Diachronic brittle exhumation of the External Hellenides

Vincent Wicker*[1], Simon Bufféral[2], Manuel Pubellier[2], Tao Wang[3], and Shun Yu[3]

[1]Université de Lorraine – Université de Lorraine, CNRS, CRPG – France
[2]Laboratoire de géologie de l'ENS – Institut National des Sciences de l'Univers, Centre National de la Recherche Scientifique, Département des Géosciences - ENS-PSL – France
[3]Institute of Geology [CAGS Beijing] – Chine

Résumé

We present new results from an extensive low-temperature thermochronological survey across the External Hellenides, combining over 100 new zircon (U-Th)/He analyses with structural and historical data. Our study covers eight key tectonic windows along the Hellenic Arc, revealing a systematic younging of exhumation ages from ~15 Ma in Crete, to 10 Ma in the central Peloponnese, and, to ~5 Ma in the northern Peloponnese, despite synchronous ductile exhumation at 25-15 Ma.
This temporal trend correlates with the along-arc variability in the nature of the subducting lithosphere during the Miocene. In the southern segment, subduction of oceanic Ionian lithosphere resumed around 20 Ma, while in the Peloponnese and farther north, the ongoing subduction of the distal continental Pre-Apulian margin-initiated during the Oligocene-persisted through the Late Miocene and continues today in northwestern Greece and Albania.
We propose that these lithospheric contrasts control the timing and style of upper-crustal exhumation of high-pressure units. In the Peloponnese, exhumation during the Late Miocene was accommodated by duplexing and upper-crustal extension, including the development of low-angle normal faults (LANFs). In contrast, Cretan units record earlier exhumation linked to forearc extension driven by Hellenic back-arc dynamics.

Mots-Clés: Exhumation, Subducting lithosphere, External Hellenides, Peloponnese, Extension

*Intervenant