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The Preliminary Discussion on the Proto-Tethys Volcanic Island Arc-Metallogenic Belt in the Western Margin of Simao Basin

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Lanping-Simao microplate is the tectonic unit of the ancient tethys in the south section of the east margin, and is located in the region between the Lancang river fault belt and Jinsha river -Ailaoshan fault belt (Li et al., 2012). To date, the tectonic environment of the Proto-Tethys together with the minerogenetic condition in this region has been poorly studied, and also has a big controversy. In present investigation, a new progress is introduced, based on the research results of the volcanic series and deposit types of Proto-Tethys in the west margin of Simao basin.

1 Redefinition of the Distribution and Time of Volcanic Rock-Intrusive Rock

A volcanic series, mainly constituted by intermediate-acid volcanic rock, is distributed in the Xibendashan of the west margin of Simao basin- Dapingzhang-Yinzhihsan. Regional geology survey successively divided this volcanic series into Longdong river group and Dawazhi group. Its age was formed in Carboniferous or Carboniferous - Devonian, and the invasion of the granodiorite was hypabyssal rock of indosinian.

Based on the chronological research of dacite and volcanic rock in Dapingzhang deposit and Yinzhihsan deposit by the Zircon U-Pb dating, very important conclusions were obtained in present investigation, as shown in the following:

The age of dacite is 428.8 ± 6.1 Ma (Dapingzhang deposit) and 422 ± 2.4 Ma (Yinzhihsan deposit), respectively (Ru, 2014); age of granodiorite-porphyry by LA-ICP-MS zircon U-Pb is 401.0 ± 1.7 Ma in the Dawazhi group of Dapingzhang deposit (Ru et al., 2012). The age of chalcopyrite by Re-Os in volcanic exhalation-sedimentary ore in the Dawazhi group of Dapingzhang deposit is 410.9 ± 6.0 Ma- 437.35 ± 11.2 Ma. Meanwhile (Li et al, 2012), Yin showed that the U - Pb age of the rhyolite and tuff zircon in the Dawazi group were 417.3 ± 1.5 Ma and

420.8 ± 1.6 Ma, respectively (unpublished). The Re-Os age of copper ore in Dapingzhang deposit is 429 ± 4 Ma, and LA-ICP-MS zircon U-Pb age of dacite is 428.9 ± 1.5 Ma in the Yinzhihsan deposit (Lehman et al., 2013).

The aforementioned data indicated that the petrogenetic and metallogenic age of the volcanic rock in Dawazi group of Xibendashan - Dapingzhang- Yinzhihsan together with the granodiorite porphyry and volcanic exhalation-sedimentary deposit has a prominent similarity and supports with each other. According to this, the volcanic formation age of the Dawazi group in the western Simao basin was redefined as the middle - late Silurian, rather than the late Paleozoic in our paper. The previous division of the granodiorite porphyry in Dapingzhang deposit should belong to the hypabyssal intrusive product at the end of the late Silurian. Granodiorite porphyry and volcanic rock in Dawazhi group belong to the result of the synchronous magmatic activities, which constitute the volcano - intrusive complex belt. The volcanic exhalation - sedimentary deposit like Dapingzhang is a typical VMS deposit. It was confirmed that Proto-Tethys volcanic - intrusive rock as well as a metallogenic belt related with it exists in the western margin of Simao basin.

2 Formative and Tectonic Environment of Volcanic-Intrusive Rock

The volcanic series rock association of the Dawazhi group in Dapingzhang-Yinzhihsan deposit contains basalt, basaltic andesite, andesite, dacite, rhyolite and pyroclastic rock. This rock association is mainly constituted by intermediate-acid rocks followed by basite, and belongs to calc-alkalic series in the whole. Volcanic rock and granodiorite porphyry are relatively loss of Nb and Ta, but enrich of Th and LREE, $Nb/Th < 2$; $^{87}Sr/^{86}Sr$ is high or radiogenic ^{87}Sr is enrichment. Petrochemistry, trace elements as well as the Sm-Nd and Rb-Sr isotope composition feature consistency indicate that the volcanic

