

Shear-Related Sn-W Mineralisations of the Martinamor Extensional Gneiss Dome (Salamanca, Spain)

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The Morille-Martinamor tin and tungsten mining district (Salamanca, western Spain) is part of the Martinamor extensional gneiss dome. Gneissic domes formed due to the gravitational collapse of the orogen during the late Variscan. Ductile extensional shear zones accommodated this process and led to a tectonic denudation and thermal attenuation of the crust. Strain increases as we approach the shear zone, with the development of a penetrative subhorizontal tectonic foliation (SE₂), recumbent and sheath folds, and shear bands (SCC') showing a top-to-the SE sense of shear. Foot-wall exhumation results in an isothermal decompression and heat transfer through the detachment zone. A syn-kinematic low-pressure metamorphism, reaching melting conditions in the dome core, overlaps the previous metamorphic signature.

In this context, the development and type of Sn-W mineralisation depends on the structural level and is mainly concentrated across the extensional shear zone. In the lowermost structural levels, Sn-W deposits occur in veins with quartz, wolframite, scheelite and cassiterite. On the other hand, in shallower zones, W stratabound-type mineralisation is predominant, with disseminated scheelite in metasedimentary calc-silicate levels.

Strain evolution within the extensional detachment led to structurally controlled mineralisations. For example, progressive deformation of recumbent/sheath folds, formed in the most competent levels, form scheelite saddle reef-type deposits in hinge zones and boudinage-neck and en echelon veins deposits along the limbs, resulting in the creation of favourable sites for the scheelite deposition and possibly in the redistribution of the stratabound mineralisation. Structural criteria have been used to define exploration targets in the area.