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Lithospheric-scale evolution of the Aegean region

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The Aegean region is a concentrate of the main geodynamic processes that shaped the Mediterranean region : oceanic and continental subduction, mountain building, high-pressure and low-temperature metamorphism, backarc extension, post-orogenic collapse, metamorphic core complexes, gneiss domes are the ingredients of a complex evolution that started at the end of the Cretaceous with the closure of the Tethyan ocean along the Vardar suture zone. Using available plate kinematic, geophysical, petrological, structural data we present a synthetic tectonic map of the whole region from the Balkans to the Mediterranean Ridge and we build a lithospheric scale N-S cross-section from Crete to the Rhodope massif. We then describe the detailed geological and tectonic evolution of this cross-section with a series of reconstructions from $\sim$ 70 Ma to the Present. Based on the available seismic tomographic images beow the Aegean domain we assume that only one slab is present in the mantle. This lead us to use a single subduction zone throughout the whole convergence process from the Late Cretaceous to the Present, which in turns implies an efficient delamination process with subduction of the lithospheric mantle and part of the crust, continental or oceanic. The reconstructions suggest that 800 km of convergence and 700 km of slab retreat since the late Cretaceous led to approx. 1500 km of subduction from the Late Cretaceous closure of the Vardar ocean to the formation of the Aegean Sea. Using this evolution we discuss the mechanisms leading to the circulation of metamorphic rocks within the subduction complex and the subsequent formation of extensional metamorphic domes in the backarc region during slab retreat, and their respective roles in the exhumation of HP-LT metamorphic rocks. The tectonic histories of the two regions showing large-scale extension, the Rhodope and the Cyclades are then compared and

the importance and causes of lower crustal partial melting is discussed.