# Fractal geometry of enclaves as a new concept to determine the viscosity of magmas on the conditions of magma mixing: A case study from the Dehe Bala complex, Central Iran

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The Dehe Bala complex, centeral Iran, is a granodiorite suite in which a lot of mafic microgranular enclaves with ellipsoidal and rounded shapes are observed. Enclaves are diorite and quartz monzodiorite in composition and commonly have a sharp contact with the host granodiorites. Detailed description of the variable degree of hybridization in plutonic environment has been provided by geochemical data and fractal method. Fractal study is a valuable tool to make a melt viscosity modeling between coeval felsic and mafic magmas during magma mixing [1]. The results show that the fractal dimension of enclaves differ from 1.14 to 1.29 with the highest frequency at 1.29. It is shown that the logarithm of the viscosity ratio between the granodiorite magmas and the enclaves varies between of 0.56 to 0.96. The viscosity calculations suggest that at different liquids temperatures log $\eta$ granodiorites > log $\eta$ enclaves. This suggests that the proportion of mafic magma may have been large enough to heat the felsic magma to lower degrees of mixing between the granodiorite magma and the enclave magma.

Key words: Dehe Bala complex, Mafic microgranular enclaves, Fractal dimension of enclaves, viscosity modelling, Magma mixing

[1] Perugini (2000) Earth Planet. Sci. Lett. 175, 93-103.