Ore-forming Conditions and Prospecting in the West Kunlun Area, Xinjiang, China

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Abstract The West Kunlun ore-forming belt is located between the northwestern Qinghai-Tibet Plateau and southwestern Tarim Basin. It is situated between the Paleo-Asian Tectonic Domain and Tethyan Tectonic Domain. It is an important component of the giant tectonic belt in central China (the Kunlun-Qilian-Tibetan Tectonic Belt or the Central Orogenic Belt). Many known ore-forming belts such as the Kunlun-Qilian Qinling ore-forming zone, Sanjiang (or Three-river) ore-forming zone, Central Asian ore-forming zone, etc. pass through the West Kunlun area. Three ore-forming zones and seven ore-forming subzones were classified, and eighteen mineralization areas were marked. It is indicated that the West Kunlun area is one of the most favorable region for finding large and superlarge ore deposits.

Key words: ore-forming conditions, mineralization collecting area, orogenic zone, West Kunlun Mountains

1 Introduction

The ore-forming conditions were favorable in the West Kunlun Mountain area, sedimentary rocks all ages developed, magmatism was strong, metamorphism was complicated and ore deposits (points) distributed widely in the area (Chen et al., 2003; Cui et al., 2003; Wang et al., 2003). Geophysical data show that the West Kunlun Mountain area is located at the conjunct of a gravitational gradient belt, geomagnetic gradient belt and mantle gradient belt between the southern margin of the Tarim Basin and northwestern margin of the Qinghai-Tibet Plateau, and the area is the most favorable place for the gathering and dispersing of metamorphic, magmatic, and ore-forming fluids. Fluvial sedimentary survey anomalies are large in average, and the intensity of anomalies is high. The anomalous elements formed in sets, and heavy mineral anomalies developed. The West Kunlun Mountain area is one of the most favorable place for exploring large and superlarge ore deposits.

2 Ore-forming Geological Conditions

2.1 Strata

Precambrian strata were the favorable ore-source layers for finding the large and superlarge ore deposits. According to statistic figures, most large ore deposits occur in Archean supracrustal rocks. The West Kunlun Mountain area was located at the connection between the Tarim Plate and Qinghai-Tibet Plate. The basement are composed of Archean TTG rocks such as gneiss, charnockite, etc., and provided the ore resources to overlying rocks.

Proterozoic sequences outcrop widely in the form of fault block or nappe, and the greenstone type and magnetite-quartzite type of iron, copper, nickel, lead and zinc ore deposits exist in the Proterozoic.

The intermediate-basic and intermediate-acid volcanic rocks are distributed widely on the southwestern margin of the Tarim Plate where splitite-keratophyre copper ore deposits occur in Ordovician and Silurian. Copper-bearing bedded pyrite deposits and polymetal deposits were derived from the eruption of intermediate magma during the continent rifting in such areas as the Kungashian area, etc. in the Late Paleozoic. The sandstone-type copper deposits and carbonate or shale-type lead-zinc deposits occur on the southwestern stable margin the Tarim plate.

The volcanic rock type of copper and pyrite deposits occurred in the volcanic rocks which were located on the northern margin of the Tethys in the Mesozoic. Coal, gypsum, sandstone copper, manganese, lead-zinc and uranium deposits occurred in the piedmont and river-lake sedimentary facies during the alternating environment of dry and moist climate in the Mesozoic-Cenozoic era. Corundum and gem deposits occurred in basalts on the southern margin of the Kunlun in the Cenozoic (Fig. 1).

