A mineralogical record of metallogeny associated with supercontinent assembly

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Analyses of temporal and geographic distributions of the minerals of beryllium, boron, copper, mercury, and molybdenum reveal episodic deposition and diversification [*1-4*]. We observe statistically significant increases in the number of reported mineral localities and/or the appearance of new mineral species at ~2.85-2.6, ~1.95-1.80, ~1.10-0.90, ~0.60-0.50, and ~0.43-0.25 Ga—intervals that correlate with presumed episodes of supercontinent assembly and associated collisional orogenies of Kenorland (Superia), Columbia (Nuna), Rodinia, Godwana (Pannotia), and Pangea, respectively. In constrast, few deposits or new mineral species containing these elements have been reported from the intervals of supercontinent stability and breakup at ~2.5-1.9, ~1.8-1.2, 0.9-0.6, and 0.50-0.43 Ga. Variations in the details of these trends may reveal changing near-surface environments, including those associated with ocean chemistry and biological influences. For example, no mercury mineral localities or new Hg minerals are documented from 1.8-0.6 Ga. By contrast, we observe pulses of 14 new beryllium minerals associated with peralkaline complexes in southwest Greenland at 1.16 and 1.27 Ga.

[*1*] R.M.Hazen *et al*.. (2012) Mercury (Hg) mineral evolution. *American Mineralogist* 97, 1013-1042. [*2*] E.S.Grew & R.M.Hazen (2010) Evolution of boron minerals. *Geological Society of America Abstracts with Programs* 42, 92. [*3*] E.S.Grew & R.M.Hazen (2013) Evolution of the minerals of beryllium. Stein, in press. [*4*] J.Golden *et al*.. (2013) Rhenium variations in molybdenite. *Earth and Planetary Science Letters*, in press.

The Study of Metallogenic Model of Super-Thin Alteration-Type Gold Deposit on XiongEr Mountains in Weatern Henan Province, China

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The gold deposit is on the north hillside of Xiong'er mountain in Luoning county, Henan province. which belongs to in the southern margin of north China platform. Taihua mountain group in Archaeozoic is crystalline basement, both Xiong'er mountain group and Nantianmen mountain group are sedimentary cover. Glided detachment faults formed between them.Super-Thin alteration-type gold deposit mainly distributed in the glided detachment tectonic zone. Metallogenic period is Yanshanian, and the characteristics of single ore veins are generally small in size, thin thickness and high grade.Generally they appear in groups. The formation of gold deposit closely connected with the detachment tectonic. The main metallogenic activities are controlled of the detachment faults' three cycle:1. The stage of thrust napping structure from north to south. The crust in the southern margin of north China platform was under the intensively constringent environment, developed a series of large scale overlap thrust napping structure and arose acidic magma's activity, at the same time,the thickness of crust became thicker, mantle material with high temperature and low density formed in upper mantle, they transported in the plastic state and arched up along upper mantle and lower crust;2. NS tensional rifting stage. The crust was on the tension releasing stage, the early thrust napping structure system and compressive detachment fault obtained a little tensional stress, brittle ductile occurred on the superficial crust. Mantle-derived mineral upwelling slowly along the detachment fault and secondary ore-transmitting structure. Thus large and super-large golden deposit Formed in PDZ（Principal displacement zone）, such as Kangshan, Hongzhuang and Shanggong golden deposits etc；3. WE thrust shear stage. At this stage brittle ductile broke and the crust shrank. Relative to superficial crust, pressure became bigger and temperature higher in the deep crust. Mantle-derived mineral accumulated rapidly along the gradient zone of pressure and temperature. At the same time, under the effect of atmospheric precipitation and retrograde metamorphism on the superficial crust, Ore mineral rapidly migrated, enriched, mineralized, and finally formed super-thin alteration-type gold deposit, such as Tantou, Nanping and Luyuan-Gou gold deposits, etc. This research is financially supported by the special Fund Basic Scientific Research of Central Colleges and the Special Fund of Basic Research Support Program of Chang'an University (Grant No.CHD2009JC159).

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