

Trace element and isotopic (Sr and Nd) compositions of clinopyroxenes in dunite channels of the Horoman peridotite complex, Hokkaido, Japan.

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The Horoman peridotite complex of Japan is one of the freshest orogenic peridotite complexes in the world. Dunite dykes occur both as large scale (several 10 meters width) concordant layers [1] and small scale (< several meters width) discordant layers [2]. The small scale dunite dykes incorporate two-pyroxenes + spinel segregations and are interpreted as replacive in origin [2]. To assess the nature of the melt/fluid that formed these dunite dykes, we analyzed mineral compositions, trace element and isotopic (Sr and Nd) compositions of clinopyroxenes (cpx) in the segregations of three discordant dunite dykes (CR811-1c, 1.6ol-III and a dunite swarm including sample SPR4, SPR5 and SPR6) and Rb-Sr isotopic ratios of constituent minerals of SPR4 and cpx of wall harzburgite (35cm apart from SPR4).

Mineral compositions and trace element and isotopic compositions of the cpx differ between samples and there is no simple correlation between them, suggesting each dyke was formed from a distinct melt. The isotopic and trace element compositions of cpx of the wall harzburgite are consistent with those of the dunite dyke SPR4. Additionally, the ⁸⁷Sr/⁸⁶Sr ratios of constituent minerals except orthopyroxene (opx) within SPR4 are positively correlated with both ⁸⁷Rb/⁸⁶Sr and 1/Sr.

These observations lead to the inference that the cpx in the wall rock is likely crystallized from migrating melt and the opx in SPR4 is a relict mineral from the wall harzburgite. Similar cpx has been observed in wall peridotite of replacive dunite channel in the mantle section of the Oman ophiolite [3].

References

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