



Lithological and structural investigations of the Finero back thrust

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The Ivrea-Verbano-Zone (IVZ, Southern Alps, NW Italy) constitutes a renowned cross-section through the continental crust. It is one of the few places in the world where a complete crustal transect from the palaeo-surface to granulite facies lower crustal conditions and accompanying mantle melt intrusions can be studied directly. It has thus gained an enormous amount of interest and generated a wealth of literature. But the litho-tectonic evolution of the IVZ is still only partly understood and numerous problems remain unsolved.

The IVZ is tectonically confined by the Insubric Line to the north and west and by the Cossato-Mergozzo-Brissago Line (CMB) as well as by the Pogallo Line to the east. The outcropping rocks are interpreted as a part of the Adriatic continental crust emplaced during the Alpine orogeny. Lithologies comprise a stratigraphically upper amphibolite facies "kinzigite series" and a lower granulite facies "stronalite series" (both with metapelites, basites, calcsilicate rocks), numerous ultrabasic mantle tectonites and a widespread suite of Permian mantle melt intrusions, the so-called "mafic complex".

The largest mantle tectonite of the IVZ is the peridotite body of Finero. This comprises three main lithologies: phlogopite peridotite, "internal gabbro", hornblende peridotite (and minor amounts of pyroxenites, gabbroic dikes, ect.). In spite of many studies, the answers to numerous questions concerning the structure and history of the ultrabasic and basic rocks are still unsatisfying and need to be questioned.

Peridotites, gabbros, stronalites and kinzigites can be found from north to south, interpreted as an extensionally thinned intersection through the lower crust. Problems arise from the difficult distinction between the "internal gabbro" within the peridotite body and the "external gabbro", as part of the "mafic complex", the unsatisfying structural interpretations concerning the peridotite body and the relationship between peridotite and "mafic complex".

New lithological and structural investigations show, that the former assumption of an Alpine back thrust south of the peridotite body of Finero has to be questioned. Field work and petrography was focused on lithological boundaries, high-T shear zones and the distinction of "internal gabbro" and "external gabbro". Our findings reveal distinct discrepancies to older mapping and interpretations. It can be shown, that the contacts between "external gabbro" and hornblende peridotite are high-temperature features and structurally far more complicate than previously supposed which makes greenschist facies Alpine back thrusting most unlikely. The contacts almost certainly are magmatic or at least formed at mantle temperatures. They are thus pre-Alpine in age.

Alternatively to the back thrust model, we present a model of a folded multi-layered peridotite body which seems to be inter fingered with the "external gabbro". Our findings definitely corroborate the possibility that the "internal gabbro", the hornblende peridotite and the "external gabbro" form a single magmatic series.