SONG Hao, ZHANG Chengjiang, XU Zhengqi, SONG Shiwei and HUANG Changhua 2013. Metallogenic and Diagenetic Events along the Bailongjiang Fault Zone and Its Response of the Northern Margin of Qinghai-Tibetan Plateau *Acta Geologica Sinica* (English Edition), 87(supp.): 771-772.

Metallogenic and Diagenetic Events along the Bailongjiang Fault Zone and Its Response of the Northern Margin of Qinghai-Tibetan Plateau

SONG Hao[1,2], ZHANG Chengjiang[1,2*], XU Zhengqi[1,2], SONG Shiwei[1] and HUANG Changhua[3]

1 *Chengdu University of Technology, Chengdu 610059, Sichuan, China*
2 *Key Laboratory of Nuclear Techniques in Geosciences of Sichuan Province, Chengdu 610059, China;*
3 *Sichuan Nuclear Geology Institute, Chengdu, 610061, China*

Trammeled by old ideas of strata controlling appearance, research of predecessors on the origin of the ore deposits along the Bailongjiang fault zone focused on the transformation and enrichment of the formation and eluviation by atmospheric precipitation, and by neglection of the metallogenic information from deep, especially the connection between magma activity and mineralization, most of them held the strata around as metallogenic-sourced bed. Based on analysis of the age of magmatite and the collection of the isotopic age dating of magmatic rocks and metallogenic age dating in this area from previous published papers, the petrogenic and metallogenic model was established for collision orogenesis on study the metallogenic regularity along the Bailongjiang fault zone.

1 Geological background

The western Qinling is located in the contiguous portion of three structural domains: the Yangzi-Qinling-Qilian-Kunlun and Tethyan. The Bailongjiang fault zone, a largest fault throughout this area, is a part of the East Kunlun - A'nyemagen deep fault, which is an important tectonic suture line in North of Qinghai-Tibet Plateau lies in the northwest of Sichuan province, as a part of the north boundary of Songpan-Ganzi orogenic belt. It has been found that there are a large number of polymetallic deposits in western Qinling, such as Cu, Pb, Zn, Au, U, etc. The association of ore deposits is uranium deposit + gold-uranium deposits + gold deposits, i.e. the combination of U-U, Mo-U, Ni, Zn, Au-U, Au-Au, which is rare at home and abroad. The horizontal zoning characteristics of ore-forming elements is copper(e.g. Deerni)→lead-zinc→gold(e.g. Dashui, Gongbei) →gold-uranium (e.g. Laerma)→uranium deposits(e.g. Jiangza 510, 512) from west to east (Fig.1), and there are relations of gradual change and transition among them. It has been found that the uranium mineralization and enrichment in the mining area is closely associated with the structure, and the important metallogenetic concentrate region is located in the composite, intersection part of linear structure (Fig.1).

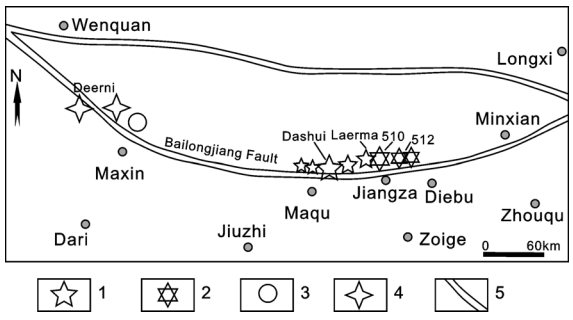

Fig.1 Ore deposit zoning map along the Bailongjiang fault zone(modified after Yang et al.,1991; Chen,2008)
1—gold deposit; 2—uranium deposit; 3—lead and zinc deposit; 4—copper ore deposit; 5 deep large fault zone

2 Results and Conclusions

The marine deposition history was concluded in the study area, and turned into the intra-continental tectonic development at the end of Middle Triassic Indosinian movement. Broad distribution of granite has close relations with the collision orogeny, RDT-1, RDT-3 dolerite sample and RDT-5 granodiorite sample are the representative, such as the samples RDT-1 and RDT-3, aged in the enrichment period of preliminary ～200Ma (RDT-1 aged 206.6±2.2Ma and RDT-3 aged 199±18Ma), indicate the diagenesis age of the late Indosinian and the early Yanshanian epoch, and the granodiorite samples,

