Geophysical Exploration of Dolomite and Baryte Deposits in the Gunjeda Formation, Pakhal Supergroup, Telangana

***[1]Udaya Laxmi G, [1]Linga Swamy Jogu,** and **[1]Vidyasagara Chary D**

[1]Department of Geophysics, Osmania University, Hyderabad-500007.

*Corresponding Author Email id: udayalaxmi.g@gmail.com

Abstract

This study presents an integrated geological and geophysical investigation for dolomite and baryte mineralization in Pocharam area, Garla mandal, Mahabubabad District, Telangana, located within the Proterozoic Pakhal Supergroup. The region comprises predominantly dolomite, quartzite, and shale formations of the Gunjeda Formation within the Mallampalli Subgroup. Field observations confirm the presence of stratabound baryte occurring as lenses and pockets interbedded within cherty dolomite, with widths ranging from 0.5 to 2.0 meters and trending NW–SE to N–S. Ground magnetic surveys using a Precision Proton Magnetometer (PPM) were conducted over seven profiles, and Total Magnetic Intensity (TMI) maps revealed strong magnetic highs in the northern area, attributed to quartzite and iron-rich shales, and magnetic lows in the southern and southwestern areas, correlating with dolomite and baryte-rich lithologies. Depth estimation through Radially Averaged Power Spectrum (RAPS) analysis indicated that the target mineralized zones occur within the upper 50 meters, while deeper anomalies likely represent the Archaean basement. Borehole data confirmed the continuity of dolomite, though baryte was found to be spatially localized. The results validate that magnetic geophysical methods effectively delineate lithological boundaries and support the identification of low-magnetic, mineral-rich zones. This study highlights the utility of integrating geological mapping with magnetic anomaly analysis for efficient targeting of non-metallic mineral deposits in Proterozoic terrains like the Pakhal basin.Keywords: Total Magnetic Intensity, Power Spectrum, Mallampalli Group, Pakhal Supergroup, Dolomite, Baryte, Geophysical Survey

Keywords: Pakhal Supergroup, Dolomite Mineralization, Baryte Deposits, Magnetic Anomaly, and Geophysical Exploration.

Introduction

The Mahabubabad district of Telangana, part of the Godavari Valley terrain, is geologically diverse and mineral-rich. The region is underlain by the Pakhal Supergroup, known for hosting economically important deposits of dolomite and baryte. These mineral resources are increasingly important due to their industrial utility in the chemical, construction, petroleum, and glass manufacturing sectors (Chakraborty et al., 2020; Roy et al., 2021). The rising demand for these minerals both domestically and globally calls for a more scientific and systematic approach to exploration, combining both geological and geophysical methods. Dolomite ($CaMg(CO_3)_2$) is widely used in metallurgy, refractory production, and cement manufacturing. Baryte ($BaSO_4$), due to its high specific gravity and chemical inertness, plays a crucial role in oil and gas drilling muds, as well as in paint, rubber, and glass industries. In Telangana, previous studies have noted the occurrence of these minerals within the unmetamorphosed sedimentary sequences of the Proterozoic Pakhal basin (Appavadhanulu, 1962; Ballurkar, 1973; Zhang et al., 2020). However, a detailed integration of magnetic geophysical data with lithostratigraphic and structural mapping has been limited, especially in the Pocharam area of Garla mandal.

Magnetic surveying, as a non-invasive and cost-effective geophysical method, has proven particularly effective in delineating lithological boundaries, detecting fault structures, and identifying zones of alteration associated with mineralization. The use of precision proton magnetometers (PPM) and advanced data processing tools such as Oasis Montaj software has further enhanced the resolution and interpretability of subsurface magnetic anomalies (Hinze & von Frese, 1990; Tripathi & Mehta, 2021; Sahoo et al., 2022; Pradhan & Tripathy, 2023). Spectral analysis techniques, such as the Radially Averaged Power Spectrum (RAPS), provide insights into the depth of magnetic sources, helping to distinguish between shallow and deep-seated geological formations (Mishra & Pedersen, 1982; Singh et al., 2023). In the present study, a detailed magnetic survey was undertaken in Pocharam (V), Garla (M), Mahabubabad district to investigate the subsurface disposition of dolomite and baryte formations. The survey aimed to assess the extent of mineralization by integrating field geological observations with magnetic data interpretation. This multidisciplinary approach not only improves the accuracy of mineral targeting but also supports future sustainable resource development in the region.

Location

The study area is situated in Pocharam village of Garla mandal, Mahabubabad district, Telangana, India. Geographically, it lies between longitude 80°12'05.89" E to 80°12'22.03" E and latitude 17°31'08.01" N to 17°31'22.03" N, corresponding to Survey of India (SOI) toposheets 65C/2 and 65C/3. The nearest settlement is Nagaram village, located approximately 1 km to the east, while Pocharam village lies around 5 km to the west. The area is easily accessible via a motorable road from Garla town, which is around 10 km away (Figure 1). This region forms a part of the Pakhal basin and is known for hosting various sedimentary formations favorable for mineral exploration. The geographical coordinates and proximity to known mineral belts make it a geologically significant site for exploration of dolomite and baryte.

