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Recycling and growth of zircons in chromitites from the subcontinental listhospheric mantle

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Chromitite bodies associated with orthopyroxenites and cordieritites are hosted in Proterozoic (~1.2-1.8 Ga) subcontinental lithospheric mantle (SCLM) rocks of the Serrania de Ronda ultramafic massifs (namely, Ronda, Ojén and Carratraca) in southern Spain. Six zircons recovered from a massive chromitite sample from the Ronda massif yielded both concordant and discordant ages between 2309 ± 37 Ma and 109 ± 15 Ma, and have $\delta^{18}O$ between 8.3‰ and 9.4‰. In the nearby Ojén massif, chromitites contain zircons that yielded a concordant age of 20.4 ± 0.9 Ma (n=4), which is in good agreement with the age of a plagioclasite dyke (20.1± 0.2 Ma to 17.9 ± 0.1 Ma; n=11).. The zircon age distribution found in the Ronda massif chromitite is similar to that determined for garnet-pyroxenites from the area, suggesting that the chromitite parental meltincorporated zircons derived from the garnet-pyroxenites, which represent relics of oceanic/continental crust recycled into the mantle. In constrast, zircon ages from the Ojén chromitites reflect the timing of fluid or melt infitration into the SCLM. These fluids/melts were produced by dehydration/melting of crustal rocks during emplacement of the hot peridotites in the Miocene. Our results confirm that chromitites in the Ronda SCLM are broadly coeval with the tectonic emplacement of the peridotites into the continental crust during the Early Miocene. We propose a model in which the Cr mineralizations found in the ultramafic rocks of the Serranía de Ronda were formed as a result of contamination of the SCLM with crustal components.