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Insights into the geodynamic evolution of the Finero mafic-ultramafic sequence (Southern Alps)

Tommaso Giovanardi (1), Alberto Zanetti (2), Maurizio Mazzucchelli (3), Massimo Tiepolo (2), and Riccardo Vannucci (1)

(1) Dept. Earth Sciences, University of Pavia, Italy, (2) IGG-CNR, Pavia, Italy, (3) Dept. Earth Sciences, University of Modena and Reggio Emilia, Italy

The Finero sequence is located in the northernmost sector of the Ivrea-Verbano Zone (Southern Alps) in contact with the Insubric line. It consists of a strongly-metasomatised mantle body, surrounded by a mafic-ultramafic intrusive sequence [1,2,3],documenting the alternation of mantle and crustal rocks placed at the bottom of the Adria plate before the opening of Ligurian-Piedmontese branch of the Jurassic Tethys. The metasomatised peridotite is enriched in phlogopite and LILE, being considered by several authors as related to the migration of melts containing significant slab-derived components.
Unlike the intrusive sequences of the central and southern sectors of the Ivrea-Verbano Zone, characterised by Permo-Carboniferous emplacement ages, the Finero massif shows abundant radiometric evidence of intrusion of basic melts at the bottom of the continental crust during Trias, which formed the cumulitic sequences of the so-called Basic Complex of Finero. Besides, in Triassic times, the mantle sequence of Finero suffered a virtually complete metasomatic recrystallisation triggered by several episodes of pervasive to channelled porous flow migration of (mostly hydrous) melts. Later on, but yet in Triassic time, the mantle sequence experienced the intrusion of basic veins-dykes (locally characterised by the presence of sapphirine), which discordantly cut the mantle foliation. Thus, the mafic–ultramafic Finero sequence represents a unique opportunity to characterise the composition of Triassic melts migrating through the Adria realm escaping significant interaction with the continental crust. Notwithstanding that several papers have been devoted to the petrologic investigation of the mafic-ultramafic Finero sequence since the beginning of the seventies, its petrochemical and geodynamic evolution is presently very poorly constrained. Crucial issues still debated are: 1) the sources of the liquids that percolated the mantle sequence, the timing and geodynamic setting of the mantle metasomatism; 2) the age of accretion of the mantle sequence to the bottom of the continental crust; 3) the geochemical composition of the parent melts of the Basic Complex, their differentiation processes, the timing of the different melt injections and their potential relationships with the melt-related events recorded by the associated mantle sequence. In the frame of this contribution, new data about the major and trace mineral chemistry of the three main units of the Basic Complex (i.e Internal Gabbro, Amphibole Peridotite, External Gabbro) and of the various peridotitic (e.g. phlogopite harzburgites, dolomite-apatite-bearing wehrlites, dunites with chromitites bands and/or pyroxenite-hornblendite veins), pyroxenitic (e.g. phlogopite-bearing websterite, orthopyroxenites, clinopyroxenites) and femic (e.g. sapphirine-bearing amphibole gabbros) lithologies of the mantle sequence will be provided, in order to constrain the geodynamic setting of the melt-related processes.

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