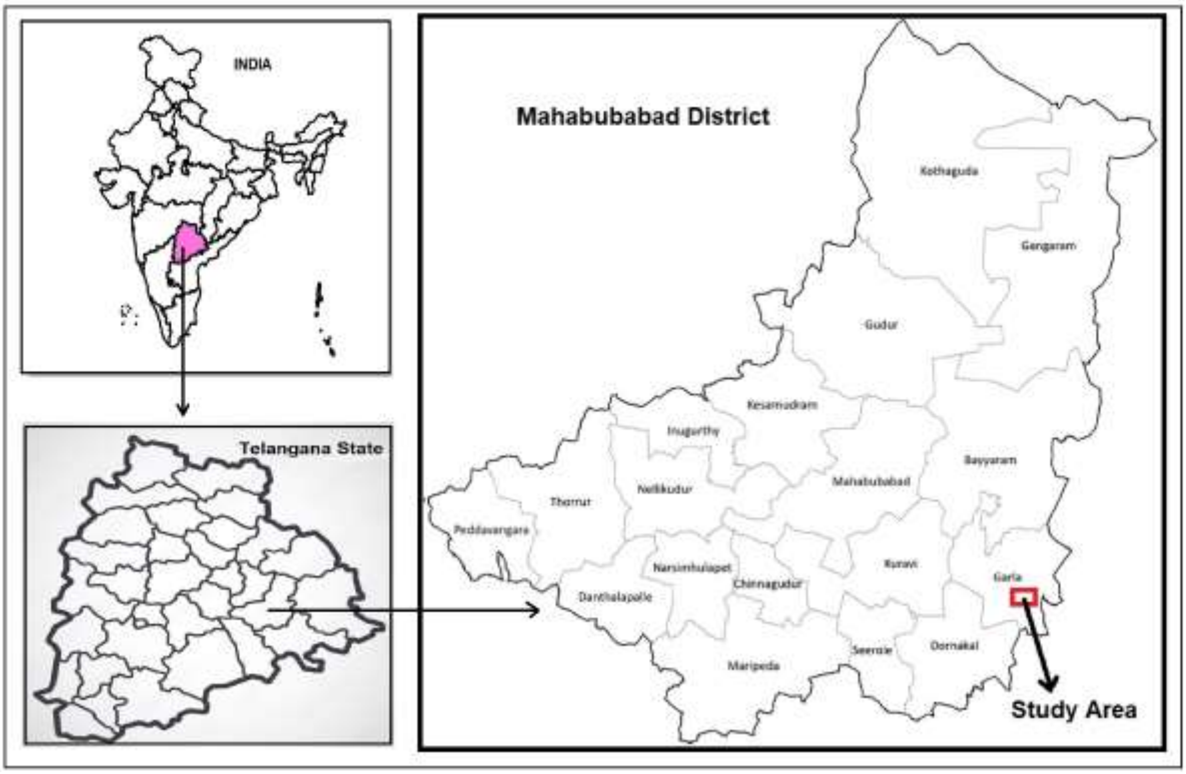

Figure 1. Location map of the study area.

Topography

The terrain is gently undulating with elevations (Figure 2) ranging between 190 meters and 201 meters above mean sea level (MSL). The area gradually slopes toward the west and northwest, which facilitates natural drainage and surface runoff. The drainage pattern is dendritic, indicating underlying homogeneous rock types, and streams flow predominantly west to east and west to north, feeding nearby tanks and agricultural catchments. The landscape is predominantly covered with dryland agricultural fields, interspersed with patches of rocky outcrops. The eastern part of the study area represents a topographic low, while the western part, which includes an existing baryte mine, is relatively elevated and hilly.

