

Tectono-metamorphic evolution of continental and oceanic crustal slices in the Alpine Subduction Complex (Piemonte – Sesia-Lanzo Zone boundary, Western Italian Alps)

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At the boundary between the Piemonte Zone (PZ) metaophiolites and the Austroalpine continental crust a tectonic mélange of thin slivers of calcschists, quartzites, metabasites, serpentinites and fine-grained gneisses (metapelites and metagranitoids) occurs all along the western margin of the central and southern Sesia-Lanzo Zone (SLZ), from Santanel klippe to Lanzo Massif (Spalla et al., 1983; Battiston et al., 1984). All the rocks belonging to SLZ and PZ together underwent four episodes of deformation, giving rise to a complex regional tectonostratigraphy. The metamorphic mineral assemblages marking successive foliations, detected from the central to the southern part of the SLZ western margin, indicate that various metamorphic conditions dominate in different portions of this tectonic mixing. In the southern sector of this “mixing zone” parageneses indicate that rocks experienced an early eclogite facies imprint, followed by re-equilibration under blueschist facies conditions, and that they were finally widely retrogressed under greenschist facies, during the last two deformational stages. The origin of this rock assemblage architecture could be the result of transposition in the mantle wedge, otherwise it may represent the reworked primary series of an extensionally-thinned continental margin. The tectonic picture along the boundary between the PZ and the southern SLZ indicates that during the Alpine convergence slices of oceanic lithosphere, recording different thermal and structural imprints during burial and exhumation paths, are mixed with rocks of Adria continental margin (Assanelli et al., 2020). Similar kinds of tectonic mélange of continental and oceanic crustal slices, with variably serpentinitized peridotites, are expected to be generated in an hydrated mantle wedge during ablative subduction as it results by 2D numerical simulations of ocean/continent subduction systems (Roda et al., 2020).

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