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# Transient stress-regime perturbations controlled by periodic basal-accretion events along the Hellenic subduction interface

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## Résumé

For decades, landmark studies, including the seminal work of Xavier Le Pichon, have demonstrated the role of plate kinematics and far-field stress changes on long-term deformation along active subduction zones. Growing evidence suggests, however, that local stress perturbations also play a significant role, resulting in a long-term pulsing evolution of active margins. Deep slicing of subducting slab, also known as basal-accretion events, is among the potential drivers of such transient behavior. Yet, the spatial extent, recurrence and tectonic impact on the forearc stress regime of these deep accretionary events remain poorly constrained, primarily because they are difficult to identify along active subduction margins. In contrast, now-exhumed, high pressure-low temperature (HP-LT) accretionary complexes offer a unique opportunity to reconstruct the tectonic and stress history from the plate interface to the surface. In this study, we combine structural and petrological observations, Raman spectroscopy on carbonaceous material, Rb/Sr multi-mineral geochronology and thermo-mechanical models to unravel the pressure-temperature-time-strain-stress evolution of the Late-Cenozoic HP-LT nappe stack exposed from Crete to Peloponnese, in the forearc domain of the Hellenic subduction zone.

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Our results reveal a sequence of  $\sim 2$ -3 Myr-long basal-accretion events that triggered pulses in strain rate associated with transient perturbations of stress regime. These pulses seem to be preserved in the structural records of the Hellenic forearc domain. Such Myr-scale stress variations superimpose on long-term trends driven by changes in far-field forces, making them difficult to detect without high-resolution structural and temporal data. This study provides a framework for quantifying these accretion-related stress pulses and paves the way to identifying this tectonic signal in the long-term records and short-term monitoring of active subduction zones worldwide.

**Mots-Clés:** Subduction, Basal accretion, Stress, regime perturbation, HP, LT metamorphism, Hellenic margin