



Timing and physical features of caldera formation in the Uşak-Güre Basin, western Türkiye

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The Uşak-Güre Basin is an 65 km by 55 km east–west trending ($38^{\circ} 55'$ – $38^{\circ} 16'$ lat., $29^{\circ} 47'$ – $28^{\circ} 49'$ long.) extensional basin located on the eastern margin of the NE-trending basins, in western Türkiye. Three caldera structures have been mapped and studied in Uşak-Güre basin. Age determinations were carried out on a total of 9 samples from the the volcanic centers of the basin that were analysed by the $40\text{Ar}/39\text{Ar}$ incremental heating method in the Nevada Isotope Geochronology Laboratory at the University of Nevada. The age spectrums define from 12.66 ± 0.06 Ma (plateau age) to 17.76 ± 0.08 Ma (total gas age). Three NE trending caldera structures are defined within Uşak-Güre basin. They are Beydağı, İtecek and Elmadağ Calderas from southwest to northeast respectively. Intermediate volcanic products dominate at each of the calderas. Beydağı Caldera produced high voluminous debris flows with block and ash flows. This is a very special place in terms of gold mining in recent years. İtecek caldera is exposed to violent tectonism up to the present so metamorphic rocks are surfaced in the middle of the caldera. Nevertheless we just focus on Elmadağ caldera because of more clearly interrelations. The volcanologic evolution of Elmadağ volcano has been distinguished as three evolutionary stages. First phase is mostly dominated by the rhyodasic explosive activities. The activity commences with pyroclastic flow deposits onto Early Miocene Hacibekir group (alluvial fan and fluvio-lacustrine deposits) with angular unconformity. This phase is also characterised by thick and wide spread extrusive and small voluminous effusif activities. Upward in the succession of the first phase, pumice-rich the pyroclastic flows are covered by the block and ash flows (pumice-rich tuff level locally) and after that andesitic blocks are dominant through middle level. This phase is terminated by tuff level, sporadically consisting andesitic blocks. Block and ash flows are sighted by debris flow deposits at south-southeast of the volcano. The second phase is consists of andesitic lavas reaching up to 650 m in thickness constitutes main cone of the volcano. These second phase lavas are observed dominantly at eastern rim of the caldera wall. Finally, the last phase is identified by rhyodasic-rhyolitic domes, accompanied with small voluminous pyroclastic fall deposits. The volcanic activity is terminated by these pyroclastic fall deposits which are interfingerring with Middle Miocene lacustrine sediments (Inay group). On the basis of field survey, it is observed that exclusively eastern half of the caldera structure has been preserved. In addition, the regional tectonics is one of the most important elements in order to eroded caldera structure within basin since Middle Miocene.