

## Study of the silting up process of the Mura River's floodplain in Hungary

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The Mura River runs across the southwest edge of the Carpathian Basin, forming a trans-boundary river between Slovenia, Croatia and Hungary. It's one of the region's significant rivers, its maximum discharge could reach 1600 m<sup>3</sup>/s. Complex water management arrangement did not happen due to historical changes of the frontiers. The riverbed changes and floods require permanent attention that was increased by the last decades' extreme climatic amplitudes. Almost 300 m<sup>3</sup>/s volumetric capacity disappeared from the floodplain in the last 3-4 decade. The flood protection dikes aren't able to compete with this tendency, but their elevation would be very expensive. Its consequence is that the present floodplain's capacity isn't enough to conduct away the previous high discharge.

The aim of the study was to determine precisely the rate of the floodplain's silting up or rather its tendency. The first step was the developing of riverbed's historical reconstruction using GIS methods and then the sediment sampling location was fixed on this digital map. We examined more sections by exploratory drillings. Sample of the oxbow lake named Hosszúvíz was the most appropriate for the purpose of examination on the downstream part of Mura River, along the Croatian-Hungarian border.

The 100 cm long drill core was cut to 5 mm width discs, saving their original moisture content. 2,5 mg glycerine was suspended into each 1cm<sup>3</sup> volume of sample, after that we homogenized them by ultrasound. The granulometric analysis of the sediment samples were made by using Malvern Mastersizer 2000 particle size analyzer, operating on the principles of laser diffraction. This instrument is able to measure materials from 0.02µm to 2000µm. The GRADISTAT program was used for the statistical evaluation of our results. The percentage content of next grain sizes: medium sand (250-500 µm), fine sand (125-250 µm), very fine sand (63-125 µm), very coarse silt (31-63 µm), coarse silt (16-31 µm), medium silt (8-16 µm), fine silt (4-8 µm), very fine silt (2-4 µm), clay (<2 µm) was defined in the sediment sample on the base of this. The grain size categories were calculated by using the Folk and Ward method.

The sand fraction grains (the first three categories) were taken into account for the dating of the drill core. The increased velocity transports the larger fraction during the flood events. The sampling location has been an oxbow lake approximately since 1830, accordingly our drill core covers this time period. After that we assigned the Mura River's remarkable floods registered in the Water Directorate's official hydrological diary to the extremely high sand fraction values. A linear model was used in the fitting of flood events and the extreme values of the sand fraction. According to the results the 100 cm long drill core was accumulated since 1915, so 1 cm/year in average.