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# Zircon U-Pb dating, geochemical and Sr-Nd-Pb isotopic compositions of shoshonitic intrusions, Western Alborz, NW Iran: petrogenesis and tectonic implications

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The petrological and geochronological study of the Large-scale Cenozoic intrusions in the Tarom area reveals important clues to interpret complex relations between magmatic and tectonic processes in the central part of the Tethyan (Alpine–Himalayan) orogenic belt. New data, including field relations, U-Pb zircon geochronology and whole rock isotopic and geochemical features, come from four intrusions with monzodiorite, monzonite, quartz-monzonite and monzogranite compositions that form the Tarom Olya pluton, which forms part of the Western Alborz magmatic belt. LA-ICP-Ms analysis of zircons gives ages from 35.71 $\pm$0.80 Ma to 37.7 $\pm$0.52 Ma for magma pulses. The $SiO_2$ contents of intrusions range from 57 to 69 wt.%, the K2O + Na2O content is high (5.5–10.3 wt.%) and K2O/Na2O ratio ranges from 0.9 to 2.0. Geochemical investigations show I-type and shoshonitic features as well post-collisional tectonic settings for studied samples. All the investigated rocks are enriched in light rare earth elements (LREEs), large ion lithophile elements (LILEs) and depleted in high field strength elements (HFSEs), and bear a weak Eu anomaly (Eu/Eu* = 0.56 to 0.9) in chondrite-normalized trace element patterns. Moreover, trace elements show some of the typical signatures of arc magmatism such as depletion in Nb, Ta and Ti. The samples display some variety in initial Sr and Nd isotopic compositions, marked with low ISr = 0.704–0.705 and $\varepsilon$Nd (36 Ma) = +0.9 to +2.1 values. The Pb isotopic ratios are (206Pb/204Pb) = 18.7–18.8, (207Pb/204Pb) = 15.58–15.61 and (208Pb/204Pb) = 38.72–38.90 Geochemical and isotopic data suggest that Neotethyan subduction metasomatized the mantle source by fluxing the fluids and melts from the slab zone and then lithosphere extension caused decompression melting and producing K-rich magmatism that formed the Tarom Olya intrusions, as well as other Eocene high potassic magmas of the Alborz magmatic belt.