



## Tertiary LCT and NYF pegmatites of the central Alps

Alessandro Guastoni (1) and Giorgio Pennacchioni (2)

(1) Museum of Mineralogy, University of Padova, Via Matteotti 30, I-35100, Padova, Italy (alessandro.guastoni@unipd.it), (2) Dipartimento di Geoscienze, University of Padova, Padova, Italy (giorgio.pennacchioni@unipd.it)

A large field (about 100 km in E-W length and 15 km in N-S thickness) of Oligocene pegmatites extends in the central Alps from the Bergell pluton (to the east) to the Ossola Valley (to the west) within the Alpine nappes north of the Periadriatic Lineament. The pegmatite field geographically overlaps (i) the highest temperature domain of the Lepontine Barrovian metamorphic dome, and (ii) the zone of Alpine migmatization. Most pegmatites have a simple mineralogy consisting of K-feldspar, quartz and muscovite, but a minor amount (< 5%) includes Sn-Nb-Ta-Y-REE-U oxides, Y-REE phosphates, Mn-Fe-phosphates, Ti-Zr-silicates, Be-Y-REE-silicates, garnet (almandine-spessartine), and schorl-dravite-fluorelbaite tourmaline.

Major and trace elements geochemistry of pegmatite bulk rock, rock-forming and accessory minerals allows the distinction of different pegmatite populations ranging from NYF (niobium, yttrium, fluorine) to LCT (lithium, cesium, tantalum) pegmatites, or mixed LCT-NYF ones. Actually, LCT pegmatites of the Central Alps did not reach a high degree of geochemical evolution. In the Codera Valley (on the western side of the Bergell pluton) LCT and NYF pegmatites are respectively hosted in tonalites and granodiorites; these pegmatites include the most evolved types which contain Mn-fluorelbaite, Mn-phosphates, pink-beryl and Cs-Rb-rich feldspar.

From the structural point of view 2 main types of pegmatites can be distinguished: (i) pegmatites that were involved in ductile deformation, and (ii) pegmatite crosscutting the ductile structures of the SSB. Many pegmatites from Codera Valley belong to the first structural type: they were at emplaced at relatively high ambient temperatures (> 450 °C) and locally show pervasive recrystallization of quartz. More to the east (Mesolcina and Bodengo Valleys) the main set of pegmatites crosscut the ductile deformation structures of the SSB, but the area also includes an earlier generation of boudinaged and folded dykes. The undeformed pegmatites from this area may contain large miarolitic pockets. There is no systematic difference in mineralogy and geochemistry between the 2 structural types of pegmatites.

Structural data and the few existing radiometric ages suggest that pegmatites were emplaced over a time span between 29 and 25 Ma with the youngest dykes postdating the ductile deformations of the Alpine nappes. The present work presents a first comprehensive geochemical and mineralogical classification of the Oligocene pegmatite field of the central Alps. In order to constrain the timing of pegmatite formation monazite and xenotime have been sampled from the different generations of pegmatite.