The Jiama copper-polymetallic ore deposit is a superlarge porphyry deposit in the eastern part of central Gangdise, found in recent years (Tang et al., 2010). In the comprehensive research of ore deposit, there are a large amount of work, such as geological characteristics, alteration-mineralization characteristics, the rock forming and ore-forming chronology, fluid evolution, the source of ore-forming materials, and so on (Tang et al., 2010; Zheng et al., 2010; Guo et al., 2012; Ying et al., 2014; Zhou et al., 2011; Li et al., 2012). But in the latest deposit model building did not completely report. 3D models are forced to respect predefined constraints to obtain the required accuracy and allow detailed integration of datasets; moreover, they permit rapid multi-scale structural analysis of data; the virtual reconstruction of an ore deposit also enables faster visualisation of geometrical characters and intensive spatial analysis of large datasets; making 3D model is not only visualization of geological, but also a scientific tool, and both for mineralization and alteration on space distribution study, a summary of the ore deposit genesis and the metallogenic law, or mineral exploration has extremely important significance (de Kemp, 2000; L.Feltrin et al., 2009).

Based on MICROMINE 3D modeling and visualization technology, according to the latest exploration and research, this study constructed Jiama three-dimensional model, which directly shows the distribution of strata, rock, tectonic and fault position, provide important scientific basis for the genesis of Jiama ore deposit, summarizing the metallogenic regularities, prospecting exploration and mining production, and so on.

1 The Construction of a 3D Deposit Model

MICROMINE software is a large special mining software, developed by Micromine international mining co., LTD. The 3D model follow the building principle of point-line-face-body, based on the software. Firstly, sort out the data of chemical analysis, drilling hole coordinates and the measurement into excel sheet, import MICROMINE software and correct, to generate geological database. Then, generate the simple prospecting line section with the terrain and drilling engineering information (all kinds of drilling information can be displayed automatically, according to need). According to the existing original drilling logging data and geological map, borehole log, etc., circle all kinds of geologic body contour in each of the exploration line. Finally through the wire frame modeling, link each cross section profile to build 3D geological model. For the mineralized model, the entity three-dimensional model only gives the space form, can't show the internal grade distribution in ore body. So, ore body is divided into innumerable dimensions known empty block module; then using the chemical analysis data in the ore body make grade interpolation by kriging and inverse distance weighting method, so that each module has the grade of each element, to finishing the grade mineralization model (Fig. 1).

2 The 3D Deposit Model

The stratigraphy in the Jiama deposit includes the Upper Jurassic Duodigou Formation comprising limestone, marble and the overlying Lower Cretaceous Linbuzong Formation comprising sand slate and a little quaternary (Figure 1). Can be seen clearly from the geological model, pluton emplacement brought about thermal alteration in the overlying strata sand slate to form large area hornfels
(about 10 square kilometers), and Duodigou Formation comprising limestone almost recrystallization to be the marble. Magmatic rocks in mining area are porphyry emplacement of porphyry bodies or dike (Tang et al., 2013), as most dike small, accordingly porphyry is regarded as magmatic rocks in the model. Structure mainly includes Linbuzong Formation comprising and Duodigou Formation comprising interlayer structure and Tongshan gliding nappe. Skarn mainly has two kinds—a kind of layer, layer surrounding the porphyry orebodies, produce in interlayer of Linbuzong Formation comprising and Duodigou Formation comprising; another is large and thick irregular, lens, controlled by sliding cover structure. Orebodies mainly hosted in hornfels, skarn and pluton, the porphyry orebody output in tubular concealed. Hornfels is large and lens are tubular above porphyry orebody.

3 The 3D Model’s Significance in Geology and Discussion

Jiama deposit’s geology and mineralization model can clearly see that the main skarn is a layered in interlayer of Linbuzong Formation comprising and Duodigou Formation comprising, also obviously distributed around porphyry, and it formed around pluton are near more than 200 meters thick. so it controlled by the porphyry, rather than submarine exhalative sedimentary origin. Other, the hornfels occupy most of mining area, according to heat balance, the scale hornfels show that deep must exist a huge heat source, which continuously providing heat. And heat, provided by seafloor hydrothermal, is so low that is far from enough quantity to form a large hornfels, so must exist deep magma chamber. The latest exploration and research also determine that Jiama copper polymetallic deposit is porphyry metallogenic system related to magmatic hydrothermal—Ore-forming fluid and heat, formed by emplacement of rock mass, result Duodigou Formation in comprising limestone and marble metasomatism to be skarn or skarn ore and Linbuzong Formation comprising sand slate thermal contact metamorphism to in formation of hornfels or hornfels ore.

According to the model inversion, it is great significance in guiding to discovering deep porphyry ore body that large-scale hornfels, and hornfels tubular ore body or skarn, skarnization and hornfels exist at the same time in a deposit. From the whole Jiama 3D model, the porphyry body, found out by drilling, is very small, and belongs to the apophysis, dike; but only amount of copper has reached more than 7000 thousand tons, so it is not enough to form such large copper ore body that only dike and apophysis directly dissolve out or copper concentrate from stratum on the basis of material balance. That also means that deep magma chamber exist, and porphyry ore body concealed in deep still has a great potential prospecting, which is an important resource for Jiama deposit.

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