Mantle-cover sequence in the Western Alps metaophiolites: a key to recognize remnants of an exhumed Oceanic Core Complex (OCC)

Tartarotti P.*[1], Festa A.[2], Benciolini L.[3] & Balestro G.[2]

1. Dipartimento di Scienze della Terra "Ardito Desio", Università di Milano. 2. Dipartimento di Scienze della Terra, Università di Torino. 3. Dipartimento di Chimica, Fisica e Ambiente, sezione Georisorse e Territorio, Università di Udine.

Corresponding email: paola.tartarotti@unimi.it

Keywords: Western Alps ophiolites, ophicarbonate breccia, Oceanic Core Complex.

Alpine ophiolites represent the sutured Jurassic Tethys ocean interposed between the European and African plates. They mostly consist, similarly to modern oceanic lithosphere at slow spreading ridges, of mantle peridotites intruded by gabbros sealed by basaltic lavas and sediments (e.g., Lagabrielle & Cannat, 1990). A true sheeted dike complex has never been recognized. In modern slow spreading ridge systems, mantle rocks and gabbros are commonly exposed at the seafloor along detachment shear zones which exhume Oceanic Core Complexes (OCC). In the hangingwall of detachment faults, syn-tectonic sediments bearing mafic/ultramafic breccias unconformably rest atop mantle rocks or ophicarbonate breccias. In the southern Aosta valley, the Mount Avic serpentinite massif is interpreted as a fossil OCC (Fontana et al., 2013), as attested by the occurrence of ophicarbonate breccias (Tartarotti et al., 1998 and refs.). In the nearby Champorcher valley a primary mantle-cover sequence is tentatively reconstructed. Here, massive to mylonic serpentinite pass upward to ophicarbonate breccias covered by carbonate-rich serpentinitic metarenites and by a chaotic rock unit on which calcschists, embedding cm-sized clasts of actinolite/tremolite-schists, rest unconformably. The chaotic rock unit has a block-in-matrix fabric with rounded to irregularly-shaped blocks of serpentinite, cm-to several dm in size, randomly distributed within a matrix of foliated impure marbles and calschists. The internal fabric of this metasedimentary succession is well consistent with mass-transport processes related to an active tectonic setting in which mantle rocks were progressively and continuously exhumed by faulting. This mantle-cover sequence may represent part of the Mount Avic OCC documenting, as for Balestro et al. (2015) for the Monviso meta-ophiolite Complex, one of the first examples of remnants of OCCs preserved in exhumed eclogitic ophiolites. The correct interpretation of this mantle-cover sequence is crucial for better interpreting intra-oceanic processes that controlled the Tethys ocean floor evolution during the Jurassic extensional stage.

Balestro G., Festa A. & Tartarotti P. 2015. Tectonic significance of different block-in-matrix structures in exhumed convergent plate margins: examples from oceanic and continental HP rocks in Inner Western Alps (northwestern Italy). Intern. Geol. Rev., 57, 581-605, doi:10.1080/00206814.2014.943307.

Fontana E., Tartarotti P., Panseri M. & Buscemi S. 2013. Geological map of the Mount Avic massif (Western Alps ophiolites): Is it a fossil Oceanic Core Complex? Rend. Online SGI, 29, 237.

Lagabrielle Y. & Cannat M. 1990. Alpine Jurassic ophiolites resemble the modern central Atlantic basement. Geology, 18, 319-322.

Tartarotti P., Benciolini L. & Monopoli B. 1998. Brecce serpentinitiche nel massiccio ultrabasico del Monte Avic (falda Ofiolitica Piemontese): possibili evidenze di erosione sottomarina. Atti Tic. Sci. Terra, 7, 73-86.