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Du manteau au système géothermal de haute température : dynamique de subduction et anomalies thermiques en Méditerranée orientale

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High temperature geothermal resources are mainly located along subduction zones. The Menderes geothermal Province (Turkey) offers the opportunity to study amagmatic geothermal systems, without necessarily invoking a magmatic heat source in the upper crust. This study shows that high temperatures in the back-arc domain are primarily related to subduction dynamics (*i.e.* rollback and tearing). Numerical models suggest that shear heating and mantle flows increase temporarily the amount of heat flow at the base of the crust. Furthermore, field studies on the entire Aegean region (Cyclades, Dodecanese and Western Anatolia) show a similar tectonic and thermal evolution since the Cretaceous, characterized by a succession of episodes of HP-LT and HT-LP metamorphism. Moreover, the contribution of TRSCM and radiochronometric data ($^{40}Ar/^{39}Ar$, U-Pb) reveals the formation of a large thermal pulse contemporaneous with the exhumation of the Menderes MCC. This event occurs in the Miocene and may be explained by a drastic change in subduction dynamics (*i.e.* slab tearing under the Menderes Massif). Crustal-scale structures (*i.e.* detachments) induce the emplacement of the Menderes MCC, and also control deep fluids circulation in the crust from brittle-ductile transition zone to the surface without magmatic contribution in the upper crust. As a consequence, the Menderes geothermal Province is recognized as a most important active geothermal province in the world because it results from subduction dynamics. This dynamics thus controls the spatial and temporal distribution of thermal anomaly and extension, inducing crustal-scale permeable structures (detachments) that enhance fluids circulation.