Deposit genesis of ore-forming system in the Tongchang Cu-Au polymetallic ore-field, Shaanxi, China

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The Tongchang Cu-Au polymetallic ore-field is located in the central part of the Mianxian-Lueyang-Yangpingguan ore-forming area celebrated as a 'gold triangle' area. Based on studying the unique ore-forming conditions, it is closely associated with the Middle-Upper Proterozoic soda volcanic series, tectonic transformation, metamorphism and magmatic superimposition. Deposits in the ore-field can be divided into five typical sub-systems: the Tongchang type (pneumatolytic-hydrothermal and hydrothermal deposits) deposit mainly associated with the diorite and Guojiagou Formation, the Chenjiaba type (volcanic exhalation—reworked deposits), the Donggouba type (volcanic exhalation hot-brinesedimentation—reworked deposits), the Yinshangou type (volcanic exhalation sedimentary—post-basic magmatic hydrothermal deposits); and the Xiakouyi type (magmatic and hydrothermally reworked deposits closely associated with ultrabasic rocks and basic magatic action). In them, mineral sources of Chenjiaba type and Xiakouyi type deposits came from Jieguanting Formation. These typical sub-systems are characterized by deep source, similar geological setting, multi-episode and multi-stage.

By study on isotope geochemistry, REE geochemistry and geological characteristics, the deposit genesis can be explained by such a metallogenetic model as rift and island arc metallogenic background—volcanic sedex—tectono-reforming and metamorphic enrichment—deep source magmatic surperimposition—motive hydrothermal reworking, belong to a composite metallogenetic pattern

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Hf and Pb isotope constraints on the source origin of Northern Lau Basin back-arc basin basalts

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We are analyzing selected samples from the Hawkins Lau Basin collection and from the 2006 Magellan expedition, for major and trace elements, radiogenic isotopes, rare gases and volatiles. This sample suite provides a grid to map mantle heterogeneity and constrain mantle dynamics in the Lau back-arc basin. Here we report Pb and Hf isotope results for basalt and basalt glasses from the Rochambeau Bank (RB), Northern Lau Spreading Center (NLSC), Peggy Ridge (PR), Mangatolu Triple Junction (MTJ), and northern Lau seamounts. The mantle wedge beneath the Lau Basin is thought to be a complex mix of Indian and Pacific upper mantle MORB sources, the Samoan OIB source, and slab-derived component. The new Pb and Hf (-Nd) systematics confirm that the back-arc spreading centers and off axis lavas in the Northern Lau Basin derive from a mantle source with an Indian-type MORB signature that has been variably polluted by OIB and slab derived material. Basalts from the RB, PR, and off-axis NLSC are indistinguishable from Indian MORB in Pb-Hf-Nd-Sr isotopes, while the MTJ and seamounts in the region are more radiogenic with relatively higher Ce/Pb suggestive of increased influence of slab derived component eastward in the back-arc upper mantle source. $^{3}He/^{4}He$ is MORB-like (~ 8 Ra or less) in the MTJ and north eastern seamounts that occur relatively close (500-600 km) to Samoa. On the other hand Indian MORB-like RB and NLSC samples, 700-900 km from Samoa, have anomalously high $^{3}He/^{4}He$ (~10-23 Ra). The Indian MORB-like mantle source signatures argue against any known Samoa source being responsible for the high $^{3}He/^{4}He$ in the RB-NLSC mantle. Instead, the high $^{3}He/^{4}He$ could derive from relatively undegassed SOPITA mantle, with Indian MORB-like signature, proposed to have migrated into the region from the North Fiji Basins [1].

[1] Pearce, JA, PD Kempton & JB Gill (2007) *Earth Planet. Sci. Lett.* **260**.