Geochemical significance of ^{14}C, ^{3}H, $\delta^{18}O$, $\delta^{2}H$ and $^{87}Sr/^{86}Sr$ isotopic data in the hot spring waters of South Korea

S-G. LEE[1]*, T. NAKAMURA[2], Y.Y. YOON[1], T-K. KIM[1], T. OHTA[2] AND T. LEE[1]

[1]Korea Institute of Geoscience and Mineral Resources, Daejeon 305-350, Korea (sgl@kigam.re.kr, yyyoon@kigam.re.kr, tkkim@kigam.re.kr, megi@kigam.re.kr)

[2]Center for Chronological Research, Nagoya University, Nagoya 464-8601, Japan (nakamura@nendai.nagoya-u.ac.jp)

Despite being a non-volcanic area, South Korea has a number of the hot springs with water temperatures of more than 40°C. The occurrence of these hot springs are related with Mesozoic granites in the Korean Prninsula. The hot springs are located at the fringes of the granite body rather than the center of the Mesozoic granites. Lee *et al.* [1] reported a geochemical characteristic of the $^{87}Sr/^{86}Sr$ in the hot spring waters, and suggested that the heat source of the hot spring water might be related with granite emplacement. Most hot springs are deep-drilled wells with depths of more than 100m, and motorized pumps are used. Here we report new data for $^{87}Sr/^{86}Sr$ ratio of the hot spring waters, and also report $\delta^{2}H$, $\delta^{18}O$, ^{14}C and ^{3}H isotopic data of hot spring waters in South Korea to discuss the origin of the hot spring waters.

Environmental isotope results such as $\delta^{2}H$ and $\delta^{18}O$ reveal that hot spring water and groundwater were originated from the meteoric water. However, there was no variation in chemical compostions and $^{87}Sr/^{86}Sr$ ratio of the hot spring waters during last eight years. ^{14}C activity of DIC in the hot spring waters in South Korea ranges from 1.7 pMC to 78 pMC. Such $^{87}Sr/^{86}Sr$ and ^{14}C isotope results show that the circulation between thermal water and current meteoric water including groundwater, surface water and rainwater at the southeastern part in the South Korea should be slow. Our data indicate that the high temperature hot spring water in South Korea might be derived from paleo-groundwater reservoir with high temperature rather than circulation of the modern meteoric water heated directly by a current heat souce. This also suggests that the hot spring water in the granite area might be one of limited groundwater resources.

[1] Lee, S.G. *et al*. (2007) *GCA* A558.

Zircon Hf isotopic study of the Mesozoic granitoids from Korea and Japan and tectonic implications

S.R. LEE[1]*, D.-L. CHO[1] AND F.-Y. WU[2]

[1]Geological Research Divison, Korea Institute of Geoscience and Mineral Resources, Daejeon 305-350, Korea (*correspondence: leesr@kigam.re.kr)

[2]Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China

Before switching to the present-day island arc system during the Miocene, the Japanese Islands grew outboard of the older continental margin of East Asia, next to the Korean Peninsula [1]. The Hida belt, including the Precambrian rocks, represents the remant of the former Asian continental margin, but its tectonic correlation to the North China or South China cratons is uncertain. The Korean Peninsula consists of three Precambiran massifs: Nangrim, Gyeonggi and Yeongnam massifs. The first and last are considered as parts of the North China craton, while the middle as a part of the South China craton [2], though such correlations are still under debating [2, 3]. The correlative study among the Hida belt and Korean massifs thus provides some clues to the Mesozoic continental accretions of the eastern margin of the Asian continent.

In this study Hf isotopic compositions of the zircons are presented for the Late Paleozoic-Mesozoic granitoids from the Hida belt and Korean massifs. In the Hida belt, εHf (t) values range from +5 to -8 for the Triassic zircons, and from +12 to +6 for the Jurassic zircons, respectively. The εHf (t) values range from -10 to -26 for the Triassic zircons of the Gyeonggi massif, while they range from -4 to -12 for the Triassic zircons and -22 to -32 for the Jurassic zircons of the Yeongnam massif. Our data indicate that the source materials are similar to each other for the Triassic granitoids from the Hida belt and Yeongnam massif, and suggest that the Hida belt is more correlative to the Yeongnam massif (i.e. North China craton) rather than the Gyeonggi massif (i.e. South China craton). During the Jurassic, however, the source materials became more juvenile for the Hida granitoid, while they changed progressively to crustal-dominated ones for the granitoids from the Yeongnam massif. This feature suggests that the crustal thickness of the eastenmost part of the Asian continental margin (i.e. Hida belt) has extended enough to shift from continental arc setting to island arc setting during the Jurassic time.

[1] Taira (1997) *EPS* **325**, 467–478. [2] Chough *et al*. (2000) *ES Rev* **52**, 175–235. [3] Oh (2006) *Gond Res*. **9**, 47–61.