

NEW FINDINGS ON THE MAGMATIC AND GEODYNAMIC EVOLUTION OF THE EASTERN ANATOLIA HIGH PLATEAU, TURKEY

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The Eastern Anatolia High Plateau is one of the best places in the world to study an actively-deforming continental collision zone with a long-lasting active volcanism from the end of Middle Miocene to almost recent times. Among the hypotheses proposed for magma genesis and geodynamics of the Eastern Anatolian Collision Zone, the “slab-steepening & breakoff model” (Keskin, 2003, 2007; Şengör et al., 2003, 2008) has been regarded as the most viable one.

On the basis of available geochronological data compiled from the literature before 2003, Keskin (2003) argued that the volcanism had tended to initiate earlier in the north and then migrated to the south, while lavas in the north contained a distinct subduction signature which decreased to the south turning into within-plate signature. This was linked to the gradual steepening of a north-dipping slab beneath a large accretionary complex after a major continental collision. This event resulted in the opening out an asthenospheric mantle wedge gradually widening to the south in time followed by a major slab breakoff event that created a “slab window” through which the hotter asthenosphere once located beneath the slab (i.e. Arabia) flowed to the north and mixed with the wedge asthenosphere containing a subduction component.

We have been conducting a series of projects in the whole region since 2007, carefully constructing the volcano-stratigraphy and conducting many radiometric datings and geochemical analyses because the southern part of the volcanic province has not been studied in detail. Our new findings revealed that the volcanism initiated in the south of E Anatolian collision zone around the N of Lake Van at around 15 Ma (Lebedev et al., 2010) with the eruption of calc-alkaline lavas with a distinct subduction signature along a volcanic belt which is sub parallel to the collision zone. The geochemical character of the volcanism changed from calc-alkaline to alkaline both in time and space (from N to S). Our new findings do not contradict with the slab-steepening & breakout model but imply that steepening of the slab was a much faster event than we previously anticipated.

Key Words: Eastern Anatolia, collision volcanism, slab steepening and breakoff.

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