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The lithosphere architecture and geodynamic of the Middle and Lower Yangtze metallogenic belt in eastern China: constraints from integrated geophysical data

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The lithosphere structure and deep processes are keys to understanding mineral system and ore-forming processes. Lithosphere-scale process could create big footprints or signatures which can be observed by geophysics methods. SinoProbe has conducted an integrated deep exploration across middle and lower reaches of Yangtze Metallogenic Belt (YMB) in Eastern China, these included broadband seismic, reflection seismic, wide-angle reflection and magnetotellurics survey. Seismic reflection profiles and MT survey were also performed in Luzong, Tongling and Ningwu ore districts to construct 3D geological model. The resulting geophysical data provides new information which help to better understanding the lithosphere structure, geodynamic, deformation and heat and mass transportation that lead to the formation of the Metallogenic Belt.
The major results are: (1) Lower velocity body at the top of upper mantle and a SE dipping high velocity body were imaged by teleseismic tomography beneath YMB; (2) Shear wave splitting results show NE parallel fast-wave polarization direction which parallel with tectonic lineament; (3) The reflection seismic data support the crustal-detachment model, the lower and upper crust was detached during contraction deformation near Tanlu fault and Ningwu volcanic basin; (4) Broadband and reflection seismic confirm the shallow Moho beneath YMB; (5) Strong correlation of lower crust reflectivity with magmatism; (6) The lower crust below Luzong Volcanics shows obvious reflective anisotropy both at the crust-mantle transition and the brittle-ductile transition in the crust. All these features suggest that introcontinental subduction, lithosphere delamination, mantle sources magmatic underplating, and MASH process are responsible for the formation of this Mesozoic metallogenic belt.

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