# Petrogenesis of amphibole-rich ultramafic and its genetic relation with more evolved rocks: A case from the Hida metamorphic complex, Japan

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Amphibole plays a key role in arc magma differentiation via crystal fractionation [1], although amphibole phenocryst is generally scarce in arc lavas. Amphibole-rich cumulates are potentially a counterpart of arc magma undergoing amphibole fractionation. Interestingly, amphibole-rich cumulates are ubiquitously found in arc regions, although the amphibole-rich ultramafic bodies are limited in volume. In this study, we conducted the petrological examination of amphibole-rich ultramafic rock in the Hida metamorphic complex, Japan for a better understanding of their role in arc crust differentiation. The studied sample is characterized by large poikilitic amphibole and orthopyroxene enclosing olivine grains, hereafter called a cortlandite. The olivine grains show resorbed textures. The olivine showed relatively homogeneous compositions with an average Mg# (Mg/(Mg + Fe)*100) of 84. In contrast, poikilitic amphiboles (pargasite) and orthopyroxene yielded higher Mg# of ~85–89 and ~84–86, respectively. Considering trace element chemistry and the results of previous experimental studies, the mineral assemblage of the studied sample suggests the crystallization of hydrous juvenile magma while consuming olivine (+ clinopyroxene). We found that the $SiO_2$ contents of the plutonic rocks, including the studied cortlandite, in the Hida Belt positively and negatively correlated to La/Yb and Dy/Yb, respectively. These correlations imply that the amphibole-rich plutonic rock was a counterpart of arc magma undergoing cryptic amphibole fractionation and contribute to arc crust evolution.

[1] Davidson J., Turner S., Handley H., Macpherson C. and Dosseto A., 2007. Amphibole “sponge” in arc crust?. Geology, 35 (9): 787-790.