



Eclogite nappe-stack in the Grivola-Urtier Ophiolites (Southern Aosta Valley, Western Alps)

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In the Western Alpine chain, ophiolites represent a section of the Mesozoic Tethys oceanic lithosphere, involved in subduction during the convergence between the paleo-Africa and paleo-Europe continents during the Cretaceous – Eocene. The Western Alpine ophiolites consist of several tectonic units, the most famous being the Zermatt-Saas and Combin nappes, and other major ophiolite bodies as the Voltri, Monviso, and Rocciavère that show different rock assemblages and contrasting metamorphic imprints. The Grivola-Urtier (GU) unit is exposed in the southern Aosta Valley, covering an area of about 100 km²; it is tectonically sandwiched between the continentally-derived Penninic Gran Paradiso Nappe below, and the Austroalpine Mount Emilius klippe above. This unit has been so far considered as part of the Zermatt-Saas nappe extending from the Saas-Fee area (Switzerland) to the Aosta Valley (Italy). The GU unit consists of serpentinitized peridotites that include pods and boudinaged layers of eclogitic Fe-metagabbro and trondhjemite, rodingites and chloriteschists transposed in the main foliation together with calc-schists and micaschists. All rocks preserve particularly fresh eclogitic mineral assemblages. The contact between the serpentinites and calc-schists is marked by a tectonic *mélange* consisting of mylonitic marble and calc-schist with stretched and boudinaged serpentinite blocks. Continentally-derived allochthonous blocks ranging in size from 100 meters to meters are also included within the ophiolites. New field, petrographic and geochemical data reveal the complex nature of the fossil Tethyan oceanic lithosphere exposed in the southern Aosta Valley, as well as the extent and size of the continental-oceanic tectonic *mélange*. The geological setting of the GU unit is here inferred as a key tool for understanding the complex architecture of the ophiolites in the Western Alps.