About 300 metal mineralization occurrences were found in the West Kunlun Mountain area. Copper deposits formed mainly in the Tertiary, Cretaceous, Permian, Carboniferous, Devonian, Sinian and Proterozoic, e.g. the Tegelimsan sandstone-type copper deposit, Kalanmayi
copper-bearing sandstone, Jillide copper mineralization, etc. Lead-zinc-silver deposits appear mainly in the Tertiary, Carboniferous, Devonian, Silurian, Ordovician and Paleoproterozoic, e.g., the Tamu lead-zinc-silver deposit, Kalang lead-zinc-silver deposit distributed in the Devonian-Carboniferous, Kekuxiilake lead-zinc deposit in the Paleoproterozoic. Gold ore deposits occur mainly in the Silurian such as the Muji gold deposit, Kangsaiyin gold deposit, etc. Iron ore deposits occur mainly in Silurian such as the Qilikeqi, Heiquia iron deposits and so on.

2.2 Intrusive rocks

Intrusive rocks developed in the West Kunlun area, and take up about 30% surface of outcropping rocks. The intrusive rocks were of the products of active marginal magmatic arc, and the ore-forming process was mainly controlled by the lithology and lithofacies of the intrusive rocks.

There were about 50 ultrabasic rock belts in the area, and over 100 ultrabasic rocks bodies which respectively belonged to the Jinjing, Caledonian, Variscan, Yanshanian and Himalayan periods. Cr, Ni, Co, Pt, Cu and serpentine ore deposits such as the Kegang serpentinite-Ni deposit, Talong Cr-Fe deposit, Wuling Ni deposit, etc. are related to the ultrabasic rocks. Some clues to finding Cu-Ni sulfide deposits from basic magma are discovered in the Liushitasi area.

The relationship between granite and W, Sn, Mo Bi, Zr,
Ha, Be, Li, Nb, Ta ore-forming mineralization were obvious, and mineralization traces are found in the Muji, Sansu, Kangxiwar, and Dahongliutan areas.

There are two ore-forming porphyry belts in the West Kunlun area. The north belt is a Variscan-Indosian ore-forming porphyry belt, in which the Datong, Burumnsial, Wubieli ore-forming areas lie. The south belt is the Yanshan-Himalayan ore-forming porphyry belt, in which the Yunwuiling porphyry copper deposit, Xiruo Cu-Mo anomaly is distributed. These ore-forming porphyry belts are located in the active continent margin zone between the Tarim Plate and Tethyan Plate.

Metallic ore deposits occur inside or around intrusive rocks in the West Kunlun area, and either the ore-forming sources or the ore-forming process were closely related with magmatism. The distributions of metallic ore deposits were accordant with that of intrusive rocks in space. The Cu, Fe deposits were related mainly with these intermediate-basic and intermediate-acid intrusive rocks which formed in the Mesoproterozoic, Late Paleozoic and Mesozoic, such as Tamuqi Cu deposit, Suluoyi Cu deposit, Daleda Cu deposit, Qiemugan Cu deposit etc. These ore deposits mainly occur in the Carboniferous volcanic-sedimentary rocks. Quartz-katophyre and quartz katophyre tuff controlled the ore-bearing strata in which the Aketashi Cu deposit exist. The Tulumuutayi Cu deposit was characterized by the assemblage of pillow basalt-siliceous rocks, the Qiemugan Cu deposit by basalt-rhyolite assemblage, the Kalama Cu deposit and Sazigou Cu deposit by biotite quartz diorite and biotite granodiorite. The extending direction of gneissic structures corresponds to that of the metamorphic structures in the Precambrian Bulunkouluo Group. Cu, Cr, Ni sulfide deposits were concerned with ultrabasic rocks and formed mainly in the early stage of the Mesoproterozoic and Neoproterozoic and Mesozoic, such as the Kiida Cu-Ni ore deposit, and Kegang Cu-Ni deposit. V-Ti-Mn deposits were related to basic rocks, ultrabasic rocks-alkaline rocks in the middle and later stages of the Late Paleozoic such as the Tagarma ore deposit.

Rare earth elements deposits and rare metal deposits were related to pegmatites in the later stage of the Neoproterozoic and Late Paleozoic, such as the Xiaolongbulake Li-Be deposit, Sansu Li-Be deposit, etc.