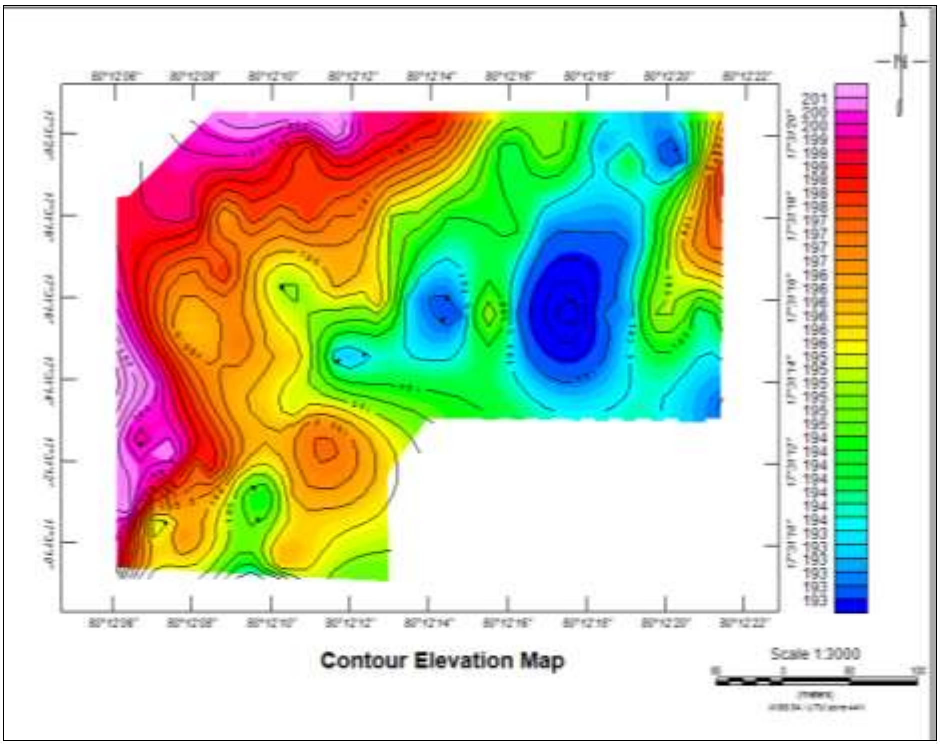

Figure 2. Elevation map of the study area.

Regional Geology

The study area falls within the Godavari Rift Valley, which hosts extensive Proterozoic sedimentary sequences known as the Pakhal Supergroup (Subrahmanyam & Nageswara Rao, 2020). These rocks represent a significant intracratonic basin developed over the Archaean Peninsular Gneissic Complex, marked by a pronounced non-conformity. The Pakhal sediments are unmetamorphosed, unfossiliferous, and composed of mixed lithologies, including calcareous, argillaceous, and arenaceous sediments a characteristic signature of shallow marine to marginal marine depositional environments.

The Pakhal Supergroup is subdivided into three main stratigraphic subgroups, each reflecting distinct lithological and depositional settings:

- **Mallampalli Subgroup (Lower Sequence):**
  Dominated by dolomite, quartzite, and cherty quartz veins, this unit forms the basal part of the Pakhal Supergroup. It represents carbonate-rich shallow shelf deposition and hosts economically viable minerals such as dolomite and baryte. The presence of glauconite and ripple-marked quartzite suggests deposition in a quiet marine environment, occasionally interrupted by high-energy storm events.
- **Mulug Subgroup (Middle Sequence):**
  Comprising shales and massive quartzites, this unit reflects deeper water conditions with reduced energy. It acts as a transitional facies between carbonate-rich lower units and siliciclastic-dominated upper units. The dominance of fine-grained sediments and cross-bedded quartzites suggests sedimentation through turbidity flows and offshore shelf settings.
- **Albaka Subgroup (Upper Sequence):**
  Restricted to the eastern portions of Mahabubabad district, this unit includes sandstone and limestone formations. The Albaka subgroup is interpreted as having been deposited under fluvial to shallow marine conditions, possibly during a regressive phase of the basin evolution.

Regionally, the Pakhal formations strike NW–SE, aligned along the Godavari–Pranahita structural corridor (Zhang et al., 2020), a major tectonic feature that influenced sedimentation patterns and basin subsidence during the Proterozoic. These sediments are unconformably overlain by the younger formations of the Penganga Group and the Sullavai Sandstone, indicating a major stratigraphic break. The stratigraphic succession and structural disposition suggest that the Pakhal basin evolved through multiple transgressive-regressive cycles under stable platform conditions. The regional geology is further influenced by post-depositional faulting, dolomitization, and localized hydrothermal activity, all of which contribute to the mineralization patterns observed in the study area.

Geology of the Study Area

The study area geologically falls under the Mallampalli Subgroup of the Pakhal Supergroup, a well-defined Proterozoic sedimentary sequence deposited within the Godavari rift basin. This subgroup is notable for its carbonate-siliciclastic lithology, stratigraphic diversity, and economic mineralization, particularly of dolomite and baryte. The Pakhal Supergroup rests non-conformably over the Archaean Peninsular Gneissic Complex, which forms the crystalline basement of the region. The stratigraphic succession in the Mallampalli

Subgroup is classified based on lithological composition and field mapping (Appavadhanulu, 1959), and is as follows (Table 1).

