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Fluvial meander generations and abandoned river channels of the Great Hungarian Plain on the SRTM elevation dataset

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The Great Hungarian Plain (GHP), the central part of the Pannonian Basin, has been mapped geomorphologically for decades (most recently eg. Gábris et al. 2001; Vandenberghe et al., 2003). Although digital elevation models (DEMs) provides very useful auxiliary information for such mapping, they are used in the geomorphologic studies of the GHP just in the last few years.

On the GHP, there are only small elevation differences. The highest point is 186 m asl. while the bottom of the local erosional basis, the estuary of the Tisza River is 68 m asl. The total elevation difference is around 100 meters in an area with an extent of 200 kilometres. The most interesting part of the plain, holding information about the events of the last 35,000 years, is the Tisza plain itself. The elevation differences are even smaller there: they remain under twenty meters. It is not an easy task to construct a high, or even a moderate resolution DEM for such an area that is almost flat. Before 2003, there were two practical methods for this: digitizing contour lines (Timár, 2003) and using photogrammetric methods eg. the radar interferometry of the ERS spacecraft images (Prati & Rocca, 1994). Both methods produces very expensive data, therefore for mapping of an area that is almost 100,000 square kilometres, they were not suitable.

In November 2003, the new, almost global Shuttle Radar Topography Mission (SRTM; Farr & Kobrick, 2000; Werner, 2001) dataset has been released (Rabus et al., 2003). This dataset is based on an eleven-day mission of the Space Shuttle *Endeavour* in February 2000. The public version of the dataset has a horizontal resolution of three

by three arc second (about 90 meters in planar systems). The vertical resolution is one meter but the vertical accuracy is estimated to be better than 20 meters. It is crucial in our study area that the height of buildings and dense forests modify the numeric elevation values of the model.

The most obvious usage of this new dataset in the geomorphology the study of montainous or hilly regions, providing a methodically unified data source for most of the Earth's surface. In these regions the resolution and the accuracy of the SRTM DEM is typically satisfying. However, despite of the aforementioned unfavourable data properties, we demonstrate in the present work that the dataset is suitable for certain types of flatland analysis even in the very flat GHP area.

During the last 35,000 years, the Tisza River and its predecessors left several abandoned river branches, meanders along the central part of the GHP. They are different in planform (changing from braided to meandering) and also in wavelength (Gábris, 2001; Vandenberghe et al., 2003). Meander generations of different sizes have been identified and mapped using the SRTM dataset throughout the GHP. Combining these data with radiocarbon and pollen ages (Hertelendi et al., 1992; Sümegi & Hertelendi, 1998; Timár et al., 2001; Gábris & Nagy, in press) makes a unique tool to trace back the evolution of the river system of the GHP. Although the presented images are inferior in resolution and quality to the best contour-based ones, the free availability and the independence from the national mapping systems make them useful in the geomorphic mapping.

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