3 Structure

Because of the different ore-forming environments, various types of ore deposits formed in different plates or in different parts of the same plate. Lead-zinc-silver deposits mainly formed in the southwestern Tarim Plate, rare metal deposits and porphyry copper deposits formed mainly in the Central Kunlun Micro-continent.

The formation of different types and different kinds of ore deposit were controlled by faults of different structural units and different magmas. Deep faults controlled the distributions of Cr, Cu, Ni, sulfide deposits and mineralizations, e.g. the Kegang deep fault controlled the Cr, Ni, Pb-bearing ultrabasic rocks in the Mesoproterozoic, the Talong deep fault controlled the distribution of Cu-Ni-bearing basic and ultrabasic rocks. Large regional rifts directly controlled the distributions of Fe, Cu, Pb, Zn deposits, and the NNW-striking Talasi-Fergana Fault controlled the distributions of Cu, Pb, Zn Ag deposits in the Shalitashi-Tamu-Kalangu ore-forming belt. The Kangxiwar Fault controlled the distributions of hydrothermal Cu, Pb, Zn Ag deposits which are closely related to clastic rocks along the both sides of the Kangxiwar Fault. The Kuyake-Kangsiariyn Fault controlled Au-Cu deposits along the sides of the fault.

It is obvious that ductile shear zones controlled the distribution of gold mineralizations and gold ore deposit in space.

Hydrothermal copper deposits were controlled by faults in the Bulunkou area. The ore bodies of the Kalama and Shazigou copper deposits are controlled by the tensional shear fractures and extend for a length of more than 100 m.

The regional structural lines are striking NNW, and the main stress field of orogenic movements was in the NE or NNE direction. It was surmised that the ore-forming structures were formed in the tensional environment in a regional relaxation stage.

Mineralizations were related closely to folds in space. Ore deposits are located mostly in the limb part of anticlines and were not far from the core of anticline, such as the Suluoyi copper deposit, Daleda copper deposit, Qiemugan and Tulumuutayi copper deposits, and in the core of anticlines such as the Aketashi copper deposit.

4 Metamorphic Rock

Metamorphic rocks outcrop widely, the metamorphic types were complicated and related closely to metallogenesis in the area.

Regional metamorphism: Granulite, migmatite gneiss, schist, phyllite and slate of Precambrian metamorphic rocks were found. Aluminum deposits, chromium deposits, BIF type of iron-copper ore deposits, muscovite deposits as well as rare metal deposits were found in pegmatite of hypometamorphic rocks. Siderites were concentrated to become lens by metamorphic differentiation. Veins and lens of ore bodies in stratabound ore deposits related closely to metamorphic differentiation, such as the Qieliekeqi siderite deposit, Kaladong siderite deposit, etc. The Kalama copper
deposit could be the result of a Proterozoic metamorphic source bed.

Contact metamorphism: Contact metamorphic belt and skarn belts occur around Caledonian and Variscan intermediate-acid intrusive rocks, and iron deposits (Tagarma Fe deposit, Hanyeilyake Fe deposit), copper deposit (Kida copper deposit), skarn Pb-Zn deposits occurred in contact metamorphic belts.

Dynamic metamorphism: Regional dynamic metamorphic belts appear widely in the West Kunlun area, and ductile shear zones and nappe interface controlled the distributions of gold deposits such as the Keziletasi and Aoyigieke gold deposits.

5 Ore-bearing Formations

There are some typical ore-forming formations in the West Kunlun such as the Cyprus-type ore-bearing formation and Kuroko-type ore-forming formation. The Cyprus-type ore-bearing formation in the West Kunlun area was the same as that of typical Cyprus ore deposit, and the favorable formation environment of Cyprus-type mineralization was the differential assemblages of basic volcanic rocks and acid volcanic rocks. The mineralization occurred mainly in the intermediate positions between two types of rocks. It was studied that the variety of rock assemblages related to mineralization were acid differential rocks replaced by basic differential rocks.

