

Evidences of Tectonic Evolution Stages for the Changpingzi Pb-Zn Deposit, Northwestern Guizhou Province



WANG Ziyong^{1,2}, HAN Runsheng^{1,2,*} and CHENG Chen^{1,2}

¹ Kunming University of Science and Technology, Kunming 650093, Yunnan, China

² Southwest Institute of Geological Survey, Geological Survey Center for Non-ferrous Metals Resources, Kunming 650093, Yunnan, China

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The Pb-Zn metallogenic area in northwestern Guizhou, located in the southwest margin of the Yangtze block, is an important part of the Sichuan-Yunnan-Guizhou (SYG) Pb-Zn metallogenic province. The Pb-Zn deposits in the area are evidently controlled by the NW-trending Weining-Shuicheng and Yadu-Mangdong fault zones. Among those, the Changpingzi Pb-Zn deposit is one of important deposits, which is located in the southwestern wing of the Jiangzishan anticline. This anticline is a first-order structure in the region along Zhazichang-Jiangzishan-Dapingzi areas with a total length of about 28km and an axial direction of 310°, and the strata of two limbs is striking along NW-SE in the whole. Furthermore, the anticline also extends to the NE-trending Bainizhai anticline and cross each other at right angles. Also, the deposit developed three sets of fault structures, trending in NW, EW and NE, respectively. The NW fault structures, distributed near the hinge zone of the two wings of anticline and the faults in SW and NE wings having the opposing tendency, are: strike 300° to 320°, dip 30° to 50°. The EW fault structure is: strike 240° to 285°, dip approximately 55° to 60°. The NE fault structures are: strike 30° to 40°, dip approximately 60°, and its scale is smaller. Of which, the NW- and EW-trending faults are major ore-controlling structure. By using the theory and method of Geomechanics (Sun and Han, 2016), the different structural features in the deposit have been summarized, and the mainly conclusions are listed as follows.

The NW-striking faults have undergone three transformations in mechanical property from tensile→compresso-shear→compresso-shear (sinistral). The first structural period is characterized by tensile breccias with a great disparity in size, cemented by white calcite, furthermore, the tectonic activities in this period are closely related to mineralization-alteration. The second period is characterized by granulite and comminuted rocks disseminated with reddish-brown ferromanganese, and there are a large amount of reddish-brown calcite on both sides of fault structures. The third period is characterized by closed fault zone, smooth fracture surfaces and gentle interface undulation, and whose surfaces developed scratches, steps and the white and reddish brown calcite films. By the analysis on geometry and mechanics of fault structures in different locations, it is found that calcite in the section where the fault strike changed from NW-trending to NNW or SN-trending, is massive and irregular plate-shaped with a width of 5-20m. The transformations in mechanical property of EW-striking faults

changed from tensio-shear (dextral)→compresso-shear to tensio-shear. And the NE-striking faults, formed the latest, cutting through NW-trending and EW-trending faults, pinching out in the Jiangzishan anticline, present only compressive (sinistral) tectonism. Due to the influence of fault structures, the conjugate joints not development or strong deformation at the intersection with NW- and EW-striking faults form brush structures.

By the analysis of the evolution processes based on the tectonic sieving method, four structural assemblages can be summarized, indicating that tectonic evolution of the deposit may have experienced four stages: NE tectonic belt→NW tectonic belt→SN tectonic belt→EW tectonic belt. In these stages, NE tectonic belt is the structural system in the ore-forming period.

Key words: fracture structural analysis, tectonic period, geomechanics, Changpingzi Zn-Pb deposit

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About the first author



WANG Ziyong, male, born in 1989 in Heze City, Shandong Province; bachelor; graduated from Kunming University of Science and Technology; PhD student in Kunming University of Science and Technology. He is now interested in mineral prospecting. Email: 295891112@qq.com; phone: 18213886950.

About the corresponding author



HAN Runsheng, male, born in 1964 in Xianyang City, Shaanxi Province; Ph.D.; graduated from Kunming University of Science and Technology; professor in Kunming University of Science and Technology. He is now interested in Dynamics of tectonic ore-forming processes and concealed deposit prognosis and metallogenic mechanism and ore-forming regularities of mineral deposit. Email: 554670042@qq.com; phone: 13987166018.

* Corresponding author. E-mail: 554670042@qq.com