

## **Detachment vs. normal faulting: Diachronous Cenozoic extension and rift basin formation in the Southern Balkans (Pirin Mts. and Sandanski basin, SW Bulgaria)**

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The Southern Balkans are a landscape of basins and ranges formed by more than 40 Ma of extension in thickened post-collisional crust and above the retreating Hellenic trench. One of the best-studied extensional systems in the Southern Balkans is the South Rhodope core complex in northern Greece and southern Bulgaria, which records multiple stages of detachment faulting, including the Miocene Strymon detachment. Paleogene, Neogene and Quaternary basins are associated with stages of extension. We present new (U-Th)/He thermochronology ages from bedrock samples of the Pirin mountains and detrital samples of the adjacent Sandanski basin, SW Bulgaria. In combination with sediment paleomagnetic ages, structural data, and geomorphic analyses, our results document two episodes of Eocene/Oligocene and early to middle Miocene detachment faulting that were probably not associated with significant relief or basin development. In contrast, the Sandanski basin formed in the late Miocene (10-6 Ma) above the West Pirin and Melnik normal faults. Late Miocene E-W extension resulted in uplift of the Pirin Mts. and the development of a mountain landscape similar to the modern topography. In the Quaternary, the stress field switched to N-S extension reflected in E-W trending faults and Quaternary basins and recorded by river profiles.

Our results advance our understanding of extension processes in the Southern Balkans in general and yield first constraints on the Neogene evolution of topography in the Southern Balkans with important implications on the evolution of regional climate and on Neogene paleoecology. Our study also documents a dichotomy between low-relief detachment faulting and steeply dipping normal faulting associated with relief and basin development.