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How to reconstruct the geometry of a Middle Triassic feeding system: clues from clinopyroxene textures in lava flows from Cima Pape (Southern Alps, Italy)

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Ancient volcano-plutonic complexes can record the evolution of single- or multi-pulse plumbing systems and thus can be used as proxy to investigate the magma dynamics beneath active volcanoes. The exceptional state of conservation of the Middle Triassic Cima Pape complex (Dolomitic Area, Southern Alps) makes it an ideal snapshot of a ~238 Ma old feeding system of a dominantly effusive volcano. It is composed of a 50 to 300 metres thick gabbroic to monzodioritic sill intruded in the sedimentary cover and overlaid by its volcanic counterpart, made up of basaltic to trachyandesitic lavas and pillow breccias. A detailed investigation of the textural and compositional features of clinopyroxene phenocrysts in the volcanites revealed that complex dynamic processes took place in the feeding system beneath the Cima Pape “volcano”. Although some crystals have normal homogeneous or simple-zoned texture, with Mg# [MgO/(MgO+FeO_{tot}) mol%] ranging between 71 and 77 (type 1 clinopyroxene), the great majority of them is typified by a peculiar texture, characterized by the occurrence of intermediate high-Mg# (80-84, up to 90), high-Cr_2O_3 (up to 1.0 wt%) and low-TiO_2 (down to 0.1 wt%) bands (type 2 clinopyroxene). These overgrowths, crystallized between low-Mg# cores and rims, likely indicate that the feeding system was affected by frequent mixing between mafic inputs and differentiated batches. An overview of the main textural/geochemical features of clinopyroxene in effusive and intrusive products was put forward in the present study to reconstruct the main chemico-physical parameters and evolution of the feeding systems beneath the Middle Triassic volcanoes of the Dolomitic Area. Afterwards, these results will be used to advance some speculations about the processes recorded by clinopyroxene crystals in lava flows from active volcanoes, such as Stromboli and/or Mt. Etna.