Subduction influence of Philippine Sea plate on the mantle beneath Kyushu, SW Japan: An examination of boron contents in basaltic rocks

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Volcanism in Kyushu is associated with subduction of Philippine Sea Plate (PSP). Kyusyu-Palau Ridge subducts nearly at right angles to central Kyushu, marking the boundary between young (26-15 Ma) PSP in the north and old (60-40 Ma) PSP in the south.

We analyzed boron (B) contents in volcanic rocks from Kyushu to investigate the influence of these contrasting oceanic plates on the mantle composition. Since B is distinctly concentrated into slab-derived fluids among the earth's materials, we can estimate the subduction contribution to the subarc mantle composition based on the B data in volcanic products.

The across-arc variation of B/Nb is not observed in the northern Kyushu basalts (NKB), whereas it is observed as a smooth depletion curve in southern Kyushu basalts (SKB). In Kyushu volcanic front, lavas from Aso and Kirishima volcanoes which are located in the central Kyushu show the highest value of B/Nb (3.0-3.7). The B/Nb ratios of the SKB (1.2-2.0) are higher than those of the NKB (0.2-0.9).

These observations indicate the young and old segments of PSP subduct beneath northern and southern Kyushu, respectively. In northern Kyushu, the dehydration of the young slab is probably completed before it reaches the volcanic front because of the high geotherm. In contrast, the dehydration of the old slab probably occurred continuously from volcanic front to backarc in southern Kyushu. The highest value of B/Nb observed in Aso and Kirishima basalts implies the subduction of seamount chain which is the extension of Kyushu-Palau Ridge.

REE-distribution between Cpx and Grt in Siberian garnet peridotites: *In situ* measurements vs. lattice strain model calculations

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We present new REE-distribution coefficients between clinopyroxene (cpx) and garnet (grt) of garnet peridotites from Vitim (Siberia) measured with the high spatial resolution of electron microprobe and SIMS (secondary ion mass spectrometry). By using the *in situ* technique it is possible to detect major and trace element variations within the mineral grains and to avoid inclusions or cracks.

The literature shows that calculated Kds from natural samples (whole-grain seperates) and those from experimental run products can differ remarkably. To address these discrepancies and to find out which factor controls the distribution of elements in a sample we measured grt and cpx of grt-peridotites from the well studied Vitim volcanic field in Siberia. These samples do not show any evidence of metasomatism or other secondary processes and formed over a restricted P-T range (1050-1200°C, 2.1-2.5 GPa). For the calculation of the REE-distribution coefficients we used only core compositions from samples with unzoned minerals.

Our newly calculated REE-distribution coefficients are consistent with the experimental data of Burgess & Harte (2004) at temperatures between 900° and 1000°C. Blundy & Wood (e.g. 1994) developed a lattice strain model to predict partitioning of trace elements between cpx and melt. This model was extended for grt compositions by Van Westrenen *et al*. (e.g. 2001). Because there is no coexisting melt in these samples, we use a measured distribution coefficient (here Sm) to predict the others (Lee *et al*., 2007). Using Sm gives the best fit between measured and predicted Kds (average deviation for La 11%, Eu 18%, Yb 63%) because there are no interference corrections and concentrations are sufficiently high in both minerals. Using the HREE cannot be recommended, because of interference corrections, the extremely low HREE concentrations in cpx and the resulting large errors on these measurements.