

Zircon U-Pb ages for Creta-Tertiary granites, south Korea: Implications for spatiotemporal changes in subduction-related magmatism

Tae-Ho Park[1]; Hikaru Iwamori[1]; Yuji Orihashi[2]; Yong-Joo Jwa[3]

[1] Dept. Earth Planet. Sci., Univ Tokyo; [2] ERI, Tokyo Univ.; [3] Earth Environ. Sci., Gyeongsang Nat'l Univ.

Upper Cretaceous to lower Tertiary granitic rocks are widely exposed over an area of more than 90000km² in South Korea, which provide important opportunity to study temporal and spatial changes in subduction-related magmatism at the eastern Eurasian continental margin.

South Korea can be tectonically divided into four provinces, Gyeonggi Massif, Yeongnam Massif, Ogcheon Belt and Gyeongsang Basin, based on the distribution of sedimentary basins upon Precambrian basements. The pre-Cretaceous basement comprises two Precambrian massifs, the Yeongnam Massif in the south and the Gyeonggi Massif in the north. The Ogcheon Belt between the two massifs consists of a northeastern non-metamorphosed and weakly metamorphosed Paleozoic-Mesozoic sequence. The Gyeongsang basin is a Mesozoic to Cenozoic sedimentary basin. Upper Cretaceous granitic rocks occur, from NW to SE, in the Ogcheon Belt and the Gyeongsang Basin. Some lower Tertiary granites are also distributed in the eastern part of the Gyeongsang Basin.

U-Pb zircon age determinations using ultra-violet (UV)-laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) were performed on total twenty-six granites: Weolaksan granite(89.6 Ma), Sokrisan granite(85.6 Ma), Munjangsan granite(84.0 Ma), Jeongup granite(84.1 Ma), Gwangju granite(82.8 Ma), Weolchulsan granite(94.5 Ma), Gangjin granite(89.3 Ma) and Donghae granite(46.1 Ma) in the Ogcheon Belt, and Changneong granite(86.2 Ma), Dalseong granite(84.0 Ma), Chwangwon granite(82.6 Ma), Jinhae granite(82.4 Ma), Jindong granite(79.8 Ma), Onjeong granite(79.4 Ma), Maebongsan granite(73.4 Ma), Palgongsan granite(71.2Ma), Milyang granite(69.6 Ma), Eonyang granite(68.1Ma), Kimhae granite(66.5 Ma), Kijang granite(67.2 Ma), Keoje granite(67.9 Ma), Namhae granite(72.4 Ma), Yeosu granite(64.8 Ma), Gampo granite(59.6 Ma), Ulsan granite(57.7 Ma) and Gyeongju granite(48.1 Ma) in the Gyeongsang Basin. U-Pb zircon dating of their granites yields ²⁰⁶Pb/²³⁸U emplacement ages between 94.5 Ma and 46.1 Ma, which shows systematically southeastward younging over approximately 250km, from 95-82 Ma in the Ogcheon Belt and 87-79 Ma in the western part of the Gyeongsang Basin, to 74-64 Ma in the middle part of the Gyeongsang Basin, and 60-46 Ma in the eastern part of the Ogcheon Belt and Gyeongsang Basin.

This age variation, together with a similar eastward migration of the extension in the Gyeongsang Basin, reflects migration of magmatism and subsidence almost continuously in time and space within-continent toward convergent margin, where the oceanic crust subducted beneath the continental crust.