



Fission track and (U-Th)/He thermochronology of Corsica (France)

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The western Mediterranean island of Corsica (France) represents an exquisite region to study the processes of cooling, exhumation and relief formation by means of low temperature thermochronometers. The island can be divided into two distinct domains - "Alpine Corsica" and "Variscan Corsica". Alpine Corsica is the southern continuation of the Western Alps and represents a complex nappe-stack dominated by metamorphic rocks of oceanic and continental origin that were metamorphosed in HP/LT and MP/LT conditions during the Alpine orogeny. Variscan Corsica is a crystalline basement made up of mostly unmetamorphosed granitoids. From the geomorphological standpoint, Variscan Corsica represents a rugged ridge-and-valley structure with peaks exceeding 2000 m. The cooling history of the Variscan basement has not been adequately resolved, since there are almost no sediments on the top of the basement, which would serve as stratigraphic constraints. There are, however, remnants of a paleosurface at different altitudes. The origin and age of the paleosurface remnants are not yet known, but they can be used as time markers. The objective of this study is to investigate the thermotectonic and relief evolution of Corsica, and to constrain the age of the paleosurface remnants by means of zircon fission track (ZFT), apatite fission track (AFT) and (U-Th)/He dating techniques.

ZFT ages are ~159 - 145 Ma, AFT ages ~105 - 16 Ma, and (U-Th)/He ages ~22 - 16 Ma. Our data indicate that some parts of the Variscan basement escaped Alpine rejuvenation. The basement was affected by a thermal event related to rifting preceding Jurassic opening of the Ligurian-Piedmont Ocean, then cooled to near-surface temperatures. From ~120 Ma onward, the basement was exposed to erosion and the

penepain formed. This period of tectonic quiescence lasted until Paleocene-Eocene times, when subduction buried parts of the basement; the penepain was partly destroyed in the subduction zone and partly "conserved" by the thick flysch pile. In the Oligocene, after tectonic reorganization, the basement experienced cooling and exhumation that was related to the collapse of the nappe-stack and rifting prior to the opening of the Ligurian-Provençal basin. The penepain was segmented by faults to numerous blocks that were individually exhumed and uplifted, creating a topographic relief. Valley incision led to the progressive destruction of penepain remnants.