An old HIMU seamount chain near the Japan Trench: Implications for temporal isotopic variation of a superplume

G. SHIMODA[1]*, O. ISHIZUKA[1], K. YAMASHITA[2,3], M. YOSHITAKE[3,4], M. OGASAWARA[1] AND M. YUASA[1]

[1]Geological Survey of Japan, AIST, Tsukuba 305-8567, Japan (*correspondence: h-shimoda@aist.go.jp)
[2]Institute for Study of the Earth's Interior, Okayama University, Misasa, Japan (kty@misasa.okayama-u.ac.jp)
[3]Department of Earth and Planetary Sciences Kobe University, Kobe, Japan
[4]National Institute of Polar Research, Tokyo 173-8515, Japan (yoshitake.miwa@nipr.ac.jp)

The northwest Pacific is well known to contain a large number of mid-Cretaceous seamounts and large igneous provinces (LIP). These seamounts and LIPs are inferred to have been formed by plume activity during one of the largest-scale magmatic events in the Earth's history, or so-called "superplume" activity. As superplume activity is considered to be related to large-scale mantle upwelling originating from the core-mantle boundary, research into large-scale magmatism may provide a key constraint in understanding material recycling throughout the silicate Earth. In spite of their potential importance, mid-Cretaceous seamounts have been studied in less detail than their present-day ocean island counterparts.

We will present the first comprehensive geochemical study of seamounts in the Joban seamount chain, the northernmost mid-Cretaceous seamount chain in the northwest Pacific. Our results suggest that these seamounts were produced by HIMU-type (High-μ; μ = 238U/204Pb) magmatism at ca. 120 Ma. On the basis of differences in isotopic composition along seamount chains in the NW Pacific, temporal isotopic variation can be inferred: old seamount chains (100-120 Ma) exhibit a HIMU-FOZO (Focus Zone) isotopic signature, while relatively younger seamount chains (70-100 Ma) exhibit a FOZO-EM1 (Enriched Mantle 1) isotopic signature. Present day ocean island basalts (OIBs) exhibit a wide variety of isotopic compositions, including FOZO, HIMU, EM1 and EM2 isotopic signatures (Enriched Mantle 2). Since the ages of old seamount chains are coeval with the initial stage of superplume activity, small isotopic variation of the old seamount chains could reflect the relatively high temperature melting conditions in the plume. Conversely, wide isotopic variation of young seamount chains and present-day OIBs could reflect a relatively low temperature melting conditions in subsequent plume flow.

Mostly differentiated products of carbonatite-phoscorite complex in Hongcheon, Korea

D.B. SHIN[1]*, Y.B. OH[1] AND M.J. LEE[2]

[1]Kongju Nat'l Univ. 314-701, Korea (*correspondence: shin@kongju.ac.kr, cp16vocal@naver.com)
[2]KIGAM, Daejeon, 305-350, Korea (mjlee@kigam.re.kr)

Carbonatite-phoscorite complex in Hongcheon, Korea, is emplaced in Precambrian gneiss and consists mainly of magnetite, apatite, monazite, ankerite, siderite and calcite with subordinate magnesite, strontianite, columbite, pyrite, chalcopyrite. No olivin is shown in these rock type. Carbonatite and phoscorite commonly show unmixed textures that are either banded or intermingled patttern. They were precipitated over three stages. In first and second stages, dolomite, magnetite, ankerite, apatite, and monazite are quite common, and in third stage quartz is an exclusive phase accompanying Fe-carbonate minerals. According to Pilipiuk *et al*. [1], this carbonatite belongs to quartz-ankerite carbonatite. Geochemical data also indicate that most carbonatites are plotted on the division of ferrocarbonatite, which is a final product in carbonate magma evolution. MgO concentrations of magnetite in phoscorite are generally below 0.5 wt.% and are distinctly lower than those of Kovdor, Vuoriyarvi, and Sokli in Kola province. Bulk concentrations of Mn contents in phoscorite are about 3 wt.% in average and they are pretty higher than those of other world wide complex (< ~1 wt.%). Considering its depleted Mg but enriched Mn content, phoscorite in Hongcheon seems to have differentiated more into later stages than other phoscorite in the world. In addition, some phoscorites showing highest SiO_2 contents up to 19.45wt.% would have evolved more into later stage than ferrocarbonatite. Geochemical as well as petrographic evidences suggest that phoscorite and carbonatite in Hongcheon area seems to be mostly differentiated products of carbonatite magma evolution.

[1] Pilipiuk, A.N., Ivanikov, V.V. and Bulakh, A.G. (2001). *Lithos*, **56**, 333-347.