The above liquidus inhomogeneity and cluster differentiation of fluid magmatic melts

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According to the current ideas, at temperatures above liquidus, melts exhibit the heterogeneous structure. Depending on temperature in the melt there arise molecular microgroups different structure, clusters. The fluidless silicate melts are 3D reticular polymers which are not capable of layering. Dissolution of fluid, salt components and, specifically, hydrogen-containing gases can lead to such a level of depolymerization of magmatic melts, when the posibility appears for gravitational migration of clusters, viz. liquid differentiation.

Numerous experimental data have been obtained in gas-media pressure vessels under controlling H–O–C–S system fluid species fugacities, to show that the interaction of H_2-bearing fluids with silicate melts develops cryptic layering, i.e. a gradual alteration of the liquid composition along the sample height; and then with a further increase of the experimental time the cryptic layering transform to a structure with the formation of layers of different composition separated by a meniscus. In the general case water–hydrogen fluid pressure leads to fractionation with more basic liquid being concentrated in the lower crucible part. At the interaction of complex hydrogen-containing fluids more basic and even ore fluid melts can accumulate by the mechanism of the cluster differentiation at the sample top. Such correlation are often observed in the nature. This occurs due to enrichment of ore clusters in light volatile components owing to their high chemical affinity to heavy elements.

The numerous specific features of evolution of differentiation magmatic complexes can be easily explained under the assumption that layering in magmas is due to the proper magmatic differentiation whereas the crystal accumulation manifests itself at the final stages of the massif evolution and conceals the effects of liquid differentiation.