Table 1. Stratigraphic succession of the area

Pakhal Supergroup (Proterozoic)	**Formation**	**Lithology**
Mallampalli Subgroup	Pandikunta Shale	Shale with interbeds of dolomite; dark grey, fissile, with mud cracks
	Gunjeda Dolomite/Quartzite	Dolomite interbedded with cherty quartzite, glauconite, and arkosic sand
	Bolapalli Formation	Conglomerate with quartzite, shale, and dolomite lenses; basal unit
Basement Complex	Peninsular Gneissic Complex	Granitic gneiss, highly weathered, representing Archaean crystalline basement

In the study area, the dominant litho-units are part of the Gunjeda Formation, which is exposed prominently in outcrops and shallow trenches. These lithologies are massive, fine to medium grained dolomites, occasionally siliceous and interbedded with cherty quartzite. Glauconitic content and occasional arkosic layers point toward shallow marine depositional conditions, possibly with periodic terrestrial influx. The Pandikunta Shales, representing the uppermost formation, are noted locally through thin shale partings intercalated within dolomitic layers, especially in lower-elevation zones. These units show features like mud cracks, laminations, and ripple marks, suggesting periodic subaerial exposure during sedimentation. The Bolapalli Formation, though not widely exposed at surface in this tract, forms the basal sedimentary layer and may be present at greater depths. It consists primarily of matrix-supported conglomerates and quartzite, indicating alluvial fan or braided stream environments prior to marine transgression. The regional strike of the Pakhal basin is NW–SE, consistent with the tectonic grain of the Godavari Valley. The bedding planes in the study area dip moderately to the northeast (10°–15°). Structural features such as minor faulting, joint systems, and fracture-controlled veins influence both the hydrogeology and mineral localization.

Mode of Mineralization and Occurrence

The Pakhal sediments in the study region are predominantly unmetamorphosed and unfossiliferous, except in localized zones showing slight thermal alteration. The depositional environment is interpreted as shallow marine, supported by sedimentary structures such as ripple marks, wrinkle structures, cross bedding, parting lineations in arenaceous (sand-rich) units, and mud cracks in argillaceous (clay-rich) and dolomitic facies. The presence of glauconite, chert, and authigenic overgrowths of feldspar further confirm a low-energy, chemically reactive marine setting.

Lithological Controls and Rock Types

The principal lithologies in the area include:

- Quartzite
- Siliceous and cherty dolomite
- Shale

These rock units are organized in stratigraphic sequences typical of the Gunjeda Formation of the Mallampalli Subgroup. The dolomite and quartzite formations serve as the host rocks for baryte mineralization.

Dolomite Characteristics

- The dolomite in the area is massive, fine to medium crystalline, and predominantly siliceous in composition.
- Exhibits ripple marks, cavernous porosity, and sometimes thin laminations indicating primary depositional features.
- Color: White to gray.
- Chemical Formula: $CaMg(CO_3)_2$.
- Hardness: 3.5–4.0 on Mohs scale.
- Specific Gravity: 2.8–3.0.
- Tenacity: Brittle.
- Exposed extensively on surface and shallow subsurface, especially in structurally elevated zones.

Baryte Mineralization

- The baryte ($BaSO_4$) occurs as interbeds and lensoidal pockets within cherty dolomite and, occasionally, within quartzites.
- These baryte bodies range from 1.0 to 2.0 meters in width, aligned predominantly in a NW–SE strike direction, conforming to regional tectonic trends.
- Textural Types: Massive, and at places, fibrous-columnar baryte is observed.
- Color: Typically off-white; variations to gray, pink, or brown occur due to iron oxide or other mineral impurities.
- Hardness: 2.5–3.5 on Mohs scale.
- Specific Gravity: Approximately 4.5, which serves as a distinguishing factor from quartz, which has a lower density despite visual similarity.
- Baryte is confined to specific topographic horizons, indicating structural and stratigraphic control on its localization.

The mineralization pattern reflects a syngenetic to early diagenetic origin, where baryte precipitated from sulfate-rich fluids in carbonate-dominated shallow marine settings. Structural features such as fractures and bedding planes may have acted as pathways for mineralizing fluids, particularly in dolomite-rich horizons (Zuo & Xu., 2021). The presence of cherty dolomite, glauconite, and authigenic feldspar further suggests that baryte deposition occurred during basin-wide chemical fluctuations, potentially associated with marine transgressive-regressive cycles.

Geophysical Studies

To evaluate the subsurface lithology and assist in identifying zones of dolomite and baryte mineralization, a detailed ground magnetic survey was conducted using a Precision Proton Magnetometer (PPM). The magnetic method was chosen for its proven effectiveness in delineating lithological boundaries, mapping subsurface structures, and estimating the depths of magnetic sources (Sahoo et al., 2022; Adebayo & Sunmonu, 2022), particularly in hard rock terrains such as those in the Pakhal basin.