* Corresponding author. E-mail: zcj@cdut.edu.cn

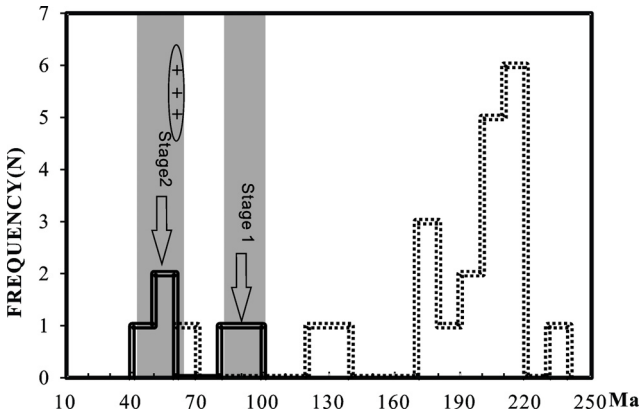

Fig. 2 Histogram distribution diagrams of the isotopic age from the deposits along the Bailongjiang fault zone
(The solid lines are metallogenic age dating, The dotted lines are the isotopic age of magmatic rocks in this area.
Shades of grey of Stage1 and Stage2 represent the main metallogenic epoch of the polymetallic deposits along the Bailongjiang fault zone)

such as RDT-5, obtained the enrichment period of 226.5~200.88Ma, in late Triassic epoch. There has undergone a complicated convergence process of the the North China plate with Tethys plate from south to north, which leads to the production of these collision type granite.

In Fig. 2, we collected the isotopic age dating of magmatic rocks and metallogenic age dating in this area from previous published papers. The dating in Fig.2 are mainly from previous published data on polymetallic deposits along the Bailongjiang fault zone, such as Gongbei gold deposit, Laerma gold-uranium, Jiangza 510, 512 uranium deposits, et al.

While the relatively new metallogenic and diagenetic events are associated with the collision of Indian and Asian continent, which begin to develop about 65Ma ago and is formed in continental collision regime before 45-40Ma(Hou et al.,2006; Gao et al.,2004) with north-south pressure. However, unlike the older above, there is on obvious magmatic events. According to our new study result, The uranium ore bodies from the Zoige Uranium ore field can be classified into two groups: the uranium ore bodies in ca. ～90 Ma are closely related to hydrothermal fluid, no direct relation with magmatism, while the 60 Ma are closely related to the magma activity represented by granite porphyry (note sample RDT-3 granite porphyry aged 64.08±0.59Ma in Fig.2).

As direct eidence for the connection of space and time between mineralization and magmatic activity, the above accurate determination in the age of magmatic rocks in this area, especially the granite porphyry, provides a good basis for the genesis of uranium-gold deposits in Zoige and an effective basis for the metallogenic theory related in deep magmatic fluid in this area.

Key word: Uranium-gold deposit; magmatite; tectonic evolvement; Bailongjiang; Western Qinling

References

Chen Youliang, 2008. The Study on Ore-forming Fluid Genesis and Ore-forming Model of Carbonaceous-siliceous-argillitic Rock Type Uranium Deposit in Zoige Region[D].Chengdu: *Chengdu University of Technology*(in Chinese with English abstract).

Gao Hongshan, Pan Baotian, Li Jijun and Sui Yuzhu,2004. Environment Change and Uplift of Qinghai-Tibetan Plateau. *Journal of Qingdao University* (Engineering & Technology Edition),19(4): 40-47(in Chinese with English abstract).

Hou Zengqian, Mo Xuanxue, Yang Zhiming, Wang Anjian, Pan Guitang, Qu Xiaoming and Nie Fengjun,2006. Metallogeneses in the collisional orogen of the Qinghai-Tibet Plateau: Tectonic setting, tempo-spatial distribution and ore deposit types. *Geology in China,*33(2): 340-351(in Chinese with English abstract).

Yang Hua, Liang Yuepeng, Wang Lan and Li Xiaoyuan, 1991. *Aeromagnetic Character in Eastern Tibetan Plateau and Its Relationship with Structural Minarel Belt*. Geological Special. Beijing: Geological Publishing House (in Chinese).