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The Architecture of the European-Mediterranean Lithosphere seen in osmium isotopes

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A growing body of work, based on the study of -Pb ages of magmatic zircons, Hf model ages of inherited zircons and whole-rock Nd model ages of crustal igneous and metamorphic rocks have provide constrain forthe timing of formation and evolution of the Iberian microplate. However, there is little robust information on the age of its underlying mantle; it is the *missing key* for a full understanding of the geological framework of the Iberian microplate. In this work we have now been filled this gap by analysing *in-situ*, using LA-MC-ICPMS, the Re-Os isotope systematics of sulfides in spinel herzolites and wehrlites from the olivine melilite mar of El Aprisco in the Calatrava Volcanic Field, central Spain. The 68 analysed sulfides ($\geq$50 μm) were enclosed in olivine and pyroxenes, rarely at the triple junctions between the main silicates, and more commonly in the interstitial glass. However, there is no difference in Re-Os isotope compositions between *included* and *interstitial* sulfides. Re-depletion model ages (T_{RD}) calculated for these sulfides show magmatic events in the mantle at $\sim$1.8, 1.1, 0.9, 0.6 and 0.3 Ga, which are correlated with main events of growth of the Iberian crust. A synthesis of Re-depletion model ages (T_{RD}) for both whole-rock samples and *in situ*-analysed of individual sulfides from mantle-derived rocks, including xenoliths and peridotite massifs, widesrpread thorough the Mediterranean area show the existence of different mantle domains across the Mediterranean. Thus, the Re-Os data identify identify the existence of a common Paleo-Proterozoic ($\sim$ 1.8 Ga) mantle on both sides of the Mediterranean realm, and an older ($\sim$2.2-2.6 Ga) lithospheric mantle sitting within the more recent Maghrebide-Appenine- Betic front generated during the Alpine-Betic orogeny. The Mediterranean basin may contain several buoyant Archean microplates, which could have impeded the northward movement of Africa and contributed to complex tectonics in the Mediterannean basin.