

Reply to Anonymous Referee #1' comments and suggestions

This paper proposes an interpretable DCN – Transformer hybrid model with attribution for mineral prospectivity mapping. The proposed framework is novel and potentially valuable. I recommend the authors address the following minor issues to further improve the clarity and quality of the manuscript.

Re: Thank you for your interest. We have addressed all your comments and suggestions. I hope you are satisfied with this revision.

It is suggested to adjust the subheadings of the methods section in Section 3. The proposed framework consists of four major components, whereas the current subsection structure only reflects three of them. I suggest revising the subsection organization so that it better corresponds to the overall framework and more clearly presents the model architecture and workflow.

Re: Revised. We have revised the subsection organization in Section 3 to fully correspond to the four principal components of the proposed framework.

Please check whether the title of Figure 4 is accurate. The current title refers to geochemical anomalies associated with mineralization, whereas the figure appears to present mineral prospectivity maps according to the description in the manuscript. The terminology should be made consistent.

Re: Revised.

Figure 7 presents the attribution results for ten mineral deposits and states that these deposits correspond to those shown in Figure 2. However, the deposits are not numbered in Figure 2, making it difficult for readers to establish the correspondence between the two figures. I suggest adding deposit numbers to Figure 2 or providing another clear way to link the deposits shown in the two figures.

Re: The ten deposits have been numbered in Figure 1, which express the simplified geological setting of the study area.

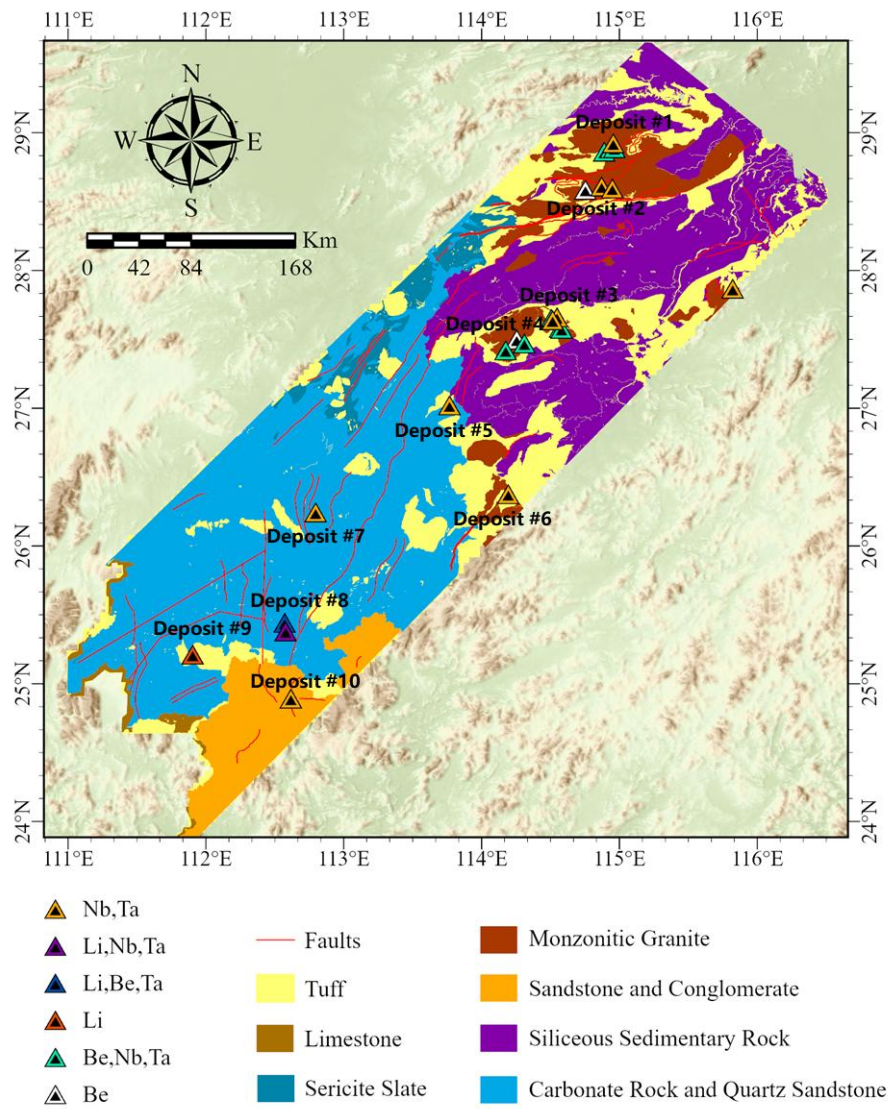


Figure 1. Simplified geological setting of the Nanling region in Southern China

In line 320: "Prior to model training, data augmentation, which was adopted in Yang and Zuo (2024), ..." Since data augmentation is an important part of the training process, I recommend briefly describing the augmentation strategy (e.g., augmentation operations and sample expansion) rather than relying solely on the citation. This would improve the completeness and reproducibility of the methodology.

Re: Revised.

Specifically, taking the grid cell where each mineral deposit occurrence is located as the center, we first expand it outward in all directions to form an $n \times n$ pixel block, and all points within this pixel block are regarded as mineral occurrences. Then, each pixel unit within the expanded block serves

as the center for a further outward expansion to generate an $m \times m$ pixel block. In this way, a single original mineral occurrence is expanded into n^2 pixel blocks each measuring $m \times m$.

The manuscript would benefit from careful proofreading. There are several grammatical and typographical errors:

- 1) the first sentence of the Abstract ("Mineral prospectivity mapping is a critical task in mineral exploration, effectively integrating which demands models capable of capturing both local and global geological features") contains a grammatical error.
- 2) the phrase "actionable c intelligence" in the Abstract appears to contain a typographical error.
- 3) There are grammatical errors in Line 73 "However, the above deep learning architecture which proficiency with local features also imposes a fundamental limitation..."
- 4) There are grammatical errors in Line 77 "The above deep learning architecture (CNN, GNN, and DCN) analyzing..."

A thorough language check is recommended before publication.

Re: A thorough language check has been conducted.