



Timing of Cappadocian volcanic events and its significance on the development of Central Anatolian Orogenic Plateau

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The Central Anatolian Plateau (CAP) displays a wealth of volcanoes of Miocene to Recent age with different geochemical characteristics and is, therefore, a unique opportunity to derive information on the physical state of the Anatolian lithosphere during CAP development. Cappadocia is a part of the Anatolian block which is moving westward by lateral extrusion as a consequence of north-south convergence between Africa–Arabia and Eurasia (Sengör et al., 1985) and has developed extensive volcanism during the past 13My. Cappadocia hosts several stratovolcanoes such as Mt Erciyes and Mt. Hasan as well as numerous monogenetic vents and some andesitic dacitic relicts of lava fields intercalated within the ignimbritic sequence. The stratovolcanoes are strongly calcalkaline, although some young adventive basalts reflect a transitional character with their mildly alkaline nature. Petrology of those calcalkaline volcanics shows a decrease of subduction-related component and an increase of the intraplume signature through time (Deniel et al., 1998). We roughly distinguish two sequences of volcanism over the plateau as lavas sequence and ignimbrite sequence.

Lavas Sequence:

The volcanism of CAVP is started around 12-13 My with isolated Kecikalesi volcano which has typical characteristics of IAT (Island Arc Tholeiite). Similar volcanism is also represented by Erdas Dag Andesitic massive that initiated to erupt 11 My ago and continue till to 8 My. Early Erdas Dag lavas exhibit typical subduction related features with their adakitic nature (high Sr/Y and La/Yb ratios). Those ratios decrease with time. The lava sequence of CAVP continue with Damsa and Topuz Dag lavas that emplaced at around 10 and 8 My, respectively. Then lava sequence of Hodul Dag volcanism (5-6 My) is characterised by andesitic lavas domes and flows. At similar time span Keslik andesitic system also emplaced. Those lavas have relatively high (mildly high) Sr/Y ratios with their adakite-like nature. Following this episodes, scarce adakites emplaced over the plateau between 4-5 My. There is no adakite or adakite-like volcanism younger than 4 My. Around 3-4 My, some ordinary andesites extruded. Around 2 My, interestingly starts contemporaneous Tholeiite-(mildly)Alkaline suite association. The CAVP witnesses Rhyolite-Basalt Bimodal volcanism since the last 1,5 My.

Ignimbritic Sequence:

The famous Cappadocian Ignimbrites are interstratified with either lavas or fluvio-lacustrine deposits. There is at least 9 different ignimbrite namely: Kavak, Zelve, Sarımaden, Sofular, Cemilkoy, Tahar, Gordeles, Kızılıkaya, Valibabatepe ignimbrites (Le Pennec et al., 1994). All ignimbrites were individually produced over the plateau between 9-5 My, except Valibabatepe (2,5 My) which is related to Mt.Erciyes.

There is no major incision/denudation process till to 5 My, than incision rate increased and was calculated around 450-500 meters as post-5 My, and 100-120 meters as post-2,5 My.

We also tried to apply Sahagian&Maus,(1994) method to estimate the paleoaltimeter. 7 different lavas were sampled for this purpose but only two lavas gave some reliable result (lavas of 8,2 My and of 0,094 My). According to those rough estimations, the older lava that is actually located at 1430 meters was emplaced at around 410 meters from sea level and the younger one was solidified at 906 meters (actually 903 meters). It is important to quote that this method has \pm 400 meters of uncertainty.

Finally, a model of sub-crustal detachment-delamination of lower crust occurred around 5 My is proposed as a responsible of CAP formation which is under the influence of extensional tectonic regime.