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# Backarc basin inversion leading to folding, shearing and intracrustal emplacement of the subcontinental lithospheric mantle: a structural study from the Ronda Peridotite Massif (Betic Cordillera, Southern Spain)

K. Hidas (1), C.J. Garrido (1), G. Booth-Rea (1), J.M. Martínez-Martínez (1), J.A. Padrón-Navarta (2,3), Z. Konc (1), F. Giaconia (1), E. Frets (1), and C. Marchesi (1)

(1) Instituto Andaluz de Ciencias de la Tierra, CSIC & UGR, Armilla, Granada, Spain (karoly.hidas@csic.es), (2) Géosciences Montpellier, Université Montpellier-2 & CNRS, Montpellier, France, (3) Research School of Earth Sciences, The Australian National University, Canberra, Australia

The Ronda massif (S Spain) is the largest (ca. 300 km2) of several subcontinental mantle peridotite massifs tectonically emplaced during the early Miocene in the Betic-Rif chain. Exhumation of large bodies of subcontinental peridotites in the western Mediterranean has been attributed to diverse tectonic processes including pure extension, transpression, or alternating contractive and extensional processes related with continental subduction followed by extension in a back-arc setting, before final contractive intracrustal emplacement. Many of these models have relied on the structural and petrological evolution of the crustal units spatially associated with these peridotite massifs.

To constrain the latest evolutional stages and mechanisms of exhumation and emplacement of subcontinental peridotites in the Westernmost Mediterranean, we present here a detailed structural study of the transition from granular spinel peridotite to plagioclase tectonite domain in the western Ronda Peridotite (Betic Cordillera, southern Spain). We show that this transition records kilometer-scale folding and shearing at the base of the subcontinental lithospheric mantle section that initiated during decompression and cooling of the massif from spinel to plagioclase lherzolite facies. Newly developed foliation in plagioclase lherzolite from the plagioclase tectonite domain represents the axial plane foliation of an anticline fold. Synkinematic mylonitic-ultramylonitic shear zones were formed at the peridotite plastic-brittle transition mainly in the reverse limb of this fold. Paleo-orientation of the present day structures, inferred from undoing the late brittle rotations that tilted and rotated the massif during the Miocene, indicates a subhorizontal inclined anticline with southward directed kinematics and a top-to-the-S sense of shear for the synkinematic shear zones. This geometry and the reconstructed kinematics suggest an Early Miocene inversion in the Alborán backarc extension prior to the intracrustal emplacement of the Ronda Peridotite massif. We propose a geodynamic model where folding and shearing of an attenuated mantle lithosphere occurred by inversion of backarc extension during southward collision of the Alborán Domain with the paleo-Maghrebian Passive Margin, leading to the intracrustal emplacement of peridotites in the earlymost Miocene (24-23 Ma).