Petrogenesis of late Cretaceous Elazig magmatic rocks from SE Turkey: New age and geochemical and Sr-Nd-Hf isotopic constraints

YU-CHIN LIN[1], SUN-LIN CHUNG[12], A. FEYZI BINGOL[3], MELAHAT BEYARSLAN[3], HAO-YANG LEE[1] AND JIN-HUI YANG[4]

[1]Department of Geosciences, National Taiwan University, Taipei, Taiwan (d02224003@ntu.edu.tw)
[2]Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan
[3]Department of Geological Engineering, Fırat University, Elazığ, Turkey
[4]Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China

This study reports new zircon U-Pb ages and Hf isotopes, together with whole-rock geochemical and Sr-Nd isotope data, of the Elazig magmatic rocks that postdate the Neotethyan ophiolites in SE Turkey. These new data allow us to divide the Elazig magmatics into three groups: (1) 84-81 Ma: tholeiitic suite that consists of extrusive (basalt and andesite) and intrusive (gabbro and diorite) rocks, showing flat REE or slightly LREE-enriched patterns [$(La/Yb)_N$= 0.5-6], coupled with positive zircon εHf(t) [+17 to 0] and wr εNd(t) [+4.7 to +5.3] values; (2) 80-79 Ma: calc-alkaline suite of monzonite, granodiorite and granite that shows LREE-enriched patterns [$(La/Yb)_N$= 7-18] and intermediate εHf(t) [+10 to -8] and εNd(t) [-3 to -5] values; (3) 74-72 Ma: calc-alkaline suite of intrusions (gabbro, monzodiorite and monzonite) in the Puturge massif, showing highly LREE-enriched patterns [$(La/Yb)_N$= 12-24] and negative εHf(t) [0 to -12] and εNd(t) [-5 to -6] values. Such a secular variation suggests that there were at least two components involved in the magma genesis, one is a depleted mantle source that prevails in the Neotethyan ophiolites and the other is an upper continental crust similar to gneissic rocks from the Puturge massif. Therefore, the variation is indicative of changing in the source components in the Elazig magmatism that we attribute to tectonic switching from an intra-oceanic subduction setting to a collision with the Arabian continent in the region.