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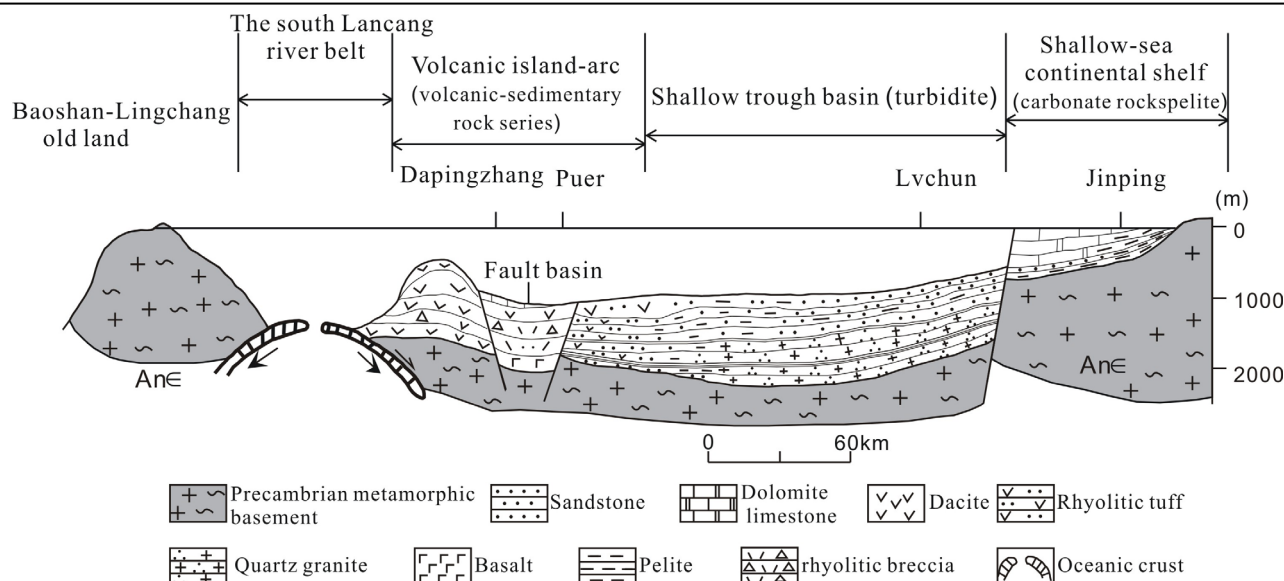


Fig. 1. Sketch map of the Silurian arc basin system of Paleotectonic in microplate of Lanping-Simao

rock and granodiorite porphyry are formed in the island arc environment of active continental margin (Ru, 2014). Meanwhile, it reflects that volcanic rock and granodiorite porphyry of Dawazhi group are characterized of crust-mantle mixed source, and belong to the product of normal arc calc-alkaline magmatic activity. They constitute a complete magma activity cycle from eruption to intrusion, and are the results of activity reducing, activity way changing and differentiation increasing during the processes of the cognate magmatic evolution.

The contrast analysis of the regional stratigraphic lithology shows that an ancient arc basin system exists in the region between Honghe fault fracture and the Lancangjiang fault fracture. Shelf facies, shallow-sea basin and volcanic island-arc environment are sequentially appeared in the order of Jinping, Lvchun and Puer, as shown in Fig.1. The formation of the active continental margin and volcanic island arc environment in the western margin of Simao basin microplate are the result of eastward subduction of the Lancangjiang ocean basin in the Middle-Late Silurian.

3 Presenting the Proto-Tethys Volcanic Island Arc-Metallogenic Belt in the Western Margin of Simao Basin

To date, it have been found the Dapingzhang VMS type copper polymetallic deposit (medium), the Yinzhihsan magmatic hydrothermal type gold polymetallic deposit (large), the Zhonghe copper polymetallic points and etc., in the island arc volcanic-intrusive rock belt of Dawazhi group. In Xibendashan - Zhonghe - Dapingzhang - Yinzhihsan region, it distributes the similar mineral occurrence and mineralization anomalies, which constitute

a NNW distribution of metallogenic belt. To this end, we proposed that a concealed - local exposed Proto-Tethys volcanic island arc-metallogenic belt exists in the western margin red-bed of Simao basin, and this metallogenic belt should be paid high attention as a new metallogenic belt in western Yunnan.

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