

Layered Intrusions Formation: It's Not Directional Crystallization

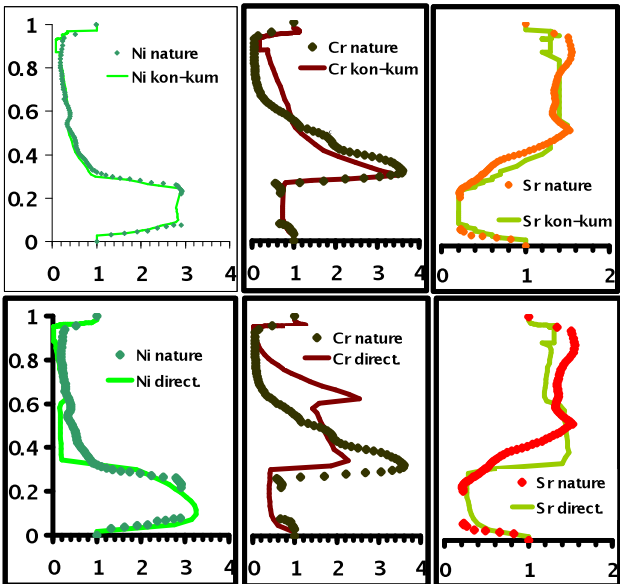
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Directional crystallization is recognized by many researchers as leading mechanism of the formation of mafic-ultramafic intrusive complexes. An alternative point of view – settling of crystals through convecting magma (convective-cumulative process).

Simulation of Kivakka layered intrusion [1] formation carried out in two variants using the program COMAGMAT [2]. The figure shows the natural and model distributions of compatible trace elements in Kivakka intrusion vertical section. Upper row – convective-cumulative model, lower row – directional crystallization. The horizontal axis – concentration in units normalized to the weighted average concentration, the vertical axis – the relative heights (normalized to the thickness of the intrusion).



Comparison of model distributions with natural distributions of trace elements show a high degree of realism convective-cumulative model of solidification dynamics of layered intrusions.

[1] Koptev-Dvornikov *et al* (2001), *Petrology* **9**, № 1, 3–27

[2] Ariskin A., Barmina G. (2004), *Geochemistry International* **42**, № 1, 1–157