

## Parental magma composition of the 1.64 Ga Ahvenisto massif-type anorthosite, Finland

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The origin and parental magma composition of Proterozoic massif-type anorthosites has been debated for decades without reaching a widely accepted consensus. In recent years the 1.64 Ga Ahvenisto complex in southern Finland has become the primary Fennoscandian locus of studies on massif-type anorthosite petrology.

Different monzodiorite types, olivine monzodiorite (Mg# 42–52), ferrodiorite (Mg# 32–42), and quartz monzodiorite (Mg# 27–28), observed in the complex represent discrete stages in the evolution of residual magmas after fractionation of anorthositic cumulates [1]. We interpret that the monzodiorites represent melt compositions, and thus the most primitive (Ol-monzodiorites, Mg# >42) samples can potentially be used for evaluating the compositions of anorthosite parental magmas. Using whole-rock and mineral chemical analysis applied to geothermobarometric methods, also the crystallization conditions of the Ahvenisto anorthosites can be evaluated.

The data will serve as background material for thermodynamic modeling studies that utilize state-of-the-art modeling tools, the rhyolite-MELTS and the Magma Chamber Simulator, to produce a comprehensive melt evolution model for mafic magmas in the Ahvenisto complex and potentially massif-type anorthosites in general.

[1] Fred, R., Heinonen, A., & Heikkilä, P., (2019), Bulletin of the Geological Society of Finland (*in press*)