5.3.P16

Late Yanshanian mafic-ultramafic rocks in the coastal area of Fujian, SE China: A Sr-Nd-Os isotopic approach

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Late Mesozoic igneous rocks occur over a vast area of SE China on the western Pacific margin. Among these rocks, granitoids are predominant, mafic-ultramafic rocks are rare and intermediate rocks are even less common. Along the coastal area of Fujian, late Yanshanian mafic rocks distribute sporadically along the east side of the Changle-Nanao deep fault. They consist of plagioclase, amphibole, pyroxene and opaques. Country rocks of these mafic intrusives are mostly granitic gneiss and migmatites. Mafic rocks in Daiqianshan show obvious cumulate layering structure, characterized by a chilled gabbros base that grades upward to medium grained gabbro or diorite. Those in Pingtan occur mainly as stocks and dykes or as enclaves within the granodiorite. Ultramafic rocks occur only in Changji which is situated to the west of the Changle-Nanao deep fault. Ultramafic rocks are strongly serpentinized and locally talc-magnesianized. The wall rocks of the ultramafic rocks are early Yanshanian volcanic rocks.

All the mafic-ultramic rocks show slightly enriched Nd and Sr isotopic compositions (εNd = -1.8 to -2.7; $^{87}Sr/^{86}Sr \fallingdotseq$ 0.706 except ultramafic rocks of 0.710) which also overlap with those of the surrounding granitoids. Thus, Nd-Sr isotopes are not likely to be effective discriminants for mafic-ultramafic rocks. However, Os isotopic compositions can be divided into three groups. Hence, the distinctions become clearer and enable us to differentiate ultramafic rocks (depleted) from cumulative (slightly enriched) and non-cumulative (enriched) mafic rocks. This study further demonstrates the general belief that Re-Os isotope system is generally less disturbed than lithophile element-based (Nd and Sr) isotope systems.

5.3.P17

Correlation of the Paleozoic porphyry magmatism of Cu-Mo deposits and global events on Earth

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Major mass extinctions, continental flood basalts, tectonic plate motion and variation in $^{87}Sr/^{86}Sr$, $\delta^{12}C$, $\delta^{18}O$ and $\delta^{34}S$ in Phanerozoic seawater are synchronous with global events. They mark stages in Earth's evolution and are interpreted in terms of mantle processes. The investigations of the Paleozoic porphyry Cu-Mo deposits of the Siberia and Mongolia showed the necessity of including porphyry magmatism of the Cu-Mo deposits in that list of global events.

The following sequence of age data was obtained for the Sora (South Siberia) ore-bearing center [1]: host rocks – gabbro 478-480 Ma; granosyenites 466 Ma; potash feldspar rocks 462 Ma; quartz monzonites 452 Ma; leucocratic granites 418-422 Ma; preore dikes 402-404 Ma; ore-bearing porphyries of the I rhythm ***386-388 Ma*****; *porphyries*** of the II rhythm ***-356 Ma.*** For the Aksug ore-bearing center (South Siberia), the following endogenic events were established: host rocks - gabbro 532-522; 497; 490-488 Ma; quartz diorites 462 Ma; porphyry-like tonalities 404+/-7 Ma. ***Porphyries*** of the I rhythm (major ore formation) are dated as ***364-356 Ma***, while dikes of granites and aplites are 331-324 Ma. The hoste rocks of the large Cu-Mo-deposit Erdenetuin-Obo (North Mongolia) formed near 270 Ma, ***porphyries of I*** rythm (main mineralization) – ***240 Ma*** ago, ***porphyries of II*** rythm ***-220 Ma***. Porphyry magmatism of the Cu-Mo deposit Tsagan-Suvarga (South Mongolia) is dating ***365 Ma***. All above mentioned ages marked by bold italics are concurring with the time of development local minima on the global [2] the Phaleosoic seawater $^{87}Sr/^{86}Sr$-evolution trend (Fig.1).

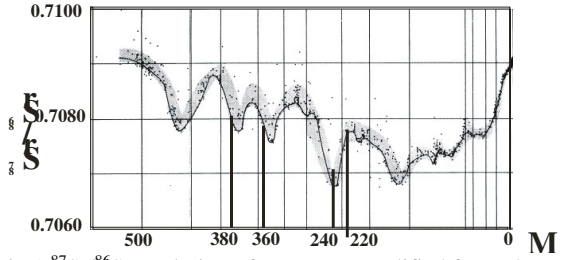

Fig.1 $^{87}Sr/^{86}Sr$ evolution of seawater. Modified from [2].

87Sr/86Sr-minima of the seawater trend mark the time of ocean opening and transport of mantle materials to the surface of the Earth and also the time of manifestation of porphyry rocks on the Cu-Mo deposits in the Paleosoic.

References

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