

Late Cretaceous arc magmatism in SE Turkey: Ages, geochemical variations and tectonic implications

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This study reports a detailed analysis of zircon U-Pb and Hf isotopes and whole-rock geochemical and Sr-Nd-Hf isotopic compositions of the Elazığ magmatics from SE Turkey. The data indicate that these rocks occurred within a short time period (83-73 Ma; ~10 my) and are characterized by arc geochemical signatures with significant temporal variations. They vary through time from low-K tholeiitic to calc-alkaline and then shoshonitic composition, associated with progressive enrichment in LREE and LILE, and change in isotopic ratios such as whole-rock $\epsilon_{\text{Hf}}(t)$ values that range from +16 to -2. Such variations are interpreted as changing magma source region by addition of continental crust material back into the mantle wedge during the short-lived arc magmatism, which we attribute to the approaching Arabian continent that led to the HP-LT metamorphism (79-74 Ma) in the Bitlis-Puturğе massif and closure of the southern branch of Neotethys. This short-lived arc magmatism in the late Cretaceous can be best explained by a rapid tectonic switching from intra-oceanic subduction to continental collision, which we argue to have been analogous to the present SE Asia where similar rock associations are identified from Timor to the Banda Sea in an arc-trench rollback system related to the continental collision of Australia.