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The two-stage Aegean extension, slow-localized vs fast-distributed

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Aegean extension is a process driven by slab rollback that since 45 Ma shows a two-stage evolution. From 45 to 13 Ma it is accommodated by localized deformation leading to i) the exhumation of high-pressure metamorphic rocks from mantle to crustal depths, ii) the exhumation of high-temperature rocks in core complexes and iii) the deposition of Paleogene sedimentary basins. Since 13 Ma, extension is distributed over the whole Aegean domain giving a widespread development of onshore and offshore Neogene sedimentary basins. The 3D reconstruction at Aegean scale of this two-stage evolution shows that the rate of trench retreat was around 0.6 cm/y during the first 30 My and then accelerated up to 3.2 cm/y during the last 13 My. Using available tomographic evidence, timing of metamorphic and sedimentary processes, paleomagnetic data and geometry and kinematics of deformation, we propose that the sharp transition in trench retreat and deformation mode, localized vs distributed, at 13 Ma was controlled to slab tearing. Moreover, the development of dextral NE-SW strike-slip faults and related pull-apart basins in the North Aegean domain, from the Cyclades to the Rhodope, strongly suggests that this sharp transition also corresponds to the onset of Anatolia westward escape.