MAGMATIC FEEDING SYSTEM AND CRUSTAL MAGMA ACCUMULATION BENEATH THE ISLAND OF VULCANO (AEOLIAN ISLANDS, ITALY) AS EVIDENCED BY FLUID INCLUSIONS

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Pure CO2 fluid inclusions were studied in quartz-rich xenoliths from four distinct localities in the Island of Vulcano (Gelso, Saraceno, Lentia, and Vulcanello), corresponding to distinct evolution stages of the volcanic complex. Xenoliths, which consist only of quartz are present in lavas of contrasting composition from dacitic to rhyolitic. They display complex textures, often bearing rounded quartz crystals surrounded by glass films, and are supposed to represent partially melted metamorphic rocks.Most commonly, CO2 inclusions in xenoliths from different localities, show one or two homogenisation temperature maxima corresponding to two distinct density intervals: a) between X and X g/cm3; and b) between X and X g/cm3. Texturally early non-decrepitated fluid inclusions give pressures corresponding to mid- to lower-crustal depths at about 580 - 300 MPa. The deepest levels are recorded in some xenoliths from Vulcanello which contain fluid inclusions indicating pressure of 580 MPa, i.e. close to the Moho. Texturally-late CO2 fluid inclusions show pressures corresponding to a shallower magmatic system, at about 100 - 30 MPa. The combined data indicate intermittent ponding of magmas at lower crustal depths, and additionally at higher levels, strongly suggestive for two main accumulation levels beneath Vulcano island, during the overall evolution of this volcanic complex. Only slightly different pressure intervals are, in fact, recorded the in the different localities; they probably indicate only minor variations within the magma plumbing system that remained constant through the different evolution stages.We emphasise that repeated magma accumulation in the lower crust along with assimilation of crustal material were important mechanisms for the modification of magma composition. Since high-density CO2 fluid inclusions show no evidence for re-equilibration in all studied xenoliths, we suggest that magma ponding and crystallisation at shallow crustal levels occurred shortly before eruption, (in the order of a few days).