Effect of thickness of oceanic lithosphere on chemical composition of OIBs: Implication for origin of the South Pacific magmatism

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The northwest Pacific Ocean is known to contain a large number of Cretaceous seamounts and several oceanic plateaus and rises. These seamounts, plateaus and rises may have formed during the large-scale magmatic event in the South Pacific that is still active in the present-day French Polynesia region. Although it is unclear whether the Cretaceous seamounts and plateaus were produced by the same process that is now operate in the South Pacific, distinct isotopic signatures of the Cretaceous seamounts can be traced back to the magmas of the South Pacific, suggesting that single process has been active since the Cretaceous [1].

In order to examine the geochemical connection between the Cretaceous seamounts and present-day ocean islands, elemental ratios are determined for fluid-immobile incompatible elements (La/Yb, Nb/Zr, Ta/Zr, Th/Nb and Th/Ta). A notable geochemical feature of these ratios is a correlation between the elemental ratios and 'relative age' that can be an index of the thickness of lithosphere beneath hot spots. In addition, there are no systematic difference in the elemental ratios between the Cretaceous seamounts and present-day ocean islands. As the thickness of oceanic lithosphere is a function of square root of its age, these correlations suggest importance of tectonic environment to determine the chemical composition of the magmas. Other important geochemical feature is that the elemental ratios of mid-ocean ridge basalts (MORBs) from the East Pacific Rise (EPR) may not be on these trends. This observation could imply that source material of the EPR MORBs is different from that of the seamounts and islands. Since the source material of EPR MORBs can have a representative composition of upper mantle beneath the South Pacific, this difference could imply the material flow from the deep mantle. Therefore melting of mantle plume from the lower mantle, which melting condition depends on thickness of lithosphere, can be a plausible origin of the magmatism in the South Pacific.

[1] Konter,. Hanan, Blichert-Toft, Koppers, Plank & Staudigel (2008) *EPSL* **275**, 285–295.

Geochemical characteristics of black slate-hosted uranium deposits in the Okcheon Metamorphic Belt, Korea

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Carboneceous black slates in the Okcheon Metamorphic Belt of South Korea are thin beds known for their low grade U mineralization accompanying rare elements such as Ba, V, and Mo. U mineralization is distinctly concentrated in coalish slates which are imbedded in the black slates. Coalish slates show highly disturbed pattern in their texture unlike black slates, and contain quartz vein and sulfide minerals such as pyrite and pyrrhotite. Chondrite-normalized REE patterns of 36 samples for both of the rock types show that coalish slates are more enriched in HREE compared to black slate, and the total REE contents are higher in coalish slate (231 ppm) than in black slate (159 ppm). These petrographical as well as geochemical features strongly suggest that U mineralization in the black slate was related with post depositional hydrothermal activity. U also shows strongly positive correlation with V, Cu, and Mo, indicating that they were precipiated together during the hydrothermal process. Sulfur isotope compositions of black slate are low in values from -19.5 to 1.5‰, implying organic sulfur from sedimentary process, and those of coalish slate range from 7.3 to 9.0‰, possibly by metamorphism or hydrothermal process. As for carbon isotope, black slate ranges from -16.8 to -3.8‰ and coalish slate from -15.8 to -4.6‰. The wide range of carbon isotope reflects the mixture of organic carbon with calcite carbon from seawater origin. On the contrary, oxygen isotope compositons of the two rock types are narrow in range and similar to each other (14.6 to 15.5‰ for black slate and 14.9 to 18.5‰ for coalish slate), implying that oxygens are from calcite of seawater origin. Thus it seems like that the rare elements listed above would have been remobilized to participate in the formation of coalish slate after they were originally introduced to black shale under reduced condition.