The survey grid comprised seven profiles, spaced 50 meters apart, with readings recorded at 20-meter station intervals along each line. This dense coverage ensured adequate spatial resolution for detecting subtle variations in magnetic susceptibility associated with different rock types. Following diurnal corrections, the magnetic field data were processed using GMSYS software (Oasis Montaj platform). This software allowed for the generation of gridded datasets, modeling of subsurface structures, and enhancement of anomaly interpretation. The survey coordinates (latitudes and longitudes) were used to construct topographic and elevation maps with respect to mean sea level (MSL), enabling correlation between surface relief and geophysical anomalies. The study area shows a gentle west-to-east slope, with an elevated, hilly zone on the western side, coinciding with an existing baryte mine, and a topographic low on the eastern side.

Magnetic Anomaly

Magnetic anomalies represent variations in the Earth's magnetic field caused by differences in the magnetic properties of underlying rock formations. These anomalies are typically associated with changes in rock type, structure, or mineral content, particularly where magnetically susceptible minerals like magnetite or iron oxides are concentrated. In mineral exploration, magnetic surveys help identify lithological boundaries, structural features, and potential mineralized zones by detecting contrasts in magnetic susceptibility between different rock units (Verma & Yadav, 2022).

In the present study, ground magnetic surveying was conducted using a Precision Proton Magnetometer (PPM), which is effective in detecting both subtle and pronounced magnetic variations in the subsurface. The data were collected across seven profiles with a spacing of 50 meters and reading intervals of 20 meters, covering the entire area systematically. The processed data yielded a Total Magnetic Intensity (TMI) map, which provided a two-dimensional representation of magnetic field variations across the study area. The TMI map revealed distinct anomaly patterns. In the northern part of the study area, zones of high magnetic intensity were identified. These high anomalies are interpreted to be associated with quartzite formations enriched with iron oxides or shale beds, both of which exhibit higher magnetic susceptibility. These rocks likely contribute to elevated magnetic responses due to the presence of ferromagnetic minerals. In contrast, the southern and southwestern portions of the area displayed low magnetic intensity, indicating the presence of magnetically weak rocks such as dolomite and baryte (Figure 3). These low-susceptibility zones are significant because they correspond to areas of mineralization targeted during exploration. Dolomite and baryte, being non-magnetic, produce little to no anomaly, resulting in magnetic lows (He et al., 2021).

To estimate the depth to magnetic sources, a radially averaged power spectrum (RAPS) was generated from the magnetic data. This spectral method analyzes the frequency components of the magnetic field and helps infer the average depth of causative geological bodies. The spectrum analysis indicated that the magnetic sources were distributed at varying depths, with shallower anomalies (up to 50 meters deep) corresponding to dolomite and quartzite with interbedded baryte. The analysis assumed a maximum Pakhal formation thickness of around 400 meters, consistent with regional geological data. Deeper-seated magnetic sources, inferred from low-frequency components, may represent massive quartzite bodies or basement structures that are not directly exposed at the surface. Field observations further support the geophysical interpretation. The overburden or soil cover in the study area is generally shallow, ranging from 0.5 to 2.0 meters, allowing some dolomite and quartzite units to be exposed at the surface. Two exploratory boreholes drilled to depths of 100 and 150 feet encountered continuous dolomite beds but did not intersect significant baryte mineralization. This suggests that baryte in the area is localized in discrete pockets or lenses, consistent with the lenticular nature of mineral deposits observed in other parts of the Pakhal basin.

Overall, the integration of magnetic anomaly data with surface geology and borehole evidence confirms that the southern and southwestern magnetic lows correlate with the presence of dolomite and potential baryte zones. Conversely, the magnetic highs in the northern area are indicative of magnetite-bearing quartzite or shale units. The orientation of anomalies also aligns with the regional NW–SE structural grain, reinforcing the influence of tectonic controls on mineral distribution. This comprehensive interpretation underscores the value of magnetic methods in identifying subsurface lithological variations and guiding further exploration in Proterozoic terrains like the Pakhal basin (Figure 3).

