

GAO Lan, XIU Qunye, HU Guyue, 2014. New Progress in Study of the Ore-bearing Black Limestone of Jinding Giant Zn-Pb Deposit, Yunnan, Southwest China. *Acta Geologica Sinica* (English Edition), 88(supp. 2): 81-82.

New Progress in Study of the Ore-bearing Black Limestone of Jinding Giant Zn-Pb Deposit, Yunnan, Southwest China

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The Jinding giant Zn-Pb deposit in Lanping, Yunnan Province, is comprised of super large-scale Zn-Pb ore, large-scale gypsum ore, large-scale celestine ore and medium-scale pyrite ore. It is noticed on huge Zinc and Lead metal enrichment of 17 million tons in 6 square kilometers. The genesis of Jinding deposit is considerable disagreement as a result of extremely complex meso-cenozoic basin evolutionary history in Lanping region. The focuses of debate are the forming age, types and metallogenic environment of the host rock series. This paper deals with some progress in the study of the origin of Jinding Zn-Pb deposit.

1 The Two-Layers Structure for the Upper Triassic Sanhedong Formation

The exposed strata are Upper Triassic Sanhedong Formation, Middle Jurassic Huakaizuo Formation, Lower Cretaceous Jingxin Formation and Paleocene "Yunlon Formation" in Jinding ore district.

The main ore-bearing wall rocks of Jinding ore district is Upper Triassic Sanhedong Formation, are comprised of grayish white dolomitic limestone containing chert and black limestone with bitumen, and they are separately exposed in the upper part and the lower part in the Jinding ore district. The former can contrast with regional Upper Triassic Sanhedong Formation. The latter is only exposed in ore district, and is still Upper Triassic Sanhedong Formation based on the result of pollen analysis.

The stratigraphic distribution of space shows the two layers for the ore bearing strata. The upper is composed of grayish white dolomitic limestone, and it is a product of reverse nappe, it is allochthonous

system. The lower black limestone embodying bitumen is autochthonous system, came from the deep of Jinding

district as a result of gypsum salt diapir.

2 Gypsum Salt Dome and Black Limestone-Breccia in Place

The Zinc-Lead ores are hosted in Jingxin Formation sandstone and Triassic black limestone-breccia, and Zinc-Lead ore occurs in Triassic strata.

The Zinc-Lead ores are hosted in sandstone and black limestone-breccia, intergrowth gypsum ore, celestine ore, and pyrite ore occur in black limestone-breccia. Gypsum and black limestone are obviously ribbon-like. These ore-bearing black limestone series are upper Triassic strata.

On mining sections, black layered limestone block upright and purple layered siltstone block lying occur in the plenty of gypsum karst breccia. There is a NNE oval dome structure. Dome structure of Jinding ore district has been proven on the basis of field geological evidence and geophysical method.

Certainly, the gypsum salt dome diapir is the emplacement mechanism of ore-containing black limestone, and there are bitumen-lots hidden in black limestone.

Re-Os isotope for show (Figures 1), the original Upper Triassic Sanhedong formation in Jinding ore district is a paleo-oil reservoir, plenty of bitumen was formed due to gypsum salt diapir about 63 Ma.

Because the Lanping region is an earthquake zone, we can speculate that regional frequent earthquakes are the main driver for forming salt dome structure.

3 Black limestone-Breccia is the Epitome of Metallization

Black limestone are widely exposed in Jinding district, having the characterized of lots of bitumen.

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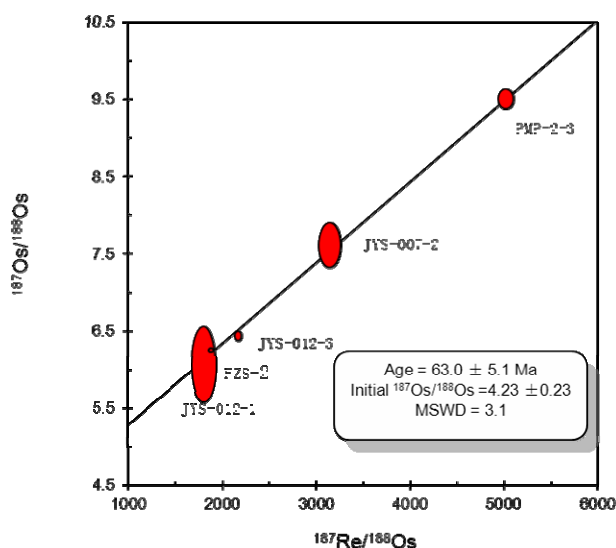


Fig. 1 Re-Os isotope for bitumen in Jinding district

The organic geochemical analyses of bitumen and black limestone confirm that there is a good correlation between black limestone and bitumen, black limestone formed in the salty reducing and non-oxidizing environments.

There are various types black limestone-breccia and grayish conglomeratic sandstone with black limestone breccia. They can be divided into two kind of breccia with stratified and unstratified.

Stratified calciferous conglomeratic sandstone and sandy limestone-breccia are exposed in the edge of district, and their petrological characteristics show that there are turbulent tectonic environment in the sediment processes.

Unstratified black limestone-breccia are exposed in the center of district, which are comprised of gypsum karst breccia and conglomeratic sandstone containing lots black limestone breccia. They are associated with the limestone type Zn-Pb mineralization, Zn-Pb ore metal reserves of both of them make up about 60% of whole Zn-Pb metal reserves of Jinding district.

Unstratified black limestone-breccia with Zn-Pb mineralization make up the main part of oval dome. There are an important relations with Salt diapirism.

4 Conclusions

(1) There are two layers for the Upper Triassic Sanhedong Formation of Jinding district; the lower is autochthonous system, and is composed of black limestone with bitumen; the upper is allochthonous system, and is composed of grayish white dolomitic limestone containing flint.

(2) Upper Triassic Sanhedong formation in the Jinding district is composed of black limestone and gypsum stratum, and is product of gypsum dome diapir after 60 Ma.

(3) Paleocene "Yunlon formation" in Jinding district should be disintergrated, and the ore-hosting rock assemblage being composed of black limestone with bitumen and gypsum should be separate from "Yunlon formation" and that being categorized as Upper Triassic Sanhedong formation. The true Yunlon formation in Jinding is mainly composed of brick-red Siltstone embodying partly mud conglomerates.

Acknowledgments

The study was funded by the National Basic Research Plan 973 Project (2002CB4126007) and China Geological survey project(12120113092700).

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