The typical example was the Cu-bearing sulfide deposits in Silurian-Devonian volcanic-sedimentary rocks in the southern Ural-Sakmarian belt, and most of these deposits are located in the top of thick accumulative volcanic rocks or in the interface between volcanic rocks and superjacent stratum. The Saluoyi Cu deposit in the West Kunlun area was similar to these deposits in type and in characters (Sun et al., 1997).

The Kuroko-type ore-forming formation such as the Wulu’ate volcanic rocks formation in the West Kunlun Mountain area was the suitable basic and acid volcanic formations for forming ore deposits. The basic volcanic rocks were formed of pillow basalts and amygdaloidal basalt, and acid rocks were formed of rhyolites.

The environments of ore-forming formations were similar to that of the Kuroko-type ore-forming formation in which the wall rocks were the acid rocks. The Kuroko-type ore deposits were located mainly in the upper acid tufts of the basic-acid volcanic formations through continuous differentiation in east Asia.

The amount of basic rocks, intermediate rocks and acid rocks were almost equivalent in volume, and the upper part of rocks were green rhyolite tuff and were the favorable ore-forming stratohorizon. The assemblage of ore-forming elements were sulfide lead-zinc polymetal. The ore bodies were covered with thin layers of siliceous-ferruginous and manganese sediments, and these sediments contained ore fragments frequently. The Kuril-Sakhalin Islands and Ural Cu-bearing lead-zinc deposits were the typical example of the Kuroko-type ore deposit (Wang et al., 2001).

It is studied that splitle-keratophyre sequence was similar to that in the products of the same magmatic cycle but different in stage. Their formations were different but were of the same evolution series in different stages. The Cyprus-type deposits were formed of the former, and the Kuroko-type deposits were formed of the latter. The Aketashi copper deposit in the West Kunlun Mountain area is similar to the Kuroko-type of ore deposits in some characteristics but still different in some other characters.

The Saluoyi copper deposit has a good prospect for exploration because the mineralization is similar to that of the Cyprus-type ore deposit in characteristics of ore-controlling wall rock conditions.

6 Regional Geochemical Characteristics

Mineralization-concentrated areas usually developed in an area of geochemical anomaly. Geochemical anomaly distributed widely and formed of the anomaly assemblage of some ore-forming elements, and a series of ore deposits were found in the mineralization concentration area. The good exploration prospects were showed out that typical geochemical anomaly was just the Xiruo and Waqia geochemical anomalies (Table 1).

The Xiruo fluvial sedimentary survey anomaly is located in southeastern Taxkorgan County and covers an area of about 10000 km². It is constituted of Cu, Mo, Ag, Sn, As, etc. The anomaly is in the south belt of the West Kunlun orogenic zone in the northern part of the Aksayqin dome. The Karakorum deep fault passed along NW direction through the center of the anomaly area where the Karakorum deep fault intersects the Mingteke fault extending in E-W direction, and NW, NNW, E-W subsidiary fractures were developed there. Proterozoic and Silurian occur in the anomaly. The former was a protolith formation which are mainly intermediate-basic volcanic-sediment rocks, and a part of them is the terrigenous elastic rocks and carbonate rocks. These terrigenous elastic rocks and carbonate rocks were strongly metamorphosed. The latter was a set of normal slightly-metamorphosed neritic sedimentary elastic rocks.

Magmatism was strong in the area, and intermediate-acid intrusive rocks of the Caledonian, Hercynian and Yanshanian periods are widely present. Veins of siderite were found in metamorphosed volcanic rocks and filled in fracture zones. Floaters of copper-bearing sulfide were
found in lows of the anomaly and malachite-bearing quartz-calcite veins were found in fracture zones with high contents of copper, lead, zinc, arsenic. It shows that the structure controlling ore-bearing thermal activities existed there, and the Xiruo anomaly region was one of the potential areas for finding Cu, Mo, Au, Pb and Zn ore deposits.

