Rb-Sr isotope evidence for sources of ore-forming fluid in Huize Zn-Pb-(Ag) district, Yunnan, China

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The Huize Zn-Pb-(Ag) district is located in the southern end of Yangzi Massif, and occurs in Sichuan-Yunnan-Guizhou carbonate-hosted Pb-Zn Ore-forming Zone. The sources of metallogenic fluid for the previous research (Zhou C. X., 2001) are still poorly understood. The Huize district mainly consists of the Kuangshanchang, the Qilinchang and margin Yinchangpo deposits. The district is composed of the Proterozoid Kunyang base, upper Sinian Series and Palaeozoid Group. The Baizuo formation (C_1b) of lower carboniferous series is the most important ore-hosted stratum. There are about 30 Zn-Pb ore-bodies with the shapes of vein, chamber, plat column and stratiform-like. The ore grade of Pb and Zn is high up to 25–35% with compact lump shape as main part. Mineral composition mainly includes sphalerite, galena, pyrite, calcite and dolomite. In ores there are Ag and dispersed elements including Ge, In, Cd, Tl and Ga. The samples of ore for Rb-Sr isotope compositions are ground as fine as –200 mesh under a contamination-free environment and are prepared as the specimens. $^{87}Sr/^{86}Sr$ values are tested by MS method in MAT-261 mass spectrometer in Geological and Mineral Resources Res. Inst. of CAGS.

The $^{87}Sr/^{86}Sr$ values of sulfide ores are within the range of 0.71021–0.71768, and the initial ratio of $^{87}Sr/^{86}Sr$ is 0.7114 (Table 1). The $^{87}Sr/^{86}Sr$ and $^{87}Sr/^{86}Sr$ shows a good linear relationship.

Table 1. Rb-Sr isotopic compositions of mineral ores in the Huize deposits

Samp. No.	Ore feature	Rb (ppm)	Sr (ppm)	$^{87}Rb/^{86}Sr$	$^{87}Sr/^{86}Sr(\pm\_)$
HQC-84	Cc-Ga-Py-Sp ore	0.3296	10.970	0.08668	0.71292±0.00004
HQC-99	Cc-Ga-Py-Sp ore	6.5150	55.440	0.33910	0.71698±0.00008
HQC-109	Ga-Py-Sp ore	3.1220	43.790	0.20570	0.7147±0.00003
HQC-212	Cc-Py-Sp-Ga ore	9.6730	68.970	0.40470	0.71768±0.00006
QLC-53	Sp-Ga ore	0.2636	2.668	0.28510	0.71600±0.00001
QLC-123	Ga-Sp ore	0.08563	8.852	0.02790	0.71170±0.00001
QLC-126	Ga-Sp-Py ore	0.1386	4.924	0.08115	0.71021±0.00003

Py-Pyrite; Sp-Sphalerite; Ga-Galena; Cc-Calcite.

The $^{87}Sr/^{86}Sr$ ratio of sulfide ores should represent those at the time of interaction between ore-forming fluid and the Baizuo Formation dolomite (Hu Y. G., 1999) at the metallogenic period, and they are obviously higher than those of wall rocks and the contemporaneous seawater, implying that the original metallogenic fluid had flown through a radiogenic Sr-source region.

Evolution of the Paleo-Pacific Gondwana margin: Isotopic constraints from West Antarctic and East Australian mantle xenoliths.

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During Late Proterozoic to Mesozoic times, eastern Australia and West Antarctica formed a continuous margin, thousands of km in length. The tectonic regime along much of this margin was dominated by accretionary arc processes, in many ways analogous to the current western Pacific arc systems. However, key aspects of the regional evolution of this part of the Paleo-Pacific Gondwana margin remain contentious, particularly the nature and age of the basement of the various component terranes.

Cenozoic volcanism has transported numerous deep lithospheric xenoliths to the surface along much of the length of this margin. Recently, the Re-Os isotopic compositions of lithospheric mantle samples from a variety of locations and settings, including southeastern Australia and West Antarctica, have been used to constrain the age of mantle depletion events, and by inference, the ages of isolation and incorporation of the samples into the lithosphere.

Here, we combine new Os, Sr and Nd isotopic data for mantle-derived xenoliths from Marie Byrd Land and Victoria Land (Antarctica) and Queensland (northeastern Australia), with previously published Re-Os data and model ages from southeastern Australia and Antartica (e.g. 1,2,3), all representing portions of the ancient Gondwana margin. The results indicate the preservation of dominantly Proterozoic lithospheric mantle. Particularly striking is the indication that a significant mantle melting event may have affected at least the two most well-sampled parts of the margin at ca. 1000-1200 Ma. The timing of this speculated mantle event(s) is consistent with a major crust formation or orogenic event suggested by the Neo-Meso Proterozoic detrital zircon U-Pb age spectra of the vast turbidite deposits that comprise much of the Paleo-Pacific Gondwana margin. Significantly older events are recorded along the southern parts of the margin, while in the north, younger melting and lithosphere addition events are preserved.

References

1. Handler MR, Bennett VC (2001) *Tectonics* 20: 177-188.
2. Handler M, Wysoczanski R, and Gamble J (2003) *Chem. Geol.* 196: 131-145.
3. McBride JS, Lambert DD, Greig A and Nicholls IA, (1996) *Geol.* 24: 631-634.