A geotraverse across two paleo-subduction zones in Tien Shan

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New zircon ages as well as geochemical and Sr-Nd-Pb-Hf isotope data from magmatic rocks of two Late Paleozoic active margins, preserved in the western Tien Shan orogen in Tajikistan and Uzbekistan, constrain the following magmatic pulses and geodynamic settings in two paleo-subduction zones [1, 2]: (1) The north-dipping subduction under the northern margin of the Turkestan Ocean from the Early Silurian to the earliest Middle Devonian is documented by supra-subduction magmatic rocks in the Chatkal-Kurama terrane with ages in the range 429–397 Ma (10 samples). Thereafter the northern side of the Turkestan Ocean developed passively or was converted into a transform fault until the Early Carboniferous. (2) In the Early Carboniferous, subduction under the northern margin of the Turkestan Ocean resumed and voluminous supra-subduction magmatic series with ages in the range 320–300 Ma (18 samples) formed in the Chatkal-Kurama terrane. (3) At the same time, in the Early Carboniferous, rifting of the southern passive margin of the Turkestan Ocean formed the short-lived Gissar Basin, separated from the Turkestan Ocean by the Gissar micro-continent. North-dipping subduction in the Gissar Basin is documented by the Andean-type Gissar batholith composed of granitoids with ages in the range 321–300 Ma (5 samples). (4) In the latest Carboniferous, the Turkestan Ocean and the Gissar Basin were closed. The Early Permian post-collisional granitoids invaded the crust across terrane boundaries within relatively narrow time span from 300 to 280 Ma (15 samples). The distinct shoshonitic affinities of post-collisional intrusions in the Chatkal-Kurama terrane, emplaced directly after supra-subduction magmatic series, are explained by the interaction of hot asthenospheric material with subduction-enriched wedge of lithospheric mantle due to slab break-off at post-collisional stage. Cessation of post-collisional magmatism was marked by emplacement of alkaline complexes with Middle Permian ages [1, 3].

[1] Konopelko *et al.* (2017) Gondwana Res. doi.org/10.1016/j.gr.2016.09.010. [2] Dolgopolova *et al.* (2017) Gondwana Res. doi.org/10.1016/j.gr.2016.10.022. [3] Konopelko *et al.* (2015) J. Asian Earth Sci. 113, 711–727.