



Two successive crustal melting events resulting from extensional exhumation and then thrusting of the Ronda Peridotites (South Spain)

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The Alboran Domain, situated at the western end of the Mediterranean subduction system, is characterized by the Ronda Peridotites, one of the world largest exposures of sub-continental mantle. Using U-Pb (LA-ICP-MS) and Ar-Ar dating, we precisely dated two tectonic events associated with the Tertiary exhumation of the Ronda Peridotites. First, shearing along the Crust-Mantle Extensional Shear Zone caused, at ca. 22.5 Ma, mantle exhumation, local partial melting in the deep crust and coeval cooling in the upper crust. Second, the Ronda Peridotites Thrust triggered the final crustal emplacement of the peridotites onto the continental crust at ca. 21 Ma, as testified by granitic intrusions in the thrust hanging-wall. The tectonic evolution of the western Alboran Domain is therefore characterized by a fast switch from a continental lithosphere extension in a backarc setting, with sub-continental mantle exhumation, to a rift inversion by thrusting driven by shortening of the subduction upper plate.