The Waqia anomaly was about 500 km² in area and formed of Cu, Au, W Ag, As, Sn, Sb, etc. This anomaly is located on the northwest side of the Kangxiwar fault belonged to the transition zone between the middle and southern West Kunlun orogenic zone. Proterozoic and Ordovician, and Silurian strata occurred in the anomaly area. The intermediate-acid intrusive rocks of the Jinning and Caldonian periods outcrop widely in the area. Depending on the ore-forming element assemblages and regional geological background and the relations between gold ore deposits, it was surmised that the Waqia anomaly area is an important prospecting area for finding Cu, Au, W, Pb and Zn ore deposits.

Metal mineralization occurred in various times, but, large mineralizations occurred mainly in the Late Paleozoic and Mesozoic, and only a few in the Mesoproterozoic and Neoproterozoic. The different kinds of ore deposits were formed in different geological stages such as Cr, Cu-Ni sulfide deposits formed in the Proterozoic, sedimentary-metamorphic Fe-Cu source beds were formed in the Ordovician and Silurian, stratabound Cu, Pb, Zn and pyrite deposits were formed in the Devonian and Carboniferous, and stratabound Fe, Cu, Pb and Zn ore deposits were formed in the Jurassic. The Yanshanian period was an important time for forming metallic ore deposits.

Distribution of ore deposits in time and space: The regional structural units, geochemical background, structure and lithofacies-paleogeography controlled the ore deposits distributions in the West Kunlun Mountain area. Pb-Zn ore deposits occur mainly in the southwestern Tarim ore-forming belt, Cu-Au ore deposits mainly in the Muji-Bulunkou mineralization concentration area, Cr and Cu-Ni ore deposits mainly along the Kegang and Talong fault zones, hydrothermal Fe (siderite) Cu, Ag, Pb, Zn ore deposits mainly along the Kangxiwar fault and some Au, Cu ore deposits along the Altun-Kuyake fracture belt (Ai, 1997).

The north belt, central belt and south belt had their own features in the West Kunlun orogenic zone, and they experienced the geological evolution history of opening and closing, underthrusting, subduction movement repeatedly, and various ore-forming geology environments formed by these geological evolution. Archean and Paleoproterozoic are deeply metamorphosed rocks with granulite characteristics, and Paleoproterozoic is moderately metamorphosed rocks of greenschist facies and amphibolite facies. The Mesoproterozoic-Neoproterozoic are the intermediate-basic volcanic rock-flysch formations, and Paleozoic is ophiolite-volcanic rock-silicilite formation. It is an advantageous region for exploring precious metal ore deposits such as gold in the Upper Paleozoic in which volcanic rocks are abundant, magmatism was frequent, tectonic environment was varied and ductile shearing developed.

The Shazigou, Datong and Yunwuling porphyry copper deposits were found in the West Kunlun area and these deposits were related closely to Yanshanian granites. Pegmatites occurred widely in the West Kunlun Mountain area, and these pegmatites were related to rare metal deposits such as the Muji, Bulunkou, Xidila, and Dahongliutan mineralization areas and related to muscovite deposits such as the Yecheng-Taxkorgan mineralization belt.

Ore-bearing pegmatite has obvious zonation and is strongly albitized. A comparison of the mineralization characteristics with that of Afghanistan and Tajikistan suggests that the prospect of rare metal deposits is obvious in the area. More than twenty sedimentary mineral deposits, sedimentary-reformed mineral deposits and volcanic hydrothermal mineral deposits were found in the area. Sedimentary deposits such as the Wulagen Pb-Zn deposits located in Wuqia County, sedimentary-reformed deposits such as the Tamu and Kalangu Pb-Zn-Ag deposits distributed in the hinge part of Shache arcuate structural belt.

Volcanic hydrothermal ore deposits formed at the same time with wall volcanic rocks, and the distribution and forming time of these volcanic hydrothermal ore deposits were controlled by stratahorizon. Cyprus-type Cu mineralization appear in Lower Carboniferous volcanic rocks and along the WNW-ESE Qiemugan anticlinal axis, and Kuroko-like ore deposits distributed in Upper Carboniferous acid volcanic rocks along the Qiemugan anticlinal limbs which stretched along WNW-ESE direction. The ore bodies occurred in layers because the volcanism and the lithologies appeared in periods.

