

***Episodic exhumation of SW-Tianshan
HP/UHP rocks inferred from P-T-time,
deformation and kinematic constraints:
Implications for late Carboniferous cold
deep subduction dynamics***

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We present the first comprehensive P-T-deformation-time and kinematic constraints for the HP/UHP eclogite, blueschist and greenschist (Ec/Bs/Gs) facies metavolcanoclastics cropping out as matrix lithologies across the ~ 30 km wide SW-Tianshan metamorphic wedge (ie, along the NS Akeyazi-Kebuerte valleys). The contrasting lithologies and P-T-time-D histories indicate that what was regarded as a HP/UHP “mélange” should be divided into three main, roughly E-W trending tectonic units. P-T estimates point to 1) LT-UHP conditions around 27-28 kbar at ~ 520 °C for the matrix metavolcano-sedimentary host rocks of the northern HP/UHP complex unit, 2) LT-HP conditions of 16-20 kbar around ~ 500 °C for the central Blueschist horizon and 3) lower-Bs facies conditions of 10-14 kbar at ~ 450 °C for the southern ultramafic-mafic unit. In situ laser ablation Ar/Ar age constraints with textural control cluster within 315 to 325 Ma for recrystallized phengites from the HP/UHP complex. Radiometric ages for phengites from the central Bs horizon are 15-20 Ma older, clustering between 325 and 345 Ma. Step-heating Ar/Ar ages on phengite from regional Gs-facies metavolcanoclastics fall within 280 to 300 Ma. Laser-ICP-MS U-Pb dating on zircon from one metabasite sample in the southern ultramafic-mafic unit yielded ~ 360 Ma. Our new field observations together with P-T-time probing of these regional metavolcanoclastic exposures disclose an episodic exhumation of three main tectonic slices, respectively from ≥ 90 km, ~ 60 km and ~ 35 km depths. Final stacking of these slices, at ~ 20 km depth, took place at around 300 Ma, prior to collision.