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Two plutonic complexes of the Sanandaj-Sirjan magmatic-metamorphic belt record Jurassic to Early Cretaceous subduction of an old Neotethys beneath the Iran microplate

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Highlights:

- Mesozoic continental arc in Iran resulted from subduction of the northern Neotethys.
- Subduction of intraplate transform fault generated asthenosphere-filled slab window.
- Long-lived partial melting of juvenile crust led to some batholiths in the SSMB.

Abstract: The Neotethyan tectonics of the Zagros orogenic belt, SW Iran remains still hotly debated in comparing with its western counterparts. One major issue concerns the timing and nature of the Sanandaj-Sirjan magmatic-metamorphic belt (SSMB), which is made predominantly of metamorphic rocks and Jurassic to Early Cretaceous large plutonic complexes. The Alvand and Qory are two largest plutonic complexes locating in north-central and southern segments, respectively, of the SSMB. Careful LA-ICP-MS U/Pb analyses of the magmatic zircons from the Alvand plutonic complex reveal a smooth spectra, along which the concordant age increase gradually from 120 to 190 Ma; while that of Qory is step-like consisting of two stages, a Jurassic and a late Early Cretaceous ones, respectively. New geochemical data, combined with zircon Lu/Hf results suggest that (1) the Alvand granitoids mostly resulted from a long-lived, successive