

Interactive comment on “Possibility of titanium transportation within a mantle wedge: formation process of titanoclinohumite in Fujiwara dunite in Sanbagawa belt, Japan” by S. Ishimaru and S. Arai

Anonymous Referee #2

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General Comments: The manuscript discusses some very interesting topics, methane-bearing fluid inclusions in subduction zone rocks and the potential implications of Ti-clinohumite for the subduction zone chemical cycle. They suggest that hydrocarbon-rich fluids may cause a HFSE mobility on large-scales, maybe from the slab into the mantle wedge. Especially the link between transport of slab-derived fluids with chemical changes and mineral reactions within the mantle wedge makes this contribution rather promising. However, there are a few things that are making a positive evaluation of the contribution difficult. To my opinion, the current version needs major revisions and a second round of review.

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The data set is rather slim and the source of the methane should be evaluated in more detail. In general, more references are needed to back up the key assumptions and points of discussion.

Ti-clinohumite is known to occur in dehydration related vein systems from the Erro Tobbio, I am missing a detailed discussion of how the findings from there (several papers by Scambelluri and Co-workers) either support or contradict the suggested concepts of the authors. Is it possible to show more petrographic documentation of how Ti got mobilised and where Ti-clinohumite formed? Maybe different generations of veins with Ti-clinohumite being part of the mineral assemblage?

F is very important for Ti-clinohumite and its content should be quantified. Is there any correlation between F-contents and the composition and abundance of Ti-clinohumite, even in the sub-wt.% level?

Ca enrichment along and HFSE-rich Ti-phases are features which are rather commonly observed in rocks displaying slab dehydration processes, this should be discussed too, to bring the results in a bit broader context. See Gao et al., 2007 GCA; Beinlich et al. 2010 GCA; Herms et al., in press ChemGeol. The latter of which is also addressing large-scale methane-bearing fluid flow through a dehydrating slab. I also recommend the paper by Lopez Sanchez-Vizcaino et al. 2009 LITHOS about Ti-mobility in ultramafic rocks.

Really important is, whether these rocks have been mantle wedge rocks or not. The reason why this might have been the case for the investigated rock suite is not convincingly shown. Here is more to be done.

All detailed issues of this manuscript are nicely addressed by referee #1 and will not be repeated here.

Interactive comment on Solid Earth Discuss., 4, 203, 2012.

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