In a word, mineralization conditions in the West Kunlun area may be compared with that of large-superlarge ore deposits in the vicinity in neighboring countries. On the basis of geological data, porphyry copper deposit, sandstone (conglomerate) type copper deposit, massive sulfide type copper and polymetal deposits were related to marine volcanic rocks, ligation sulfide types of copper deposits were related to basic and ultrabasic volcanic rocks, and Mississippi type of Zn-Pb polymetal deposits were considered as the main kinds and main types of ore deposits in the future exploration in the area.
7 Exploration Foreground for Main Ore Types

As mentioned above, the West Kunlun area with a long evolution history is characterized by geological structure, complete sedimentary formations, strong magmatism, various types of ore deposits.

It was showed by geophysical data that the Kangxiwar fracture zone was a mantle-slope belt, and controlled the ore-forming geological environment, and it was the main passage through which magma and ore-forming hydrothermal passed and gathered.

The characteristics of repeatedly opening and closing, subduction in the geological evolution history made different types of geological environment.

7.1 Exploration foreground of Cu, Pb, Au, Ag deposits related to Late Paleozoic rifting

Rifting in the Late Paleozoic was one of the important tectonic events and developed along the Kunghashan-Tamu-Talong belt. This rifting event formed a set of complete rock sequence of fault basins, and the lower part of the sequence is molasse-like formations formed of red sand-conglomerate (Upper Devonian-Lower Carboniferous), the middle part is fine detrital rocks, carbonate rocks and intermediate-basic volcanic rocks, and the upper part is molasse formation formed of coarse detrital rocks.

It is shown that ore-forming elements, such as Hg, Cu and Cr, are enriched in the Carboniferous sequence, Sb, As, Cu, Hg, Cr, Ni, Co and Mo are enriched in the Carboniferous-Permian, As, Sb, Cd, Cu, Zn, Mo and Au are enriched in the Permian, and the enrichment coefficients of Sb, As, Cu and Hg were more than 5 as is indicated by study on the ore-forming characteristics of stratum.

The ore-forming sequence corresponding to the rifting event was sandstone (conglomerate) type of copper-silver deposits formed in the Early Carboniferous, massive sulfide copper deposits formed in volcanic rocks of the Middle-Late Carboniferous (VHMS) and massive Pb-Zn deposits related to carbonate rocks of the Devonian-Permian (SEDEX).

Result of 1:200,000 geochemical exploration shows that Cu, Zn, Ag, Pb and Au anomaly appear widely along the rift belts of Tegelimansu, Tamu-Kalangu and Ku'erlang. The anomalous elements overlapped with high value. It was thought that the rift belts are one of advantageous ore-forming districts (Zhu et al., 1997, 2000).

The Tegelimansu copper deposit is located in the red sandy conglomerate on the southern margin of the Carboniferous rift basin. Ore bodies occur in gray or gray-black quartz-sandstone, and a lot of ore bodies occur and the largest ore body is thicker than 50 m and longer than 1,000 m. The content of Cu is about 0.4%–11.9%, and Ag about 10 ppm.

Pb-Zn ore deposits in the Tamu-Kalangu mineralization belt occur on the northeastern margin of the rift basin, the wall rocks are Devonian-Permian limestone and sandy shale, and Pb-Zn ore bodies occur mainly along layers and some along fracture belts between layers.

Spout sulfide deposits which formed in sandstone and carbonate rocks in the rifting period of the Late Paleozoic were large Cu, Pb and Zn deposits. The Tegelimansu sandstone (conglomerate) type Cu deposit, and the Tamu and Kalangu Pb-Zn deposits possess the favorable foreground of superlarge Cu, Pb, Zn and Ag deposits (Jia, 1999).

