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Apatite fission-track analysis of the tectonic effects of the Arabia-Eurasia collision

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The Oligo-Miocene collision between Arabia and Eurasia led to the development of (i) the Bitlis-Zagros orogenic belt, (ii) the North and East Anatolian fault systems, (iii) the structural inversion of the Caucasian basins, and (iv) widespread deformation in the Turkish-Armenian-Iranian plateau. Despite the importance of the event, the exact age of the collision is poorly constrained. The integration of new apatite fission-track (AFT) data from the eastern Pontides, the Lesser Caucasus (Adjara-Trialeti zone), and the eastern part of the Anatolian plateau with preexisting data from the Bitlis suture has provided insights on the syn-and post-collisional evolution not only of eastern Anatolia but also of the entire Eastern Mediterranean area.
The AFT samples have a wide spatial distribution and include different types of rocks: Paleogene sandstones and magmatic rocks with Cretaceous-to-Eocene intrusion ages.
Despite the disparate lithologies and large distance, apatite fission-track ages from the easternmost Pontides, the Georgian Lesser Caucasus, the eastern Anatolian Plateau, and the Bitlis collision zone show a distinct geographic pattern. Exhumation along the Black Sea coast occurred in the Middle Miocene, mirroring the age of collision between the Eurasian and Arabian plates along the 2,400-km long Bitlis-Zagros suture zone some 200 km to the south. Exhumation in the Anatolian Plateau occurred in the Paleogene (with a cluster of ages in the Middle-Late Eocene), coevally with the development of the Izmir-Ankara-Erzincan suture. Successive development of the Anatolian Plateau did not exhume a new partial annealing zone and thus is not recorded by the apatite fission tracks.