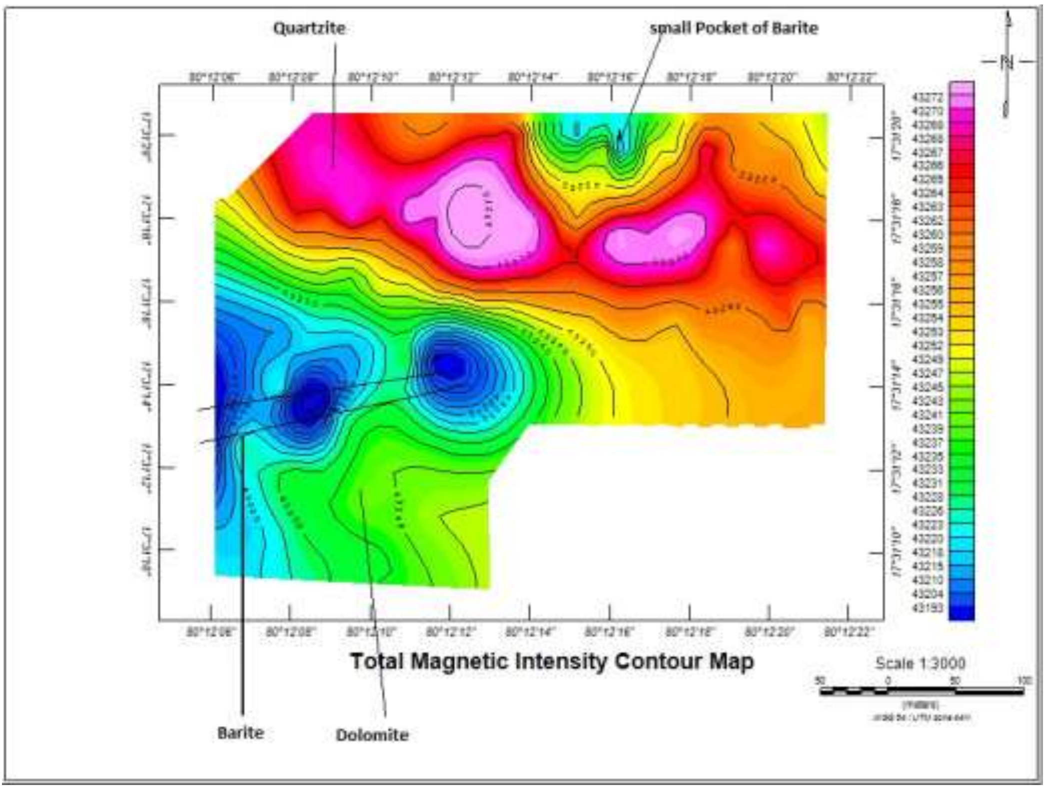

Figure 3. Total Magnetic Intensity (TMI) map of the study area.

Radially Averaged Power Spectrum (RAPS)

The Radially Averaged Power Spectrum (RAPS) is a spectral analysis technique used in geophysical exploration to estimate the depth of subsurface magnetic sources (Singh et al., 2023; Gao & Liu, 2023). It is particularly effective in areas where multiple magnetic bodies of varying depths exist. This method works by transforming the spatial magnetic anomaly data into the frequency domain using Fourier analysis. The resulting power spectrum plot reflects how the energy (or strength) of the magnetic signal is distributed over different frequencies. In essence, high-frequency components are associated with shallow magnetic sources, while low-frequency components correspond to deeper geological features.

In the current study, the RAPS technique was applied to magnetic data collected along seven survey profiles. The objective was to determine the depth ranges of the lithological units contributing to the magnetic anomalies identified in the Total Magnetic Intensity (TMI) map. The processed magnetic data were analyzed using GMSYS (Oasis Montaj), which generated a radially averaged power spectrum plot. The slope of the linear segments in the log-power versus wavenumber graph was interpreted to estimate the average depth of the causative magnetic bodies. The analysis assumed a regional Pakhal formation thickness of approximately 400 meters, based on prior geological records of the Godavari rift basin (Figure 4). The RAPS results suggested that magnetic sources are distributed at different depths across the study area. The higher-frequency (short-wavelength) components indicated the presence of shallow magnetic bodies, particularly dolomite and quartzite with interbedded baryte, occurring at depths of up to 50 meters. These results closely matched field observations and borehole data, where dolomite was encountered within the top 150 feet.

In contrast, the lower-frequency (long-wavelength) signals are attributed to deeper-seated magnetic formations, likely comprising iron-rich quartzites or the Archaean basement complex. These deeper sources contribute to the broader regional magnetic trends and may influence the structural setting of the overlying Pakhal sediments. Although the baryte itself is non-magnetic and does not directly produce magnetic anomalies, its presence within dolomite units can be indirectly inferred from the magnetic response of the host rocks and their surrounding lithological contacts. By applying the RAPS technique, the study effectively delineated the vertical distribution of litho-units, enabling a more accurate understanding of the geological framework. The method confirmed that the main zones of interest, particularly those with low magnetic intensity, correspond to shallow dolomite beds with potential baryte mineralization. The combination of spectral analysis and ground magnetic data thus provided valuable insights into both the depth and lateral continuity of subsurface lithologies, supporting further mineral exploration and resource evaluation in the Pakhal basin region.

