

Radiometric ages and Nd-Sr isotopes of granitic rocks in Cheju volcanic Island.

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Major and trace element and Nd-Sr isotopic data are presented on the granitic rocks known as a basement in the Cheju volcanic Island, together with CHIME age data on porphyritic hornblende- biotite granite from the Byeoldobong area of northeast Cheju city.

The purpose of this contribution is to examine geochemical and isotopic characteristics and radiometric age and evolution of granitic basement rocks beneath the volcanic island.

The CHIME age of porphyritic hornblende-biotite granite using zircon grains was determined to be 173 ± 31 Ma, corresponding to Jurassic age. It is concordant with K-Ar age, 172.4 ± 5.2 Ma (Kim et al., 1999), of biotite granite in the same area, which is comparable to Daebo granite in the inland of Korean peninsula.

Granitic inclusions in the Byeoldobong area have $^{143}\text{Nd}/^{144}\text{Nd}$ values from 0.51165 to 0.51190 (initial ratio $(^{143}\text{Nd}/^{144}\text{Nd})_i = 0.51156 \sim 0.51158$, $\epsilon_{\text{Nd}} = -19 \sim -14$) and $^{87}\text{Sr}/^{86}\text{Sr}$ values from 0.7116 to 0.7229 (initial ratio $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7156 \sim 0.7164$, $\epsilon_{\text{Sr}} = 101 \sim 179$) which are close to those of Jurassic Daebo granite ($\epsilon_{\text{Nd}} = -21 \sim -14$, $\epsilon_{\text{Sr}} = 104 \sim 171$). On the other hand, micrographic granite from the drilling core in the Hadeokchen area gives $^{143}\text{Nd}/^{144}\text{Nd} = 0.51221$ (initial ratio $(^{143}\text{Nd}/^{144}\text{Nd})_i = 0.51218$, $\epsilon_{\text{Nd}} = -8.3$) and $^{87}\text{Sr}/^{86}\text{Sr} = 0.7108$ (initial ratio $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7077$, $\epsilon_{\text{Sr}} = 90$). It shows a clear indication that it is a blend of Cretaceous Bulguksa granite ranging from 0.51184 to 0.51268 in $^{143}\text{Nd}/^{144}\text{Nd}$ ($\epsilon_{\text{Nd}} = -6.6 \sim -0.4$) and 0.7055 \sim 0.7167 in $^{87}\text{Sr}/^{86}\text{Sr}$ ($\epsilon_{\text{Sr}} = -2.5 \sim 33.5$). The Nd and Sr isotopic values suggest that the granitic magma is originated from similar source of granitic magma in the inland of Korean peninsula: Crustal source for Daebo granite of Jurassic age and fractional crystallization of mantle source for Cretaceous Bulguksa granite.

Based on the petrochemistry, Nd-Sr isotopes and radiometric ages of granitic rocks, older continental basement rocks which are correlated with the continental crustal materials in the Okchon zone, are continuously extended to the Cheju volcanic Island where aparted from ca 90 km from continental mainland of the peninsula.

주요어 : CHIME age, Nd-Sr isotope, Cheju granite

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