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Deep-Setting of the Large-scale Magmatism and Mineralization in Late Mesozoic of the Eastern China

QIU Ruizhao[1], ZHOU Su[2], TAN Yongjie[1], LIU Zhigang[1], XIAO Qinghui[3], FENG Yao[2] and ZHANG Guoqing[2]

1 *Development and Research Center, China Geological Survey, Beijing 100037, China*
2 *China University of Geosciences, Beijing 100083, China*
3 *Information Center of Ministry of Land and Resources, Beijing 100812, China*

1 Introduction

The lithosphere thinning and "Mesozoic metallogenic explosion" in east China was one of the most noticeable scientific issues in the recent decade. Regarding to its dynamic background, various viewpoints have been proposed by the geologists both at home and abroad, and have become a hot spot to be widely concerned (Deng, 1996; Wilde et al., 2003; Mao et al., 2003).

2 Lithospheric Discontinuity

Continent of China & adjacent areas was pieced together by the orogenic belts in different periods, and consisted of the five type lithospheres (Qiu et al., 2006, 2014). The area between the different type lithospheres was defined the lithospheric discontinuity zones (Kutina, 1995), which show differences on the many aspects such as the crust-mantle structure, rock composition, heat flow and thickness of the crust and the subcontinental lithospheric mantle, and should be have the close relationship with the metallogenesis.

five types lithospheres are recognized in east China, including Eerduosi and Yangzi cratonic lithosphere, Yanshanian orogenic-type lithospheres represented by the Da Hinggan and Yanshan-Taihang mountains and central segment of the Nanling Mountains remain, rift-type lithospheres represented by the Songliao plain, North China plain and sea areas off Fujian and Guangdong, oceanic crust-type lithospheres represented by the Central sea basin of the South China Sea, and the island arc-type lithosphere represented by that of Taiwan. Masses of the lithospheric discontinuity zones in east China means having the important factors would cause the strongest and more active tectonic-magmatic-metallogenic events.

3 Deep-Setting of the Eastern China in Late Mesozoic

As we all know, The Indosinian orogeny refers to the East Asian collisional tectonic events associated with the closure of the eastern parts of the Paleo-Tethys Ocean and the formation of the Asian continent. Collisions occurred between the Sino-Korean Craton (North China) and the Yangtze Craton (South China), and Indochina and Sibumasu in Southeast Asia. Means after Triassic continents of Europe and Asia reaches the biggest continent and with the largest lithosphere-asthenosphere system. Most of the granitic belts in Mesozoic, volcanic belts in Cenozoic with northeast trend as a whole and running through different tectonic units in east China imply that it controlled by the same geodynamic-system and the two kinds of mechanisms actually are also the common mechanism that east China has undergone in Mesozoic-Cenozoic. It comes to us that seem that the Pacific plate had also played an important role, but it's hard to explain why Yanshanian igneous rocks distribution reaching more than one thousand kilometers from coast to inland. It's required to interpret the uniqueness of the east China from deep geological process, asthenosphere upwelling and interaction between lithosphere and asthenosphere supported.

Such as North China platform possessed a cold and strong continental lithosphere-root before Jurassic. The

* Corresponding author. E-mail: qiurrzz@163.com

continental lithosphere-root and the continental crust were destroyed and reconstructed by the intensive magmatism and tectonic deformation under the orogenic compression mechanism in Mesozoic. Rigid crust was heated up and weakened by the underplating of basaltic magma, which had induced a rheological condition favorable for the shrinking, structural deformation and thickening of the continental crust. The shrinking tectonic environment is favorable for the sealing up of the under-plated magmas in the crust, and result in the heating up and melting of the crust, and the formation and intrusion of granitic magma; consequently, the original TTG crust of craton type gave way to the granitic crust of orogenic type. With the accumulation of the eclogite remnant of the intra-crustal differentiation, its high density induced the de-stabilization of orogenic lithosphere-root which had in turn led to the large scale de-rooting and thinning of the lithosphere and the disequilibrium of the tectonic and thermal states; consequently, more material and heat of convective mantle was urged to input into the continental crust, resulting in the lithosphere mantle partial melting, asthenospheric material upwelling and extensional basin forming in the North China craton. The large-scale crust-mantle interaction had caused the magmatism come to a climax in J_3 and K_1 and led to the planar distribution of igneous rocks and the metallogenic explosion about 120Ma. During this process, lithospheric discontinuity zone were a weak belt, even those areas between continental cores can be regarded as the lithospheric discontinuity reactivated, also might be the good chunnels for the material and heat of the asthenosphere upwelling, partial melting. It's proposed that the Large-scale Magmatism and Mineralization in Late Mesozoic of the Eastern China was the combined result of the systematic changing of lithosphere/asthenosphere in China continent and the subduction of the Pacific plate, and the lithospheric discontinuity and lithospheric discontinuity reactivated play a very important role (Qiu et al., 2014).

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