

# Joint Interpretation of Magnetotelluric and Deep Seismic Reflection Data Reveals Deep Fossil Source Region and Fluid Pathways of Gold Deposits in the West Qinling Orogenic Belt, Northeastern Tibetan Plateau

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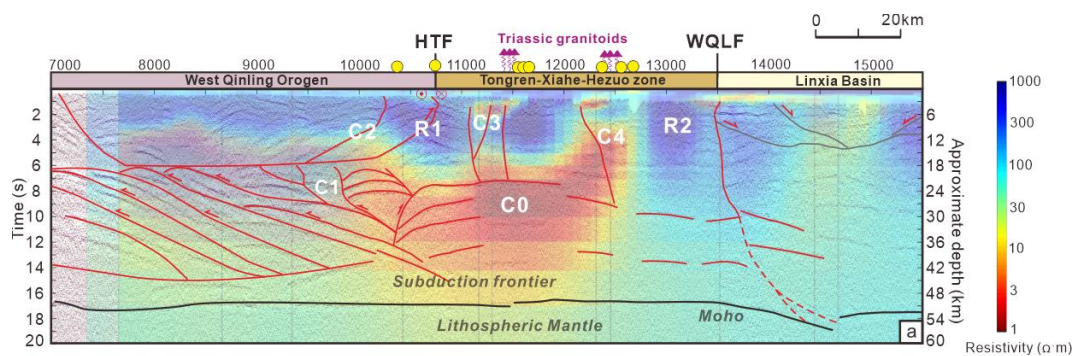
## SUMMARY

The West Qinling Orogenic Belt, located in the northeastern margin of the Tibetan Plateau, has undergone a series of subduction–collision orogenic events and hosts abundant polymetallic mineralization deposits, particularly in the Tongren–Xiahe–Hezuo area, which is an important gold mineralization belt in China. However, the origin of Au-bearing materials and the processes of fluid transport from the deep crust remain unclear.

In this study, magnetotelluric (MT) imaging reveals a large high-conductivity zone ( $<20 \Omega \cdot \text{m}$ ) at depths of 18–50 km beneath the Tongren–Xiahe–Hezuo area. This zone represents the deep source region of Au-bearing fluids that may be associated with devolatilization processes during Triassic slab subduction. Additionally, sub-vertical conductors in the upper crust that connect with the inferred source region may represent pathways for Au-bearing fluids. Interpretation of the MT and seismic reflection profiles suggests that the subduction system provided the conditions necessary for the development of the source region and auriferous pathways, ultimately contributing to the formation of gold deposits in the Tongren–Xiahe–Hezuo area.

\* This work was supported by the National Natural Science Foundation of China (No. 42304105, 42074089, 42374125, 42325402, 42274120, 41974097), the Guangdong Pearl River Talent Program (No. 211ZT07Z066), and the Southern Marine Laboratory (Zhuhai) Program (No. 311021003).

**Keywords:** West Qinling Orogenic Belt, Magnetotelluric imaging, Fossil fluid source and pathway, Subduction system, Gold mineralization



**Figure 1.** Integration of the deep seismic reflection profile and MT images. Yellow dots are Au deposits, HTF: Hezuo–Tanchang fault, WQLF: West Qinling fault.