



Magma ascent, storage and recharge at Avachinsky volcano (Kamchatka, Russia): the 1991 effusive eruption

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Whole rock geochemical data together with textural and compositional features of selected plagioclase phenocrysts from the 1991 effusive eruption of Avachinsky volcano (Kamchatka) were used to decipher magmatic processes occurring in the feeding system. Major and trace element variation for the sampled lavas provide preliminary information on the evolutionary processes, highlighting changes in melt composition due to crystal fractionation plus recharge by geochemically distinct magmas. Textural and compositional zoning patterns of plagioclase were investigated by high-resolution BSE images and core-rim profiles for An and FeO obtained by SEM-EDS analyses. Several texture types were found including: 1) two oscillatory zoning patterns (small- and large-scale oscillations); 2) disequilibrium textures at the crystal core: coarse sieve textures, patchy zoning and dissolved cores; 3) disequilibrium textures at the crystal rim such as strongly sieve textures. Furthermore, a growth texture, consisting of thin stripes of melt inclusions, was also recognized around the core or at the crystal rim. On the whole, compositional and textural features of the observed plagioclase phenocrysts allow us to infer various aspects of the magma system dynamics at the Avachinsky volcano such as: 1) magma ascent styles from depth and its rates; 2) crystal growth conditions in the magma chamber; 3) open-system processes as magma recharge with consequent mixing.