Major transformation of subcontinental lithosphere mantle beneath the Sino-Korean Craton in Late Mesozoic: A possible global link

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Major transformation of subcontinental lithosphere mantle (SCLM) beneath Sino-Korean Craton (SKC) in Mesozoic has been evidenced by a variety of geological and geochemical studies. This dramatic change in architecture of lithosphere has raised a hot debate on the consequences and causes of this profound geodynamic process. This study would postulate a possible link between the catastrophic event in eastern China to the contemporary global overturn, with emphasis on the comparative study of chronological and geochemical characteristics.

Evidence for timing of basaltic underplating comes from SHRIMP dating on lower crust xenoliths entrained in Cenozoic basalts in SKC. The entire data sets prominently define a broad peak of activity between 80 and 120 Ma and the peak around 160 to 180 Ma. Recent works on ore-forming chronology indicates that the major episode for super-large deposits in SKC are around 120±10 Ma. Sr-Nd-Pb isotopic compositions from typical gold deposits suggest that mantle component was partly involved in the mineralization. The Mesozoic carbonatites, emplaced in eastern SKC show extremely high initial $^{87}Sr/^{86}Sr$ and very low εNd, a character completely different from their global counterparts. The geochemistry of mantle-derived rocks suggests a common trend of migration of source signature, from enriched to depleted, in ca. 120 Ma ago. The above arguments imply that the collision between North China Block and Yangtze Block might cause a major adjustments of SCLM architecture. A variety of geodynamic mechanisms could be involved in when Izanagi Plate northward movement and the Okhotsk Sea closure were going on by late Jurassice. This has been regarded as a regional response to the global major overturn.
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Modes of occurrence of selenium in Yutangba and its impact on the local environment

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Yutangba village, located in the northern part of Shuanghe Town of Enshi City in the SW of Hubei Province, China, is one of the most typical high-Se areas in Enshi Prefecture where a sudden incidence of Se poisoning took place in 1963. In Yutangba, many researchers have collected carbonaceous siliceous rock and siliceous shale samples with higher Se concentrations (maximum content of Se up to 8%) from the lower Permian Maokou Formation, but little is known about the detailed modes of occurrence of Se in Yutngba and its impact on local environment.

The results of our studies by using SEM/TEM-EDX, electronic microprobe, X-ray diffraction and sequential extraction technique show that native Se has been discovered within the abandoned stone coal spoils and Se-rich rocks. Krutaite ($CuSe_2$), mandarinaoite ($Fe_2(SeO_3)_3$) and other Se minerals are also found. In the Se-rich rocks of Yutangba, Refractory-Se and Organic-Se are dominant; the others are sulfide or selenide-Se, elemental Se and available Se, respectively. But native Se is easily found within the weathered Se-rich rocks, this indicates that the processes of forming elemental Se is not only the key phase for Se transformation among the different Se fractions in Se-rich rocks, and also for Se release, mobility and transport during Se-rich rocks weathering. The Se-rich carbonaceous siliceous rock and carbonaceous shale of the Permian Maokou and Wujiaping Formantion are the predominant factor for Yutangba developed into a high-Se area. The manners of cultivating activities and life of local inhabitants are the main factors that cause Se to accumulate in food chain, and the high risk of Se poisoning occurrence is mainly controlled by Se content in corn (main food). So, Yutangba is still a highly risk area to villagers, where Se poisoning is possible to take place.

References

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