



## **Subduction processes below Zagros: New constraints from the magmatic evolution of the internal zones**

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The Neotethyan ophiolitic suture of Zagros represents a very sharp boundary separating the northern active margin of Eurasia and the southern passive margin of Arabia. Compared to the wealth of recent studies dealing with the Zagros Fold and Thrust belt, the internal zones of Zagros (the Sanandaj-Sirjan Zone and the Urumieh-Dokhtar Magmatic Arc; SSZ, UDMA), one of the best-preserved within the greater Alpine-Himalayan convergent system, have remained poorly studied.

We herein focus on the key constraints shed on the long-lasting convergent processes (c. 130-150 My) by the subduction-related magmatism of the upper plate, which spectacularly shifted inward from the SSZ to the UDMA (~300 km) at the end of the Mesozoic.

The main results pertaining to the spatial, compositional and geochemical evolution of this active margin, calc-alkaline magmatic activity, are that:

(1) Element and rare-earth element (REE) systematics for Mesozoic (SSZ) and Eocene (UDMA) volcanics and plutonics strongly suggest a similar mantle wedge source for both domains.

(2) Major and trace element data for the Upper Miocene onward magmatic activity, which developed after a period of quiescence, reveal a typical adakitic signature (e.g., Sr/Y v. Y plots). Enlarged REE patterns evidence a marked depletion of heavy REE, which is consistent with the presence of garnet in the source.

The formation of the adakitic magmas likely results from the melting at depths of

mafic material (i.e., the oceanic crust from the slab and/or the obducted ophiolitic material and/or the base of thickened lower crust), either in response to the regional-scale thermal reequilibration accompanying collision or to slab breakoff. The fact that their distribution is spatially restricted to the central parts of the UDMA (i.e. 200-300 km along strike) rather supports the second hypothesis.

These results are finally set back within the geodynamic frame of the subduction to collision evolution of Zagros.