

Microplate tectonics and precision exploration: a new paradigm to study basins, ore deposits and geohazards

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With the fine combination and accumulation of multidisciplinary data, it is found that the same orogenic belt under the control of the interaction of two large-scale plates has significant metallogenic segmentation, or the formation of basins in different segments along one tectonic zone is also very different, or the same metallogenic belt is also significantly different, and so on. Obviously, these differences can no longer be simply summarized as a product of the interaction between the two large-scale plates. Therefore, it is necessary to promote the detailed division and fine research of microplates. Firstly, based on the in-depth investigation and analysis of plate configuration in plan view, it is found that these so-called large-scale plates are actually the mosaics of unactive or active microplates. When some microplates move relatively along the same one subduction zone, orogenic belt, mid-ocean ridge or transform fault, they will have significant differences in activity and will inherit pre-existing differences in composition, so their metallogenic, reservoir-forming, geohazard effects are naturally significantly different. Secondly, from the vertical analysis of surface-deep coupling and from the perspective of three-dimensional interaction of mantle micro-block, continental micro-block and oceanic micro-block (Li et al., 2018), some scholars found a new type of reservoir formation induced by teleconnection between mantle micro-block cooling and cratonic depression (Liu and Stegman, 2011), and some new types of gold deposits caused by the coupling of mantle micro-block delamination and craton destruction (also known as cratonic destruction-linked gold deposit), etc. It can be seen that fine division of microplates can not only reveal the diversity and complexity of mineralization, oil-gas accumulation and geohazard triggering mechanisms, discover new types, new laws, new mechanisms and new models of resources, energy and

disasters to guide the geological investigation in deep Earth, deep sea and deep layer; but also it can be beyond the traditional Plate Tectonic Theory to establish a new theory of microplate tectonics with a high quality. In particular, the high-technological use of Digital Twin Earth can also realize the paradigm revolution of digital mining and precision exploration in the future.

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