

The Nature and Reactivation Time of the Magma Storage beneath the long-dormant Late Pleistocene Ciomadul volcano (Eastern-Central Europe)

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The Late Pleistocene dacitic Ciomadul Volcanic Complex is an apparently inactive volcano in eastern-central Europe. It erupted last time at 30 ka, however, the long repose time between active phases in the past and the persistent magma storage, as geophysical studies revealed, suggest still a potential for rejuvenation. Thus, understanding the nature and reactivation processes of the long-lived felsic crystal mush body is crucial.

The erupted products contain a wide range of mineral phases with dominant phenocryst phases of plagioclase, amphibole and biotite which often form also felsic crystal clots. High-Mg olivines and clinopyroxenes occur occasionally and indicate the role of basaltic magma in the petrogenesis. Amphiboles and plagioclases show complex zoning patterns consistent with intermittent replenishment events in a transcrustal magma storage. Felsic crystal mush resided in the upper crust at 7-12 km depth and at 700-750 °C temperature. Reactivation of this locked magma storage could have occurred due to emplacement of a basaltic magma causing strong reheating by >200 °C. Texture and compositional variation in plagioclases clearly reflect this recharge process. In many cases, an abrupt strong increase of Fe and Sr is found at the outermost 10-20 micron wide crystal rim suggesting a mafic magma influence and fast - 10-100 days - reactivation timescale. Thus, even several 10's kyr dormancy and quietness of volcanoes cannot necessarily indicate inactivity. Presence of long-lived melt-bearing subvolcanic magma storage and the potential of fast reactivation has to be considered in hazard assessments.