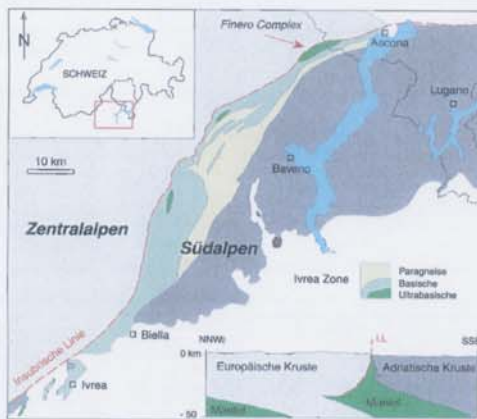




# Exotic zirconiferous nepheline pegmatites from the eastern part of the finero ultrabasic complex, Ivrea zone, Southern Alps, CH

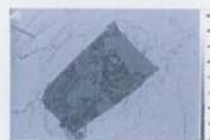
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Geographical and geological setting of the Finero Complex containing the described alkaline pegmatites. Map designed by M. Antognini.



Striped nepheline in boudin-type syenite pegmatite. 3 cm-sized red-brown zircon crystal is visible below left. Locality #2, eastern Finero complex (CH). Foto: Stefan Ansermet.



BSE image of an inclusion in zircon.  
light grey = zircon  
grey = nepheline  
dark grey = hitherto unidentified Hf-rich phase. Analyst: K.T.Fehr

Nepheline-rich syenopegmatises are not uncommon in Scandinavia, on the Kola peninsula or in the Ural mountains of Russia. Here we present the first results on the discovery and exploration of a mayor alkaline pegmatite in central Europe within the metabasic Ivrea-Verbano zone of the Southern Alps.

This pegmatite is the biggest and most "exotic" of a recently discovered field of syenopegmatises especially enriched in albite and zircon; these silica-poor pegmatites were emplaced ~210 mio. years ago near the tectonized base contact of the Finero phlogopite peridotite to laminated gabbros of the Ivrea zone.

The lens-shaped pegmatite - with a volume of at least 25 m<sup>3</sup> - mainly consists of coarse albite-rich feldspar, massive white to smoky laminated nepheline and brown-black "biotite" (intermediate phlogopite-annite) with significant amounts of pale pinkish brown to rose-red zircon and greenish hydroxylapatite. Minor amounts of magnetite, grey-blue sodalite, cancrinite and pink paragonite were detected. The generally well developed zircons are rich in crystallographic forms and reach at average 1-3 cm, dimensions which were previously unknown in central Europe.

Generally the internal structure of the pegmatite is characterized by a distinct "boudin" to "flaser" structure, including oval-shaped lenses of nepheline (up to more than 10 kg) and albite megacrysts (up to 30x20 cm) surrounded and interlaminated by dark "biotite". The albite portions frequently contain "schlieren" of grey-green apatite (up to 5 cm).

The internal boudin-type structure of the pegmatite might be due to tectonic movements and deformation during emplacement and consolidation.

Apparent crystallization sequence:

Reddish oligoclase to white albite megacrysts + phlogopite/annite +/- magnetite + zircon -> albite + massive apatite(I)+/- grey sodalite(II) -> white nepheline +/- bluish sodalite(II) +/- apatite(II)-prisms +/- paragonite -> cancrinite

EMS analysis of zircon showed a very pure zirconium silicate with very low Hf contents. As inclusions were found albite, nepheline and two different hitherto unidentified Hf-rich phases.

Upper right: Large zircon crystal (4.8 cm) in naturally weathered syenite pegmatite. Locality #2, eastern Finero complex. (CH). Foto: Stefan Weis@CLAPIS magazine

Middle right: Distorted platy zircon crystal (2 cm) in nepheline-rich syenite pegmatite. Locality #2, eastern Finero complex. (CH). Foto: Uli Zeisberg@CLAPIS magazine.

Lower right: Blocky nepheline with small zircon crystal (red-brown) in "biotite"-rich syenite pegmatite. Sample size 12 cm, locality #2 in eastern Finero complex. Foto: Uli Zeisberg@CLAPIS magazine.



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