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Flood events as geomorphic thresholds for river channel change

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Abstract: River channel are highly dynamic in time and across space, constantly adjusting under the influence of natural and anthropogenic controls. The aim of this study was to assess the role of flood events recorded between 1994 and 2020 in the Trotuș River (Eastern Carpathians) channel changes. The response of the channel to these floods consisted of discontinuous spatial adjustments in the channel width and channel bed elevation. The assessment of the channel aggradation/degradation rates was performed based on the evolution over time of average multiannual discharge levels and channel survey data (cross-sections). Prominent changes in the channel occurred in the Târgu Ocna–Căiuți sector (30 km long, nearly 20% of the entire length of the river), where, between 1994 and 2020, the channel planform have widened significantly and channel bed deepened by an average value of 1.15 m (2.2 cm y^{-1}). In terms of their geomorphic impact, the 2005, 2010 and 2016 flood events can be considered severe floods, even catastrophic in certain sectors. The recovery time for changes triggered by major flood events ranged between one and nearly 10 years, whereas in the case of shifts generated by high frequency, low magnitude events, the recovery time was maximum one year. Over short term flood events drive the direction and intensity of channel bed elevation adjustments.

Keywords: Flood; channel bed level change; channel planform change; recovery time; geomorphic impact