

Compositional evolution of basaltic magmas in crustal magma chambers

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The efficiency of the boundary layer fractionation in a basaltic magma chamber is suggested to be governed by the content of dissolved water. The boundary layer fractionation occurs effectively in hydrous magmas, which significantly promotes compositional evolution of the main magma. In anhydrous magmas, on the other hand, the boundary layer fractionation is not effective and the main magma tends to become porphyritic in the early stage of the evolution. Because of the small density contrast between crystals and melt, compositional evolution is less likely to occur than the hydrous magmas.