



## **Timing of orogenic gold ore formation in the central Lapland Greenstone belt, northern Finland, based on LA-ICPMS U-Pb dating of hydrothermal phosphates**

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Orogenic gold occurrences within the Central Lapland greenstone belt (CLGB), are located in shear zones within Paleoproterozoic mafic-ultramafic metavolcanic rocks and metasedimentary successions. In the mineralized zones, monazite and xenotime of hydrothermal origin are typical accessories in alteration zones and ore veins, and thus allow direct dating of the mineralization.

We present U-Pb data from three different gold deposits within the CLGB: Iso-Kuotko, Levijärvi, and Saattopora. All three record several stages of hydrothermal activities along faults which were re-activated several times during the 1.92-1.8 Ga Svecofennian orogeny. The oldest, 1.91-1.90 Ga monazite occur at Levijärvi and all locations have grouping of ages at 1.87-1.85 Ga. At Saattopora, there is also a prominent monazite population with a 1.82 Ga age. However, both xenotime and monazite from the main gold ore stage are characterized by crystallization ages of 1.78-1.77 Ga. Thus the timing of gold mineralization in these deposits is connected to the late to post-orogenic stages of the Svecofennian tectonic evolution.

Electron microprobe analyses of the phosphates reveal that especially monazite and to a lesser extent also xenotime have compositional variations according to age. This suggests that the hydrothermal fluid sources varied over the ~140 Ma time span of repeated hydrothermal activities, in accordance with the metamorphic-tectonic evolution of the region.