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The tectonic evolution of UHP metamorphic belt of SW Tianshan, China

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Recently, a huge, more than 80 km long, UHP metamorphic belt of oceanic type has been recognized in the SW Tianshan, China [1]. It was formed by the northward subduction of the Tianshan Paleo-Asian Ocean. Petrological studies show that the UHP metamorphic rocks of SW Tianshan orogenic belt include three groups: mafic eclogite and blueschist, felsic garnet–phengite schist and serpentinites. Well-preserved coesite inclusions are commonly found in lawsonite-bearing eclogite and garnet–phengite schist. Ti-clinohumite and Ti-chondrodite have been identified in serpentinite [2]. The PT pseudosection calculations show that both eclogites and garnet–phengite schists have similar PT paths characterized by peak PT conditions of 450–500°C and 2.6–2.8 GPa and then heating to the maximum temperature of 550–600°C during decompression, which is quite different from other oceanic subduction zone metamorphism [3]. Based on the zircon U-Pb dating, peak UHP metamorphic ages of 320 ± 3.7 Ma and retrograde eclogite facies ages of 230–240 Ma have been obtained [4]. Syn-subduction arc-like 333–326 Ma granitic rocks and 266–278 Ma S-type granites have been recognized in SW Tianshan orogenic belt [5]. Dehydration of UHP metamorphic rocks from P_{max} to T_{max} results in the formation of coeval arc magmatic rocks and post S-type granites. A petrotectonic evolution of the SW Tianshan orogenic belt based on these studies of UHP rocks and coeval magmatic rocks has been proposed.

References:

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