A biogeochemical orientation study in Mo skarn deposits, Jecheon distict, Korea

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A biogeochemical orientation survey was conducted in the vicinity of Mo skarn deposits in Jecheon district in Korea. A skarn zone of over 600 m length is hosted in Ordovician carbonate sediments and is adjacent to both Jurrassic and Cretaceous felsic intrusives. Molybedenum occurs in fracture zones within the skarn and in disseminated form. The skarn ore minerals consist mainly of scheelite, molybdenite, galena, and chalcopyrite. The total samples of rocks, soils, and plants – daimyo oak leaves/branches (*Q. dentata*) and sargent cherry leaves (*P. sargentii*) – were collected from the target area and barren control area, and analyzed by ICP-MS. Each of three sampling lines was designed to cross the orebody at 30 m spacing intervals. The soil samples (n=36/10, target/control) collected from the target area show higher values of Mo (<0.1~38.7 ppm) compared with those from the control area (<0.1~3.2 ppm Mo). In all of the plant samples (n=108/30, target/control), Mo concentration from the target area (2.7~95 ppm in *Q. dentata* leaves, 0.2~99.1 ppm in *Q. dentata* branches, and 1.7~69 ppm in *P. sargentii* leaves) is 3~7 times higher than that from the control area (1.9~10.3 ppm in *Q. dentata* leaves, 0.9~6.3 ppm in *Q. dentata* branches, and 2~5 ppm in *P. sargentii* leaves). The variation patterns of Mo in plants are similar to those in soils, suggesting a corresponding Mo anomaly and contrast between soils and plants. The values of Mo in soils and plants are strongly correlated. The biological absorption coefficient (BAC) of Mo in the plants is generally high (*Q. dentata leaves* = 15 and *Q. dentata* branches/*P. sargentii* leaves = 9.1). The three plant organs have high possibilities to be used as indicators for the biogeochemical prospecting of Mo.

Delamination of subcontinental lithosphere beneath the Korean Peninsula: evidence from ultramafic xenoliths in Cenozoic basalts

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The Cenozoic alkali basalts are widely scattered over Korea and often carry spinel lherzolite xenoliths, indicating that the lithospheric thickness beneath Korea does not reach deep enough to the garnet lherzolite stability field. Interestingly enough, the spinel peridotite xenoliths from Korean peninsula can be divided into two groups based on their geochemical and Sr, Nd, Hf and Pb radiogenic isotopic compositions, i.e. enriched group and depleted group. The former xenoliths have enriched isotopic compositions very similar to their host basalts but show refractory nature of major element compositions with quite low CaO and Al_2O_3 contents indicating their derivation from the old Paleoproterozoic subcontinental lithospheric mantle beneath the Korean peninsula. In contrast, the latter have depleted isotopic compositions similar to mid-oceanic ridge basalts with apparently fertile major element compositions of relatively high CaO and Al_2O_3 contents similar to present day asthenospheric mantle indicating that such asthenosphere-derived materials may have replaced the lithosphere quite recently. In general, the host basalts show isotopic compositions similar to the enriched xenoliths, indicating genetic link between them.

Simple geobarometric calculations indicate that the depths of origination of the xenoliths are in average of ca. 75 km, suggesting that the maximum thickness of the subcontinental lithosphere would not exceed such depth quite much. On the contrary, the crustal evolution of the Korean peninsula seemingly started since the Archean, at least some part of it, suggesting normal lithospheric thickness of 150 km or greater. Such lithospheric thickness of the Korean peninsula significantly thinner than expected is quite similar to the case of North China Craton having lithospheric thickness of ca. 80 km in average, suggesting significant delamination of the lithospheric mantle in a depth scale of a few tens of kilometers during the past geologic time. Such delaminations may have occurred after the continental collisional events of Paleoproterozoic and early Mesozoic, suggested by wide occurrences of igneous and metamorphic events during the 1.9-2.0 Ga and also during the early Mesozoic throughout the Korean peninsula.