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Neotectonics and seismicity of a slowly deforming segment of the Adria-Europe convergence zone - the northern Dinarides fold-and-thrust belt

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With GPS-derived shortening rates of c. 3–5 mm/a, the Adria-Europe convergence zone across the fold-and-thrust belt of the Dinarides (Balkan Peninsula) is a slowly deforming plate boundary by global standards. We have analysed the active tectonics and instrumental seismicity of the northernmost segment of this fold-and-thrust belt at its border to the Pannonian Basin. This area hosts a Maastrichtian collisional suture formed by closure of Mesozoic fragments of the Neotethys, overprinted by Miocene back-arc extension, which led to the exhumation of greenschist- to amphibolite-grade rocks in several core complexes. Geological, geomorphological and reflection seismic data provide evidence for a compressive or transpressive reactivation of extensional faults after about 5 Ma.

The study area represents the seismically most active region of the Dinarides apart from the Adriatic Sea coast and the area around Zagreb. The strongest instrumentally recorded earthquake (27 October 1969) affected the city of Banja Luka (northern Bosnia and Herzegovina). Fault plane solutions for the main shock (ML 6.4) and its largest foreshock (ML 6.0) indicate reverse faulting along ESE–WNW-striking nodal planes and generally N–S trending pressure axes. The spatial distribution of epicentres and focal depths, analyses of the macroseismic field and fault-plane solutions for several smaller events suggest on-going shortening in the internal Dinarides. Our results therefore imply that current Adria-Europe convergence is widely distributed across c. 300 km, rendering the entire Dinarides fold-and-thrust belt a slowly deforming plate boundary.