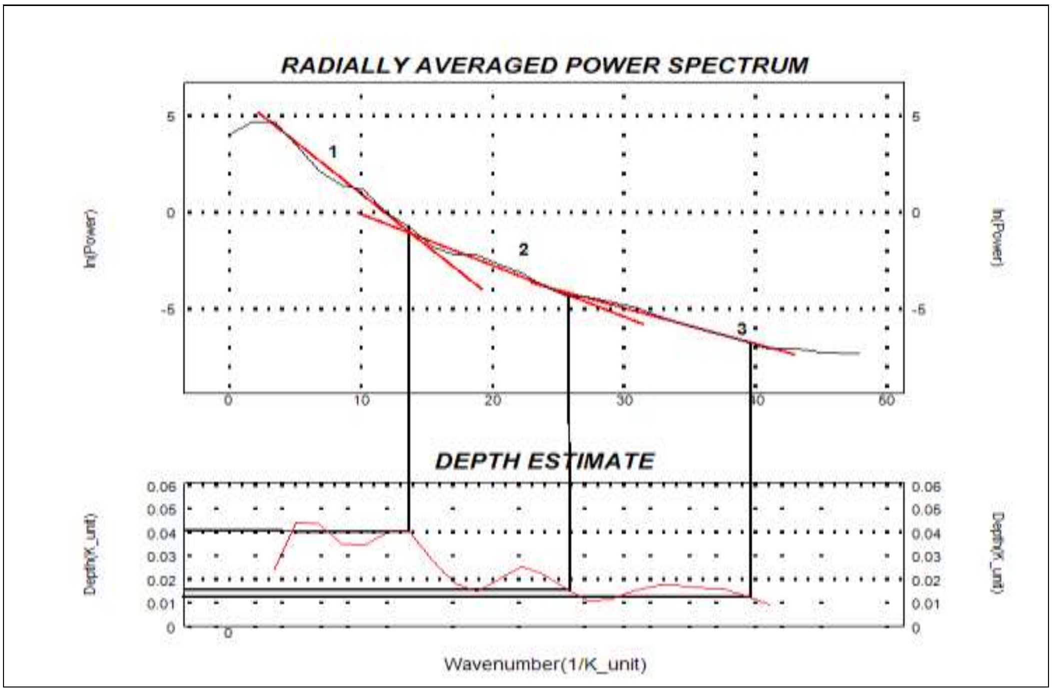

Figure 4. Radially Averaged Power Spectrum map of the study area.

Discussion

The integrated geological and geophysical investigations in Pocharam village, Garla mandal, Mahabubabad District, Telangana, offer a comprehensive understanding of the lithological framework and mineralization potential of the Pakhal Supergroup. The study area lies within the Gunjeda Formation of the Mallampalli Subgroup, which unconformably overlies the Archaean Peninsular Gneissic Complex. Field mapping confirms a northeast-dipping stratigraphic sequence comprising dolomite, quartzite, and shale. The dolomite is characterized by massive, siliceous, and cherty textures with features such as ripple marks, parting lineation, and mud cracks, indicative of shallow marine depositional conditions. Baryte mineralization is confined to lensoidal pockets and thin interbeds within cherty dolomite layers. These bodies range between 0.5 and 2.0 meters in width and align NW–SE to N–S, reflecting regional structural trends. The baryte exhibits distinguishing field characteristics such as off-white to pink coloration (due to iron staining), fibrous texture, and high specific gravity.

Magnetic surveys conducted using a Precision Proton Magnetometer (PPM) produced Total Magnetic Intensity (TMI) maps, revealing two distinct zones: high magnetic intensity in the north, attributed to quartzite and iron-rich shale; and low magnetic intensity in the south and southwest, corresponding to non-magnetic dolomite and baryte formations. These magnetic lows are of particular interest, as they correlate with potential mineralized zones due to the low susceptibility of dolomite and baryte (Li et al., 2023). The Radially Averaged Power Spectrum (RAPS) analysis further enhanced the interpretation by estimating the depth of magnetic sources. It confirmed that dolomite and baryte-bearing units lie within the upper 50 meters of the subsurface, while deeper magnetic anomalies may relate to quartzite or the Archaean basement. Borehole data from two exploratory wells supported this, revealing continuous dolomite beds but no significant baryte, suggesting its lensoidal and discontinuous nature.

Key Findings

- The Gunjeda Formation is the primary lithological unit, hosting dolomite interbedded with strata bound baryte lenses.

- Baryte mineralization is structurally controlled and restricted to topographically lower zones aligned with low magnetic anomalies.
- TMI mapping effectively differentiates between magnetic (quartzite, shale) and non-magnetic (dolomite, baryte) units, aiding precise targeting.
- RAPS confirms that mineralized litho-units lie within 0–50 meters of the surface, making them suitable for shallow exploration methods.
- Exploratory drilling corroborated geological and geophysical interpretations, though baryte's localized nature necessitates anomaly-guided drilling.
- The combined methodology enhances confidence in subsurface delineation, reducing the need for extensive trenching or random drilling.
- Overall, this multidisciplinary approach integrating geology, stratigraphy, and advanced magnetic data proves highly effective and cost-efficient for mineral exploration in Proterozoic basins.

