



Evolution and structure of Vulsini calderas (Italy)

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The Vulsini Volcanic District is located in the northernmost part of the Quaternary Potassic Roman Comagmatic Region, central Italy. Vulsini mainly consists of two large, partly overlapping calderas, Bolsena and Latera, developed between 0,6-0,1 Ma. Their activity was dominated by Plinian and pyroclastic flow-forming explosive eruptions and subordinate lava flows. At Bolsena, the “basal ignimbrites” (0.6-0.5 Ma, Paleovulsini activity) are related to an early caldera collapse; this formed a box-shaped depression (controlled by regional structures) in the Bolsena Lake. The erupted magma (DRE) and the collapse are both consistent with a volume of 25-30 km³. The later activity of Bolsena (0.5-0.2 Ma), responsible for the emplacement of several pyroclastic and lava flows, formed an arcuate ring structure to the NE of the lake; conversely, the remaining part bordering the lake consists of a down-sag like structure. The explosive eruptive activity of the Latera Volcano was accompanied by the formation of a nested caldera system. The main steps of the Latera Caldera evolution can be linked to discrete magma withdrawal events, the Sovana, Onano and Pitigliano eruptions, between 0.19-0.16 Ma. However, the size of the present topographic caldera (9x7x0.2 km) is broadly consistent with the magma volume erupted (DRE) during the whole explosive activity of the Latera Volcano, thus suggesting incremental caldera formation. Comparison and consistency with analogue models of

caldera collapse suggest that both the Latera and Bolsena calderas are the result of incremental collapses developing nested depressions (2 in Bolsena and 2 in Latera) undergoing trapdoor subsidence. This increases, in both calderas, to the NE, forming an outer ring fault, whereas, to the SW, it forms a down-sag.