

Multidisciplinary approach to investigate the tectono-metamorphic evolution at the southern Sesia-Lanzo/Piemonte zone boundary

Piloni C.B.*¹, Escalona-Orellana H.², Gusmeo T.³, Filippi M.¹, Rebay G.⁴, Roda M.¹, Zannoni D.¹, Zucali M.¹ & Spalla M.I.¹

¹ Dipartimento di Scienze della Terra “A. Desio”, Università di Milano. ² Department of Mineralogy, Petrology and Applied Geology, University of Barcelona, Spain. ³ Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università di Bologna. ⁴ Dipartimento di Scienze della Terra e dell’Ambiente, Università di Pavia.

Corresponding author email: chiara.piloni@unimi.it

Keywords: Alpine subduction, tectonic mélange, eclogite facies transposition.

This contribution proposes a multiscale structural analysis of a key area located in the axial zone of the Alpine chain, close to the triple junction between the Adriatic continental crust (Sesia-Lanzo Zone - SLZ), the eclogitized metaophiolites (Piemonte Zone - PZ) and one of the huge ultramafic bodies of the Alpine subduction complex (Lanzo Massif). This setting offers a unique opportunity to investigate the structuring of a convergent margin at deep structural levels during active convergence and to explore the deformation and metamorphic mechanisms operating between the two facing tectonic domains: the oceanic subducting plate and the continental crust, tectonically sampled from the upper plate. The inferred structural history reveals four groups of superimposed ductile structures in the rocks from the SLZ and PZ (Spalla et al., 1983). Rootless isoclinal folds are associated with a pervasive S_1 foliation. D2 structures are tight to isoclinal folds associated with a dominant S_2 foliation. D3 includes tight to open folds, and D4 gentle folds have sub-vertical axial planes, locally associated with a disjunctive cleavage. This poly-phase tectono-metamorphic history results in a mixing of thin slivers of oceanic and continental eclogitized rocks characterised by peak conditions of approximately $T = 520\text{--}630\text{ }^{\circ}\text{C}$ and $P = 1.8\text{--}2.0\text{ GPa}$ (Rebay & Messiga, 2007; Assanelli et al., 2020). The type of tectonic mélanges here described, consisting of continental and oceanic crustal slices with variably serpentinitized peridotites, is expected to form in a hydrated mantle wedge during ablative subduction, as shown by 2D numerical simulations of ocean/continent subduction systems (e.g. Roda et al., 2020).

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