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Interactive comment on "First report of ultra-high pressure metamorphism in the Paleozoic Dunhuang orogenic belt (NW China): Constrains from P-T paths of garnet clinopyroxenite and SIMS U-Pb dating of titanite" *by* Zhen M. G. Li et al.

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The replies are immediately listed below the comment

Interactive comment on "First report of ultra-high pressure metamorphism in the Paleozoic Dunhuang orogenic belt (NW China): Constrains from P-T paths of garnet clinopyroxenite and SIMS U-Pb dating of titanite" by Zhen M. G. Li et al.

Chunjing Wei (Referee)

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Discussion paper

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Ultra-high pressure (UHP) metamorphic rocks of continental affinity indicate that continental slabs can subduct to great depths where coesite and diamond can stabilize, and UHP metamorphism has been a hot topic for the past decades. Li et al. (2020) for the first time report UHP garnet clinopyroxenites from the Paleozoic Dunhuang orogenic belt, NW China. The rocks are retrieved to show clockwise P–T paths with the peak conditions of 790âĹij920âĎČ / 28âĹij41 kbar that are constrained by available garnet-clinopyroxene thermobarometries. This UHP metamorphism can be further confirmed by the presence of high-Al titanite inclusions in garnet and pyrope-rich garnet with exsolved rutile lamellae. Titanite SIMS U-Pb dating yields a metamorphic age of 389âĹij370 Ma, interpreted to represent the post peak exhumation time. The evidence for the UHP metamorphism is robust and the age data are in good quality. It will be much better to involve available bulk-rock compositions for both major and trace elements because these are significant for understand the petrogenetic origin of the UHP rocks. The discovery of the UHP garnet clinopyroxenites is great advance for the study of the Dunhuang orogenic belt, which has added a new case for the globe occurrences of UHP metamorphic rocks.

[REPLY] Thanks for your suggestions. We have presented bulk-rock compositions for both major and trace elements in supplementary Table S3 and discussed petrogenesis of garnet clinopyroxenite enclaves in section “Protoliths of garnet clinopyroxenite” of discussion part (now in Lines 328-344 and 349-352). From discrimination diagrams, the protoliths of these rocks are basalt. But, SiO2 contents of the rocks are between 42.2 to 47.7 wt%. Thus, we inferred that the bulk rock compositions had possibly been modified in the metamorphism or alternatively, the rocks experienced chemical weathering prior to metamorphism.

Comments from Chunjing Wei at the School of Earth and Space Sciences, Peking University, China. cjwei@pku.edu.cn Interactive comment on Solid Earth Discuss., https://doi.org/10.5194/se-2020-95, 2020.

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