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Changes in sinuosities of the rivers at geological structural lines in the Pannonian Basin – Mosaics to the neotectonic image of the region

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In the central, flat area of the Pannonian Basin, there are just few topographic features for neotectonic investigations. However, a lot of meandering rivers flow here, and it is possible to reconstruct their natural, pre-regulation planforms. Using the map sheets of the Second Military Survey of the Habsburg Empire (mid-19th century; Timár et al., 2006), I digitized the meandering rivers on this area. Sinuosities at different sample section lengths were computed in a GIS environment, providing so-called 'sinuosity-spectra' (van Balen et al., 2008) for each point of the analyzed channels. The channel sinuosity of this river systems are analyzed in order to draw conclusions on the neotectonic activity of the Great Hungarian Plain and the other flat areas of the Pannonian Basin.
Several points of sinuosity change were identified. To prove, that these are of neotectonic origin, seismic sections crossing the study area, were also analyzed as well as the geodinamical map of the area (Horváth et al., 2006). High sinuosity variations (low to high or high to low), spatially correlated to linear features identified in seismic survey sections, indicating their neotectonic activity (after Ouchi, 1985).
We can see two significante sinuosity changes on the Hron/Garam River (Slovakia), one at Tekov and the one at Kéménd. There are faults on the neotectonic map at these points, crossing the river – they are the possible causes of the increasing of the sinuosity. The vertical activity of these structural lines is verified by the sinuosity changes. At the Maros/Mureş River (Romania/Hungary), a significant sinuosity change can also be identified near to the town of Aiud, where the phenomene is just the opposite like in the Hron/Garam river. There is a fault on the neotectonic map crossing the river. Upstream of the river has higher sinuosity values, and after crossing the fault, it decresed. Here also the fault caused the sinuosity changing, so this fault is also an active one. However, there are more case studies, concerning the rivers of the Pannonian Basin, such as the Tisza River (Timár, 2003), the Körös system (Petrovszki and Timár, 2010), the creeks of the Little Hungarian Plain (Zámolyi et al., 2010) and the downstream part of the Danube (Petrovszki, 2010), providing a broader overview of the river-confirmed neotectonic activity of the region.

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