

Magma û Wet Sediment Interaction in a Crater Lake of a Tuff Ring, Developed in a Pyroclastic Mound Dammed Valley: Kissomlyo Volcano (Western Hungary)

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Kissomlyo volcano a Pliocene erosion remnant of an alkaline basaltic tuff ring is part of the Little Hungarian Plain Volcanic Field (LHPVF), Western Hungary. Sub-horizontally bedded lapilli tuff and tuff beds are underlain by Late Miocene shallow subaqueous, fluvio-lacustrine sandstone and mudstone units with an erosional contact inferred from drill core data. The pyroclastic units build up a ~20 m thick sequence, forming a semicircular mound structure with gentle (<15 degrees) inward dipping beds. Sedimentary features and field relationships indicate that the pyroclastic units were formed in a well-localized shallow lake that occupied a valley. The pyroclastic mound is overlain by cross and parallel laminated siltstones and mudstones that were deposited in a lake, which developed within the initial tuff ring. The textural and structural differences between the underlying and overlying lacustrine units allow an interpretation that both units have been deposited in different lacustrine sedimentary environments. It is inferred that a lake developed shortly after building up the tuff ring, which dammed a valley, and caused a gradual overfilling of the valley floor with water. The preserved thickness of the post-tuff ring lacustrine units are 5 m. It is therefore inferred that the water depth of this subsequent lake that occupied the tuff ring ranges in metres-scale. The post-tuff ring lacustrine sequence was subsequently invaded by basaltic lava, filling the centre of the crater lake. The lava has peperitic margins forming globular peperite, partially destroying the original texture of the lacustrine beds due to fluidization and heat effect. The time gap between the tuff ring formation and the emplacement of the lava flow in the crater lake is estimated to be as long as 100 ka calculated from the thickness of the laminae of the varvic crater lake lacustrine sediments. Other lava sources for the peperite forming lava can be ruled out because there are no other eruptive centres in the vicinity of Kissomlyo (10 km scale).. Kissomlyo volcano is therefore an intriguing example of rejuvenation of basaltic volcanism from the same vent in a short (thousands years-scale) period of time, and highlights the complexity of monogenetic volcanism interplayed with temporary flooding, lake development in valleys dammed by pyroclastic mounds.