Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.29074

Metamorphic evolution of felsic granulites from the Lapland Granulite Belt and Kaamanen Complex, arctic Finland

KAROLIINA M HILTUNEN[1], JON M POWNALL[1] AND KATHRYN A CUTTS[2]

[1]University of Helsinki
[2]Geological Survey of Finland (GTK)

The Lapland Granulite Belt (LGB) is a Paleoproterozoic complex comprising granulite facies metapelites and enderbite–norite series mafic sills. The LGB is bordered to its northeast by the Kaamanen Complex of the Neoarchean Inari Terrain and to the southwest by gneisses and greenstones of the Karelia province [1]. Pressure–temperature (P–T) paths for the LGB's metamorphic history have been constructed previously by Tuisku et al. (2006) [2], peaking at ~850°C and 8 kbar for the highest-grade components, but sample-specific P–T pseudosections have not yet been used to infer P–T histories for different components of the Belt. The nature of the Kaamanen Complex is not so well understood – some studies have considered it a marginal zone to the LGB, while others have mapped this as part of the Archean Inari Terrane to the NE. This study concentrates on a roadcut transecting the LGB–Kaamanen Complex boundary zone between the towns of Ivalo and Nellim. Four thin sections were mapped for major element chemistry by electron probe micro-analyzer at HelLabs, University of Helsinki. The maps were quantified with XMapTools [3] to calculate the bulk compositions and almandine and pyrope contents of garnets. Local bulk compositions of the thin sections were modelled in MAGEMin [4] to produce P–T pseudosections. Modelled almandine and pyrope contents of garnets and P–T pseudosections indicate peak metamorphic conditions of 800–870°C at 6–8 kbar for the LGB and 720–800°C at 4–6 kbar for the Kaamanen complex. The Kaamanen complex is colder than the LGB, and the P–T estimates agree with the previous work of Tuisku et al. (2006) [2].

[1] Meriläinen K. (1976), *Bull. Geol. Surv. Finland* 281.

[2] Tuisku P., Mikkola P. & Huhma H. (2006), *Bull. Geol. Soc. Finland* 78, 71-105.

[3] Lanari P., Vidal O., De Andrade V., Dubacq B., Lewin E., Grosch E.G. & Schwartz S. (2014), *Computers & Geosciences* 62, 227-240.

[4] Riel N., Kaus B.J.P., Green E.C.R. & Berlie N. (2022), *Geochemistry, Geophysics, Geosystems* 23.