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Low-temperature thermochronologic constraints on the tectonic evolution of the Subei and Shibaocheng areas, northern Tibetan Plateau

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The northern Tibetan Plateau, between the Kunlun and the Altyn Tagh faults, contains high relief topography, such as the Eastern Kunlun Range, the Altyn Tagh Range and the Qilian mountain belt, and plays an important role in researching the tectonic evolution and topographic growth of the Tibetan Plateau. We present new apatite fission track (AFT) and $^{40}\text{Ar}/^{39}\text{Ar}$ thermochronologic data from the Subei and Shibaocheng areas near the eastern Altyn Tagh fault. Two Cenozoic exhumation phases have been identified from our AFT thermochronology. The AFT cooling ages of ~ 60–40 Ma farther away from the faults represented a slow widespread denudation surface as response to the Indo-Eurasia collision and signified that the Subei and Shibaocheng areas denudated as a whole in the northern Tibetan Plateau. Another phase with AFT cooling ages between about 20.5 Ma to 13.6 Ma on the hanging walls near the faults, located in the Danghenanshan and Daxueshan Mountains, recorded widespread fault activities resulted from local uplift and exhumation in late Miocene (~ 8 Ma) acquired from AFT thermal history modeling. A Cretaceous exhumation (~ 120–70 Ma) acquired from AFT thermal history modeling may have made great contributions to the growth of the pre-Cenozoic northern Tibetan Plateau.

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