A Big Earth Data Platform for Three Poles

**Ca-id-tims U-Pb dating and Muscovite ar Ar dating in tiegelong south of duolong ore concentration area**

1、Description

Tiegelongnan deposit is a large porphyry epithermal copper (gold) deposit in duolong porphyry area in the south of Qiangtang terrane in central and Western Tibet, China. The deposit is centered on the multi-stage granodiorite porphyry (GP) intrusion invading Jurassic sandstone. Phase 1 and phase 2 GP are related to biotite and sericite alteration, while phase 3 and phase 4 GP occur in the middle and shallow part of the deposit affected by sericite and high-grade argillaceous alteration (alunite kaolinite dickite pyrophyllite). Sericite alteration generally exists in the deep part of the deposit, replacing biotite alteration, and occurs porphyry chalcopyrite boron nickel pyrite ± molybdenite mineralization. The high-grade argillaceous alteration is related to the mineralization of high sulfide (marmatite, marmatite, bornite and monzonite) in the epithermal stage, superimposing sericite and biotite alteration in the shallow part of the deposit. The top of tielongnan hydrothermal system is weathered with a layer of supergene oxidation enrichment zone, which is stripped and covered by andesite and gravel. The 40Ar-39Ar age of Muscovite sampled from deep sericite alteration is 120.9 ± 0.8 Ma, which is consistent with the previously reported 40Ar-39Ar age of hydrothermal biotite 121.1 ± 0.6 Ma, molybdenite Re Os ages 121.2 ± 0.6 Ma and 119.0 ± 1.4 Ma, and GP 1 and 2 zircon U-Pb ages 121.5 ± 1.5, 120.2 ± 1.0 MA (laicp-ms results) and 118.7 ± 0.9 MA (SIMS results). The ca-id-tims zircon U-Pb age from stage 3 GP 3 is 119.9 ± 0.2 mA, which limits the age of porphyry magmatic hydrothermal events. The porphyry system was subsequently exfoliated, weathered and superimposed by discrete stages of high-grade argillaceous alteration and high sulfide mineralization. The 40Ar-39Ar ages generated by the two pulses of alunite event are 116.3 ± 0.8 Ma and 111.7 ± 1.0 Ma, respectively, representing the main epithermal alteration and mineralization ages in tielongnan. The first alunite pulse age is consistent with the younger porphyry (gp4) age of 116.2 ± 0.4 MA (zircon LA-ICP-MS age). The weathering and exhumation of porphyry epithermal deposits continued until ~ 110 Ma, and the andesite and andesite were covered with gravel. Andesite is affected by younger weak hydrothermal alteration at 108.7 ± 0.7 Ma, which is limited by the 40Ar-39Ar age of muscovite. The 40Ar-39Ar age of another barren alunite is 100.6 ± 2.0 Ma, which may represent the youngest hydrothermal event. The long-lived exothermic fluid activity of tielongnan deposit in ~ 120 ~ 100mA is consistent with the long-term tectonic magmatic event of Bangong Nujiang suture zone. The discrete epithermal metallogenic events in tiegelongan are younger than those in porphyry, which is similar to several other epithermal deposits in the world. The ~ 10 m.y exhumation history of tiegelongan is slower than the typical and rapid erosion history of ~ 1 – 2 m.y. porphyry deposits in low altitude tropical climate, and during a specific sudden uplift pulse in the Andes. The slow exhumation of tielongnan is considered to be the comprehensive result of the Cretaceous arid climate environment, relatively flat terrain and slow uplift conditions in central and Western Tibet.  
The experiment was entrusted to the inert gas Laboratory of the Pacific isotope and geochemistry research center of Columbia University, Canada; The data quality is good. The sample is crushed in the ring mill, washed with distilled water and ethanol, dried to - 40 + 60 mesh and sieved. Select suitable mineral particles from the bulk part. The samples were wrapped in aluminum foil and stacked in the irradiation chamber together with similar aged samples and neutron flux monitors (fish Canyon tuff Sani DIN (FCS), 28.201 ± 0.046ma). These samples were irradiated at the McMaster nuclear reactor in Hamilton, Ontario, in July 2017 at 134 MWh of the flux point in 8e. The J value error generated by the analysis of 16 neutron flux monitor positions (n = 54) is less than 0.5%.

2、Keywords

Theme：Zircon CA-ID-TIMS,Porphyry-epithermal deposit,Exhumation,Others,40Ar-39Ar,Alunite  
Discipline：Solid earth  
Places：Tibet, Qiangtang  
Time：2018-2021

3、Data details

1.Scale：None

2.Projection：

3.Filesize：0.4MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：32.9 | - |
| west：83.25 | - | east：83.75 |
| - | south：32.67 | - |

5、Time frame:2018-06-30 16:00:00+00:00--2021-08-14 16:00:00+00:00

6、Reference method

References to data:

YANG Chao , WANG Liqiang . Ca-id-tims U-Pb dating and Muscovite ar Ar dating in tiegelong south of duolong ore concentration area. A Big Earth Data Platform for Three Poles, doi:10.11888/SolidEar.tpdc.2720692022

References to articles:

Yang, C., Tang, J., Beaudoin, G., Song, Y., Lin, B., Wang, Q., & Fang, X. (2020). Geology and geochronology of the Tiegelongnan porphyry-epithermal Cu (Au) deposit, Tibet, China: Formation, exhumation and preservation history. Ore Geology Reviews, 123, 103575.

7、Supporting project information

Mineralization systems of important ore deposits and integrated demonstration of prospecting and exploration technology

8、Data resource provider

name: WANG Liqiang   
unit: Institute of Mineral Ｒesources，Chinese Academy of Geological Sciences  
email: wlq060301@163.com  
  
name: YANG Chao   
unit: Département de géologie et de génie géologique, Université Laval, Québec  
email: chaoyangcn8@gmail.com