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The Long Duration and Slow Exhumation of UHPM Oceanic Rocks in Western Tianshan, China

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The UHP metamorphic rock of oceanic type is extremely rare comparing with the continental type. This may be due to very hard for the exhumation of oceanic rock with heavier density than continental rock. The Chinese western Tianshan UHP metamorphic belt is the largest one of the oceanic type. The metamorphic petrological study shows that both coesite-bearing eclogites and their country rocks have the similar PT path characterized by the heat relaxation which is quite different from the hairpin shape PT path of HP metamorphic rocks for oceanic subduction such as Franciscan metamorphic complex and New Carlidonia metamorphic belt. The PT pseudosection calculation of both eclogites and country schists yield the similar PT conditions of 24-27 kbar and 470-510℃ for peak UHP stage, 20±1.5 Kbar and 500-550℃ for eclogite facies retrograde stage and 10-8 Kbar, 500℃ for blueschist facies stage. The geochronological studies by SIMS U-Pb zircon method, Lu/Hf and Sm/Nd isochron of mineral and whole rocks suggest that the peak metamorphic ages are 308.9±2.0 to 326.8±5.2 Ma and retrograde metamorphic ages are 243.3± 2.9 to 263±10 Ma. Both PT path characterized by heat relaxation and long duration for the return process suggest that the Tianshan UHP metamorphic rocks undergone slow exhumation which is different from the continental type such as Dabie and Sulu UHP belt. This may be due to the more density for the oceanic crust then the continental rocks.

Key words: slow exhumation, UHPM oceanic rocks, Western Tianshan, China

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