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Thermochronology across tectonic contacts in southwest Turkey defines extensional South Menderes Monocline

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Apatite and zircon fission track data from the contact zones between the Menderes nappes, the Cycladic Blueschist unit, and the Ören nappe in the Anatolide belt of southwest Turkey provide new constraints on the debated Oligocene-Miocene kinematics of these nappe contacts. Apatite fission track ages range from 18.1±10.5 Ma to 27.8±7.0 Ma for the Menderes nappes and 31.5±5.8 Ma to 42.1±7.2 Ma for the Ören nappe. Zircon fission track ages are 29.2±4.9 Ma to 30.8±2.8 Ma for the Menderes nappes, 30.1±1.7 Ma to 33.3±3.5 Ma for the Cycladic Blueschist unit and 93.0±5.8 Ma to 128.7±12.8 Ma for the Ören nappe. The absence of any well-defined breaks in fission-track ages across the three nappe contacts in the southern Anatolide belt in southeast Turkey indicates that the tectonic contacts have not been reworked during the first phase of Menderes-wide extensional deformation in the late Oligocene and early Miocene. Distinctly older zircon fission track ages from the Ören nappe are mixed ages with single grain ages varying from ∼300-75 Ma reflecting partial to full resetting during late Cretaceous high-pressure metamorphism. The contact between the Cycladic Blueschist unit and the Ören nappe does not show any significant tectonic movement in the brittle crust after ∼70 Ma. As none of the tectonic units in the southern Menderes Massif appear to have moved significantly relative to the Earth's surface since the Oligocene, no reactivation could have occurred during the Oligocene/Miocene onset of continental extension. We interpret the steeply dipping part of nappe pile in the southern Menderes Massif as a tilted crustal section that formed as the footwall response to late Oligocene/early Miocene large-scale extension across the Simav detachment.