Geochronological constraint on the depositional age of Triassic collision belt (Imjingang belt) in Korea: Preliminary SHRIMP zircon U–Pb age

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The Imjingang belt in the central Korean peninsula, a possible eastern extension of Triassic Dabie-Sulu ultrahigh-pressure belt in China, consists mainly of metasedimentary rocks: (1) stratigraphically the lower calc-silicates rocks alternating with pelitic schists, quartzite and marble, and (2) the upper metapelites. The massive or foliated amphibolite sills, parallel to the regional foliation, commonly occur in the middle–lower parts of the calc-silicate rocks. The hornblende granite locally intrudes the lower part of the calc-silicate rocks and is strongly deformed during the Triassic collision orogeny to have the same geometry of structural elements with the calc-silicate rocks. The granite is mylonitezed to have isoclinal fold and sheath fold characterized by the development of mineral stretching lineation parallel to the fold axis. Alkali-feldspar clasts (<3mm) are common in the fine grained matrix consisting mainly of quartz, alkali-feldspar and plagioclase with minor hornblende, biotite, titanite, garnet and zircon.

The maximum depositional age of the Imjingang belt is known as ca. 447–397 Ma based on the SHRIMP U–Pb age of detrital zircons separated from the garnet-biotite paragneiss of the upper metapelites [1]. Zircon grains separated from the foliated hornblende granite show oscillatory zoned core and rarely thin and dark overgrowth rim under cathodoluminescence image. The U and Th concentrations of the analyzed zircon grains are 114–1162ppm and 63–976ppm, respectively, and Th/U ratios are 0.57–0.88. Weighted mean age of the SHRIMP zircon U–Pb analysis yielded ca. 342 Ma, suggesting the foliated hornblende granite to be an Early Carboniferous intrusive. Therefore, the depositional age of the Imjingang belt may be constrained to Middle–Late Devonian.

[1] Cho *et al.* (2005) *GSA Abstract,* 171-6.

Stabilization of arsenic in mine tailings by using limestone ($CaCO_3$)

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The main objective of this study is to evaluate the efficiency of limestone to immobilize arseic from mine tailings. Mine tailings having high arsenic concentration in Samkwang, Korea were taken and the powdered limestone was used as the stabilization amendment for the experiments. Heavy metal concentrations in tailings were analyzed on ICP/OES and As concentration of tailings was 22 times higher than KSCL (Korea Soil Counterplan Limit : 15 mg/kg), suggesting that As was the main target contaminant to immobilize from tailings. Column experiments were performed to investigate the efficiency of limestone as the immobilizing amendment to reduce As leaching by rainfall from tailings. A glass column (5 cm in diameter and 15 cm in height) was designed with a leaching system and its upper and lower part consist of dense lattice screen plates and the drain system for injection and extraction of artificial rainfall. For the mixing treatment process of the stabilization, 2 and 5 w.t.% of powdered limestone were mixed with mine tailings and were packed in the column. From the bottom of the column, 1092 ml of artificial rain (50 % of average yearly rainfall) was uniformly injected from the bottom of the column everyday at the constant rate of 2 ml/min for 10 days (representing 10 years of rainfall at the real site). Leached water was drained from the top of the column and As concentration was analyzed on ICP/OES to investigate the decrease of As amount in drained water by limestone. From the result of experiments, the amount of As in drained water dramatically decreased and its As concentration was much lower than KDWL (Korea Drinking Water Limit: 0.05 mg/L). The capability of limestone to immobilize As from mine tailings was outstanding, suggesting that the limestone is more available to immobilize As from mine tailings than the lime (CaO) because of low pH increase and thus less harmful side effects.