7.2 Ore-forming foreground of the Tethyan porphyry copper deposit

The Tethyan type of ore-forming belt is one of the most important one in the world. The belt pass through the South Kunlun Terrane and Karakorum Terrane in the Southwest Kunlun orogenic zone. Results of 1:200,000 fluvial sedimentary geochemical exploration and 1:1,000,000 aeromagnetic exploration indicate that the West Kunlun area has an advantage foreground for finding porphyry copper deposits, specially in the Waqia and Xiruo anomaly areas. Flysch formation (some basic volcanic rocks of Lower Paleozoic and littoral-shallow sea facies carbonate and intermediate-basic volcanic rocks of Jurassic) occur in the Xiruo-Waqia anomaly area. Intrusive rocks occur widely and are mainly Variscian and Yanshanian-Himalayan intrusive rocks, the former commonly are in the batholith and the latter usually are intermediate-acid rocks in small stocks or in dikes.

The Waqia fluvial sedimentary anomaly covering about 500 km² in area was composed of Cu, Au and Ag anomaly, while the Xiruo anomaly covering about 10,000 km² was composed of Cu, Mo, W and Ag.

The result of 1:1,000,000 aeromagnetic survey indicate that many aeromagnetic anomaly exist in the West Kunlun area. It further shows that there are large buried intermediate-acid intrusive bodies in the area.

The exploration foreground of the Tethyan type porphyry copper deposit are broad in the two aeromagnetic anomalies, and porphyry type of copper deposits associate with Au, and, Ag in the Waqia anomaly area and with Mo in the Xiruo anomaly area (Wang et al., 2000).

It showed that the ore-forming foreground of the Tethyan type of porphyry deposits are optimistic by the analysis on the Xiruo Cu and Mo anomaly and Cu and Mo-bearing porphyry which is located in eastern Daftar township based on a comparison with typical ore-forming belts and typical
ore deposits. The Buqiong Cu polymetal mineralization target area may be compared with Precambrian Akinak volcano-sedimentary metamorphic type copper deposits in Afghanistan. Besides, the volcanic rocks distributed widely in the West Kunlun area, the ore-forming foreground of the massive sulfide ore deposits were very favorable, the ore-forming conditions related to volcanic rocks in the Xiruo copper mineralization concentration area and the Tamuqiqi-Buqiong copper mineralization belt are very similar to that of the Akinak copper deposit in Afghanistan.

8 Conclusion

The ore-forming geological conditions were very favorable in the West Kunlun area, the information is very abundant in geophysics, geochemistry, natural heavy minerals and remote sensing, and the West Kunlun area is one of the most hopeful area for finding large and superlarge ore deposits. The result of ore-forming regional planning shows that the West Kunlun area is located in the conjunct part of the Tarim tectonomagmatic metallogenic provinces, Qinling-Qilian-Kunlun tectonomagmatic metallogenic belt and Tethyan tectonomagmatic metallogenic belt, but it was mainly at the west end of the Qinling-Qilian-Kunlun metallogenic belt. The West Kunlun area may be divided into seven ore-forming belts, and eighteen mineralization concentration districts in which five mineralization districts possess the very favorable ore-forming conditions such as good geological conditions, a series of ore deposits which had already been found, heavy mineral survey anomaly, good result of geological prospecting, geochemical survey and remote sensing etc. It was thought that a lot of ore deposits were considered as admirable exploration foreground such as the Qielihekqi and Kaladong Fe deposits, Tamuq-Shangqihan, Kungaishan, Ku’erlang, Tegelimansu, Mangsha massive sulfide type of copper deposits and sandstone-conglomerate-type copper deposits, Datong, Burumshal, Yunuwing, Xiruo porphyry copper deposits, Tamu, Kalangu, Waqia, Kekuxilike stratabound reformed Pb-Zn deposits, ductile shear zone type of Au deposits in North Kungaishan and Xiamaillao-Shangqihan, Carlin type of gold deposits etc.

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