

SHRIMP U-Pb detrital zircon ages for metasedimentary rocks from the Seosan Group at western margin of the Gyeonggi Massif, Korea, and their tectonic implications

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The Gyeonggi Massif (GM) located at the central part of Korean Peninsula is one of the major tectonic units where Precambrian basement rocks are widely exposed. Recent studies reveal that Precambrian rocks in the GM are mostly consist of Paleoproterozoic (1.89-1.82 Ga) para- and orthogneiss, and small bodies of Neoproterozoic (0.90-0.75 Ga) TTG and alkali pluton. Mesoproterozoic sedimentary succession and igneous activities in the GM, however, have not been well defined yet.

In this study, sensitive high-resolution microprobe (SHRIMP) U-Pb age dating is carried out for detrital zircons from metasedimentary rocks of the Seosan Group (SG) which unconformably overlies the ~1.87 Ga basement rocks at western margin of the GM. Samples are mica-schist (SS3) and quartzite (SS6) from the Soguri Formation, and biotite gneiss (Btgn) from Ibugri Formation of the SG. In cathodoluminescence image, most of the zircons show oscillatory zoning patterns, and rarely present core-rim structure. Zircon ages from the SS3, SS6 and Btgn have ranges of 3.15-1.86 Ga, 2.84-1.78 Ga and 3.02-1.82 Ga, respectively. In age spectra, they have distinct peaks at ~1.87 Ga and ~2.54 Ga, and minor peaks exist between these ages. Only a few of the ages are older than 2.75 Ga.

The youngest detrital zircon ages in this study constraint sedimentation of the SG after ~1.8 Ga, and the age spectra are very similar to those reported from Meso- to Neoproterozoic sedimentary succession in the North China Craton [1], that is Changcheng, Jixian and Qingbaikou Groups in ascending order, which deposited after the Lüliang movement at ~1.8 Ga. On these bases, it can be concluded that (1) protolith of metasedimentary rocks of the SG derived from North China Craton; (2) western margin of the GM is correlated with North China Craton.

[1] Wan *et al.*, (2011) *Gondwana Research* **20**, 219-242.

Determination of ²³⁸U, isotope Uranium(²³⁴U/²³⁸U), ²²²Rn and gross alpha in the ground water of the Goesan area in Korea

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Ground waters generally contains various amount of radio-activity. Measurement of natural occurring radionuclides in groundwater is important for environmental and public health studies.

The measurement of the activity concentrations of ²³⁸U, isotopic Uranium(²³⁴U/²³⁸U), gross alpha and ²²²Rn in sample of ground water is very important in the general study of radionuclide migration that is the source of the radio-nuclides dissolved in the water. Liquid scintillation counting (LSC) is an effective technique for the determination of radionuclide and measurement of radio activity in water samples using LSC which is one of the most common screening techniques applied in ground water.

The activity concentrations of the ²³⁸U, isotopic Uranium (²³⁴U/²³⁸U), gross alpha and ²²²Rn are reported for 55 natural water samples collected from public wells in the sample area. This method is dependent on sample preparation procedures and the setup of measurement conditions, which are typically individual to each of counting laboratories. The aim of this project was to get an overview of the distribution of natural radionuclide activity concentration levels in the ground water sampled from the area. The study area is located in Goesan (36° 35' N, 127° 37' E), Korea. The ²²²Rn could be extracted easily from the water sample(10mL) using a 10 ml commercial organic scintillant. Gross alpha activity was measured in the water sample using LSC method. The sample preparation in this methods was based on the evaporation of relatively small sample(200ml) and measurement in the LS spectrometer with alpha/beta discrimination feature. Determination of ²³⁸U concentration using individual coupled plus mass spectrometry(ICP-MS) and partial sample are solvent extraction method which was utilized to measure isotopic Uranium(²³⁴U/²³⁸U) content in the ground water. The ²³⁸U, isotopic Uranium(²³⁴U/²³⁸U), gross alpha and ²²²Rn, major ion concentrations and physico-chemical parameters were also measured.

The results revealed that the concentrations of Gross alpha, ²²²Rn and ²³⁸U ranged from 0 to 174.9(pCi/L), from < 94 to 29,300(pCi/L), from < 0.1 to 293(ppb), respectively. The isotopic Uranium(²³⁴U/²³⁸U) activity ratio varied between 0.39-1.75.