

Symmetrical Mn, Y and HREEs annular maxima garnet zonation in UHP oceanic eclogite: A witness of thermal structure heterogeneity in the subduction channel?

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Manganese, HREEs and Yttrium zonation with patterns of central peak and symmetrical mantle annular maxima are documented in garnets from UHP eclogite, SW Tianshan. This kind of patterns has not been reported before [1,2, refs therein]. Previous investigations, based on constant $\delta^{18}\text{O}$ compositions during multi-stage zircon growth, suggest the existence of a long-lived closed metamorphic system (ca. 280-318Ma) [3].

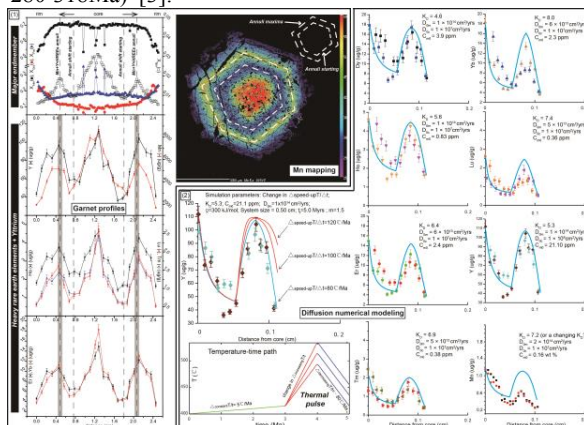


Figure 1: Profiles, mapping and numerical modeling results.

Discussion

We herein show, using diffusion-controlled modeling, that such garnet zonation patterns may be accounted for by a thermal pulse of ca. 100°C across ca. 2My. In light of the regional geodynamic context (i.e. eclogite peak T of ca. 520°C), we propose that this thermal pulse inferred from the peculiar Mn/HREEs/Y garnet zonation may be representative of thermal structure heterogeneities and/or may help track subtle changes in location within deep subduction plate interfaces.

[1]Moore et al.(2013) JMG **31**,663-689. [2]Yang & Rivers (2003) AM **88**,1398. [3]Tan et al.(2017) Lithos **278-281**,1-25