



## **Fluids drainage along detachments: the West Cycladic Detachment System and synkinematic skarns on Serifos Island (Cyclades, Greece)**

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Back-arc extension in the Aegean Sea has been accommodated by several large-scale detachments such as the West Cycladic Detachment System (WCDS) in the Oligocene and Miocene. The WCDS is associated on Serifos island (Cyclades) with a synkinematic granodioritic intrusion. Serifos is also well known for its skarn deposit and a rich mineralogy as well as colder Fe-Ba ore deposits that were exploited until 1963. The geometrical and kinematic relations between the detachments and ore bodies have so far been little studied.

Different types of skarn can be observed (1) massive garnet endoskarns, (2) garnet-pyroxene endoskarns in the granodiorite, (3) garnet-pyroxene cracks exoskarns, (4) brecciated pyroxene +/- ilvaite skarn within the Meghàlo Livadhi and Kavos Kiklopas detachments.

Field observations show that the formation of the skarn is intimately associated with the detachments and the deformation of the intrusion in the footwall. Endo and exo-skarn deposits formed before, during and after the ductile and brittle structures resulting from the activity of the WCDS. They are represented by echelon veins, veins with antithetic shear and boudinaged veins wrapped within sheath folds, with a shearing movement top SSW or SW compatible with the regional tectonics, deformation in host-rock and the emplacement of the syn-tectonic granodioritic intrusion. Skarnified breccias formed within the two main detachments attesting for the intense circulation of fluids at a certain distance from the main intrusion.

These skarn parageneses were deposited by hydrothermal fluids associated with the intrusion, mixed with meteoric or oceanic fluids forming at the regional level of pyroxene. The two detachments acted as preferential crustal-scale drains during footwall exhumation. This example illustrates the potential of detachments to channelize large amount of fluids in the crust during extension.