Conclusion

This study successfully applied an integrated geological and geophysical approach to assess dolomite and baryte mineralization in the Gunjeda Formation of the Pakhal Supergroup. Through detailed field mapping and magnetic surveys, the lithostratigraphic framework was delineated, confirming the presence of massive siliceous dolomite, cherty quartzite, and shale. The magnetic data, analyzed via TMI mapping and RAPS, identified shallow, non-magnetic zones associated with dolomite and baryte, and deeper anomalies likely tied to quartzite or basement structures. These interpretations were validated by exploratory drilling and field evidence, emphasizing the lensoidal and discontinuous nature of baryte. In conclusion, the study demonstrates the viability of integrating stratigraphic geology with magnetic geophysical methods to accurately identify and delineate mineralized zones in Proterozoic terrains. This approach offers a robust, low-cost framework for future exploration and can be replicated across similar geological settings in India. Further work should include targeted resistivity surveys, precision drilling, and reserve estimation, particularly in low-magnetic zones delineated by this study.

References

Adebayo, T. S., & Sunmonu, L. A. (2022). Application of ground magnetic survey in delineating mineralized zones in basement complex terrain. Journal of Applied Geophysics, 200, 104-112.

Appavadhanulu, K. (1959). Geology of the Pakhal rocks around Pakhal Lake, Warangal District. Records of the Geological Survey of India, 87(2), 173–188.

Appavadhanulu, K. (1962). The stratigraphy and structure of Pakhal rocks. Journal of the Geological Society of India, 3, 110–120.

Ballurkar, S. P. (1973). Report on baryte deposits in the Pakhal Supergroup. Geological Survey of India Report (Unpublished).

Chakraborty, S., Reddy, M. V. R., & Rao, V. R. (2020). Economic potential of barytes and dolomites in the Pakhal Basin. Indian Minerals, 74(2), 155–169.

Gao, Y., & Liu, W. (2023). Advanced spectral analysis for geophysical prospecting in sedimentary basins. Geophysics, 88(3), R217–R229. https://doi.org/10.1190/geo2022-0365.1

He, Z., Zhang, Q., & Li, B. (2021). Magnetic signatures and ore-bearing lithologies: Implications for mapping hidden deposits. Ore Geology Reviews, 131, 104000. https://doi.org/10.1016/j.oregeorev.2021.104000

Hinze, W. J., & von Frese, R. R. B. (1990). Gravity and magnetic exploration: Principles, practices, and applications. Cambridge University Press.

Li, X., Chen, W., & Xu, H. (2023). Interpretation of low-susceptibility lithologies in magnetic surveys. Journal of Geophysical Research: Solid Earth, 128(4), e2022JB025716.

Mishra, D. C., & Pedersen, L. B. (1982). Estimation of depth to the bottom of magnetic sources using power spectrum. Geophysical Prospecting, 30(4), 507–518.

Pradhan, P. K., & Tripathy, D. (2023). Magnetic anomaly modeling using Oasis Montaj software: A case study from India. Geoscience Frontiers, 14(1), 101204.

Roy, S., Dutta, S., & Banerjee, A. (2021). Industrial applications of barytes and dolomite in India: A review. Materials Today: Proceedings, 47, 448–455.

Sahoo, B., Reddy, K. N., & Sinha, A. (2022). Magnetic anomaly analysis for delineating mineralized zones in Proterozoic basins. Journal of the Geological Society of India, 98(5), 599–607.

Singh, A., Yadav, R. K., & Kumar, N. (2023). Depth estimation of subsurface structures using RAPS technique: A case from central India. Geophysical Research Letters, 50(6), e2022GL101301.

Subrahmanyam, A. S., & Nageswara Rao, D. (2020). Stratigraphic architecture and tectonic evolution of the Pakhal Supergroup, Telangana. Journal of Earth System Science, 129(7), 161. https://doi.org/10.1007/s12040-020-01430-9

Tripathi, D., & Mehta, R. (2021). Application of magnetic geophysical surveys in mineral exploration: A review from Indian Proterozoic basins. Journal of Geosciences and Environment Protection, 9(12), 89–105.

Verma, R., & Yadav, S. K. (2022). Interpretation of magnetic anomalies for basement mapping in hard rock terrains. Geoscience Letters, 9(1), 21.

Zhang, Q., He, Z., & Zhou, H. (2020). Tectonic setting and stratigraphy of the Pakhal Basin: Implications from field studies and geophysical modeling. Tectonophysics, 789, 228529. https://doi.org/10.1016/j.tecto.2020.228529

Zuo, X., & Xu, J. (2021). Geochemical and stratigraphic controls on baryte mineralization in carbonate settings. Ore Geology Reviews, 129, 103943.