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Generation of Permian Ni-Cu Sulfide Deposits in the East Tianshan (NW China) by Syn-collisional Mantle Derived Magmatism

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A series of Ni-Cu sulfide deposits hosted in Early Permian mafic-ultramafic complexes occur along the ~500 km long linear Huangshan-Jingerquan belt in the East Tianshan at the southern margin of the Central Asian Orogenic Belt (Fig. 1) (Zhou et al., 2004; Song and Li, 2009; Song et al., 2011; Qin et al., 2011; Deng et al., 2014). Questions for genetic link between these deposits and the Early Permian Tarim mantle plume are: (1) Early Permian Ni-Cu sulfide mineralized mafic-ultramafic complexes have been also found in locations 1500-2000 km to the east along the southern margin of the Central Asian Orogenic Belt and (2) Similar Silurian and Devonian complexes also occur in adjacent West Tianshan and Beishan Belt.

Absence of Late Carboniferous and Permian strata, along with Early Permian retrogression (269 Ma) of blueschist and eclogite along the Aqikkuduk suture indicate that the continental collision occurred during the Late Carboniferous to Early Permian. This permits us to propose that Ni-Cu sulfide mineralized the mafic-ultramafic complexes were formed in a syn-collisional environment. Collision between the Kanggur-Yamansu arc and the Central Tianshan micro-continent resulted in slab detachment melting of uprising asthenosphere and adjacent metasomatized mantle. This process induced unusual partial melting of the mantle along the Huangshan-Jingerquan Belt in a short time (Song et al., 2013). P-T

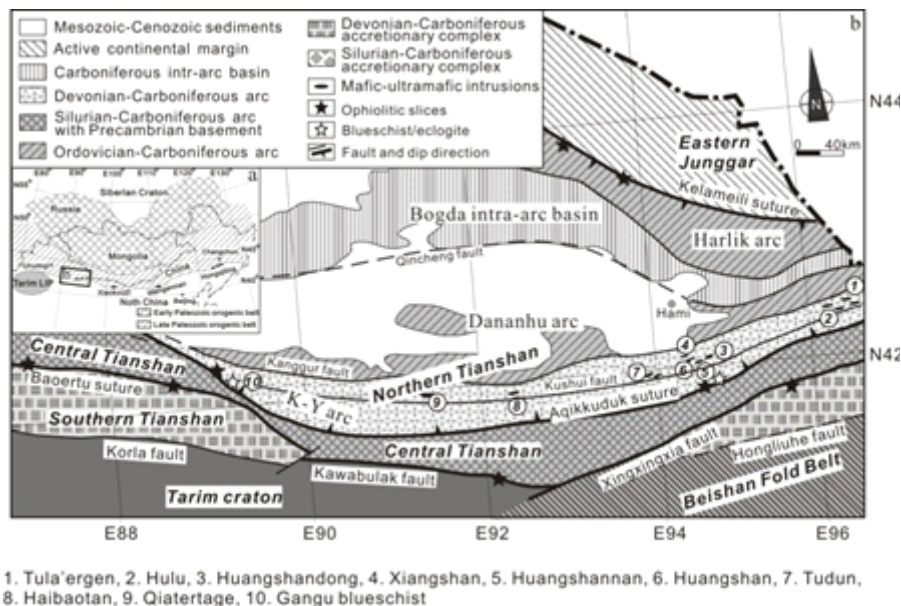


Fig. 1 (a) Distribution of the Permian and Triassic Ni-Cu sulfide mineralized mafic-ultramafic intrusions along the southern margin of the Central Asian Orogenic Belt. (b) Tectonic sketch of East Tianshan, showing distribution of the Early Permian Ni-Cu sulfide deposit hosting intrusions of the Huangshan-Jingerquan Belt, and Permian blueschists and eclogites. K-Y arc means Kanggur-Yamansu arc.

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estimations of the eclogite and blueschist along the Aqikkuduk suture suggest that the subducted oceanic slab reached a depth of ≥ 30 km. We propose that shallow slab detachment induced decompression melting of uprising asthenosphere and generation of the tholeiitic magmas at depths less than 50 km along the Huangshan-Jingerquan Belt. The tholeiitic magmas mixed with melts derived from overlying metasomatized mantle wedge and crustal material that were heated by the upraised hot asthenosphere.

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