoo *et al.*, 2023).

These basalt columns exhibit pentagonal and hexagonal morphologies with diameters ranging from 30–40 cm and heights extending up to 2 meters (Fig. 2a-d). The columnar-jointed basalt flows, occurring beneath ferricrete duricrusts of the early Palaeocene age, provide crucial insights into the mechanisms of thermal contraction, non-uniform cooling, and the influence of water in the formation of columnar joints (Goehringa *et al.*, 2009; Shirke *et al.*, 2018; Lamur *et al.*, 2018).

Petrographic analysis of basalt samples reveals the presence of plagioclase phenocrysts within a groundmass composed of clinopyroxene and opaque minerals (Fig. 2e-f). The development of polygonal columnar joints suggests that the cooling process was non-uniform, influenced by thermal contraction and the presence of water, which played a key role in columnar jointing (Goehringa *et al.*, 2009; Lamur *et al.*, 2018). The observed colonnade structure (Fig. 2c) indicates that differential cooling occurred at various levels within the lava flow, leading to the formation of these distinct columns (Hetényi *et al.*, 2012; Shirke *et al.*, 2018).

The site shares similarities with globally recognized columnar basalt formations, such as the Giant's Causeway in Northern Ireland and St. Mary's Islands in Karnataka. Although the current areal extent of columnar basalt exposure at Dudiyal is



**Fig. 1.** Geological map of Telangana showing the study area (Source: Geoinformatics division, State Unit: Telangana, Southern Region, Geological Survey of India, Hyderabad and Sahoo *et al.*, 2023).



**Fig. 2.** Outcrop of columnar basalt: (a) Sectional view of massive slender columnar basalt; (b) Planar view of columnar basalt showing pentagonal shape; (c) Sectional view of columnar basalt (entablature) in dug well section; (d) Platy joints in columnar basalt. Photomicrographs of columnar basalt: (e) Zoned plagioclase phenocryst in association with fine-grained plagioclase and clinopyroxene; (f) Sub-ophitic texture in basalt under crossed polarized light (Pl- Plagioclase, Cpx- Clinopyroxene).

relatively limited (less than 1 sq. km) compared to other Deccan Volcanic Province occurrences and globally recognized geoheritage sites, it holds significant local importance. From an educational and research perspective, this site has the potential to enhance the geological studies in Telangana and neighboring states. It serves as an important natural field site for geology and volcanology, facilitating academic research, field investigations, and public awareness initiatives. The well-preserved columnar joints at Dudiya village provide crucial insights into the Deccan volcanism while serving as a natural laboratory for students and researchers exploring volcanic processes and geomorphology.

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