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Miocene induction of peridotites into the lower crust during opening of the Algerian basin: evidence from the Edough massif and implications for the evolution of the W. Mediterranean

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Sizeable pieces of deep mantle material croup-out worldwide within orogenic belts involving major continental collisions or within regions with rift-thinned continental margins. From their original mantle position these peridotites have been transferred into the crust by tectonic processes involving subduction, collision or extension. Although minor components of most metamorphic belts, the understanding of how and when orogenic peridotites were emplaced within the continental crust and their subsequent exhumation is paramount. In the following, we present the results of a U-Pb laser ablation ICP-MS study on rocks from the Edough massif (eastern Algeria), a southern segment of the peri-Mediterranean Alpine Belt. A U-Pb age of 17.84$\pm$0.12 Ma was obtained from monazites separated from a leucocratic diatexite collected in close proximity to a small peridotite massif incorporated into the lower crustal sequence of the massif. Monazites, extracted from a neighbouring deformed leucogranite, yield a similar age of 17.4$\pm$1.3 Ma. However, zircon domains with magmatic characteristics yield an age of 307$\pm$7 Ma interpreted as the age of magmatic crystallisation of the leucogranite and reflecting partial melting during the hercynian orogeny. Low Th/U domains from the same zircon population comply with a metamorphic induced recrystallisation whose upper age limit is 286$\pm$11 Ma. These results are evidence for the polycyclic evolution of basement rocks preserved in the western Mediterranean and indicate that part of their metamorphic features was inherited from older events. Taken together with published Ar-Ar datings, the late Burdigalian age of monazites,

indicates a fast cooling rate of $c.$ 300˚C/Ma and is regarded as closely approximating the emplacement of the peridotites into the hercynian basement. This age is significantly younger than those recorded for orogenic peridotites from the Betic-Rif orocline and for lithospheric extension forming the Alboran sea. It is also younger than rifting and back-arc extension opening the Liguro-Provençal basin. The late Burdigalian age is interpreted as dating the incipient rifting event that opened the Algerian basin, which is consequently not a continuation of the Liguro-Provençal basin. At the scale of the western Mediterranean, these observations concur with current models supporting slab roll-back and an eastwards migration of extension in the western Mediterranean.