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# Geological-structural and metamorphic study of the Southern Dora-Maira Massif in Valmala (Varaita Valley, Western Alps)

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This study presents new field, structural and petrographic data for a portion of the southern Dora-Maira Massif (western Alps), with the aim of reconstructing its tectono-stratigraphic and tectono-metamorphic architecture.

The southern Dora-Maira Massif is a (ultra)-high pressure ((U)HP) tectonic nappe stack consisting of different continental crust units which underwent (U)HP metamorphism during the Alpine orogenesis. The study area is located immediately south of the world-famous UHP Brossasco-Isasca Unit and exposes, from the lower to the upper structural level, a quartz-eclogitic unit (i.e. the Rocca Solei Unit: RSU) and a blueschists-facies unit (i.e. the Dronero-Sampeyre Unit: DSU), relatively poorly known in terms of lithostratigraphy and metamorphic conditions. Such a geological setting, in which a blueschists-facies metamorphic unit overlays eclogitic metamorphic units, is a unique feature in the Internal Crystalline Massifs and the geodynamic processes responsible for its formation are still debated. Moreover, lithologies apparently related to an oceanic setting (already reported by Carraro *et al.*, 1971 and Henry, 1990) are tectonically interposed between the RSU and the DSU, and their origin has not been interpreted yet.

The detailed field, structural and petrographic study, supported by a geological map at 1:10,000 scale with related GIS-database, was carried out in the Valmala area (a right tributary of the Varaita Valley). Here a lithologically heterogeneous unit named as “Valmala Shear Zone” (VSZ) is tectonically sandwiched between the RSU and the DSU.

The VSZ, which is several kilometers long and about 500 meters thick, shows a “block in matrix” structure. In its lower portion, blocks of metabasics, meta-ultrabasics and calchschists, lenticular in shape and up to hundreds of meters in size, are embedded in a matrix dominated by micaschists, locally rich in carbonates. On the contrary, in the upper portion of the VSZ blocks of micro-augen gneisses and minor impure marbles, lenticular to tabular in shape and up to tens of meters wide, are embedded in a matrix of micaschists and paragneisses.

In the DSU, a metasedimentary Polymetamorphic Complex has been recognised basing on the occurrence of relict pre-Alpine porphyroblastic garnet, and distinguished from a Monometamorphic Complex mostly consisting of metavolcanics. Our findings show that the structural setting of the studied sector is the result of five deformational stages (from D1 to D5). The D2 is the most pervasive one, responsible for the development of the regional foliation S2 and for the activation of the tectonic contacts separating the three tectonic units. Both the VSZ and the DSU preserve relicts of the peak metamorphic assemblage compatible with the blueschist-facies (Gln + Grt ± Zo in the metabasics; Ctd + Grt ± Gln ± Lws in the micaschists). Preliminary petrologic data on the metapelites from the DSU constrained peak P-T conditions of ca. 470°C, 19 kbar, in the lawsonite-blueschist facies.

## REFERENCES

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- Henry C. 1990: L'unité a coesite du massif Dora-Maira (Alpes Occidentales) dans son cadre petrologique et structural. PhD's thesis. Univeristé Paris 6.