# NEW STRUCTURAL, PETROLOGICAL AND GEOCHRONOLOGICAL CONSTRAINTS FROM THE META-OPHIOLITES OF THE SUSA VALLEY (WESTERN ALPS)

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**Keywords:** *Structural geology, Petrology, Geochronology, Western Alps, meta-ophiolites*

T A multidisciplinary approach to the study of orogenic belts allows obtaining a better knowledge of their geodynamic evolution. In this work (result of the PhD project), the focus is on different shear zones acting at different depths, and on the relationships with the adjacent tectonic units. Obtained data (geological mapping, structural analysis, metamorphic evolution and radiometric ages) provided several information on the multistage exhumation of (U)HP meta-ophiolites of the Piedmont Zone, occurring along the Susa Valley (NW Italy).

The Piedmont Zone is subdivided in Internal (IPZ) and External (EPZ) zones, based on their metamorphic peak (eclogite-facies and blueschist-facies conditions, respectively) and lithostratigraphic features. IPZ and EPZ were deformed by 4 regional deformation phases (D1 to D4). In addition, IPZ and EPZ were coupled by a first-order polyphasic shear zone, the Susa Shear Zone (SSZ), which drove their exhumation. The SSZ is a thick shear zone, wherein two distinct generations of kinematic indicators occur (T1 and T2), showing opposite shear sense (Top-to-E and Top-to-W, respectively).

Metamorphic evolution of IPZ and EPZ was achieved using pseudosections and stable mineral assemblages on mafic and meta-pelitic rocks. In IPZ, 4 metamorphic events were recognized: i) peak-P conditions, at eclogite-UHP boundary, ii) prograde decompressive stage, still in eclogite-facies, iii) greenschist re-equilibration, iv) isobaric late heating (greenschist-amphibolite boundary). In EPZ, 3 metamorphic events were preserved: i) peak-P in blueschist conditions, ii) greenschist re-equilibration, iii) isobaric late heating (high-T greenschist). Metamorphic events were correlated to the deformation recognized at the mesoscale. Metamorphic foliations (referred to D1, D2 and T1) were dated by in situ Ar/Ar on white mica. D1 foliations (IPZ and EPZ) developed at ~46-41 Ma, while D2 foliations (IPZ and EPZ) developed at ~39-36 Ma. T1-realted mylonitic foliation developed coeval with the D2 (~39-36 Ma).

Obtained data constrained a geodynamic model, for the exhumation of the IPZ and EPZ, distinguished into 4 stages. The first stage (D1), in the IPZ, represent the path from the peak-P to the coupling with the underlying Dora Maira. In this time-lapse, EPZ reached its peak- P conditions.

The second stage (D2) occurred when IPZ and EPZ were exhumed towards W, with different exhumation rates, along the T1-related shear zone, resulting from higher exhumation speed of IPZ than EPZ. Coupled IPZ and EPZ suffered a subsequent folding, due to the doming (D3). This interpretation explains the T1 apparent reverse kinematics recorded along the SSZ. The late exhumation event (D4) occurred when the coupled meta-ophiolitic units reached upper crustal levels, triggering the EPZ tectonic collapse. The relative movement of the IPZ below the EPZ were driven by T2-related shear zones, which display Top-to-W extensional tectonics.