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SESSION 08 RESTORING HYDRO-MORPHOLOGICAL PROCESSES

MORPHOLOGICAL MONITORING OF THE DRAVA RIVER-SEDIMENT STUDY

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BACKGROUND

The Drava morphological monitoring has set out the goal to examine the morphological conditions of the river, and the repeated measurement on the hydraulic characteristics. The project features a co-operation between the South-Transdanubian Water Management Directorate and the Croatian Water Management Organization (Hrvatske Vode), and was selected for support in 2011.

The work is strongly related to the requirements of the EU Water Framework Directive, which implies that during preservation work and action in order to maintain the good status of the waterbodies the regular moitoring of certain Drava reaches has to be carried out, in order to be able to follow the changes in the status of the river. One of the most important elements of the monitoring programme is the system which monitors the *sediment transport processes, the riverbed changes – the morphological conditions along the river.*

INTRODUCTION

In frame of the project in 2012, measurements were carried out in 5 cross-sections (Fig. 1.) along the Hungarian-Croatian common reach of the river (Fig. 2.): Botovo, Bélavár, Barcs, Drávaszabolcs and Belisce.

The measurements comprised 3 discharge measurements, suspended and bed-load sampling, and bed material sampling and were carried out in May, June and August, respectively. In-situ measurements were carried out by the South-Transdanubian Water Management Directorate (Pécs), while the laboratory analysis of the sediment and bed material samples was carried out by Eötvös József College (Baja).

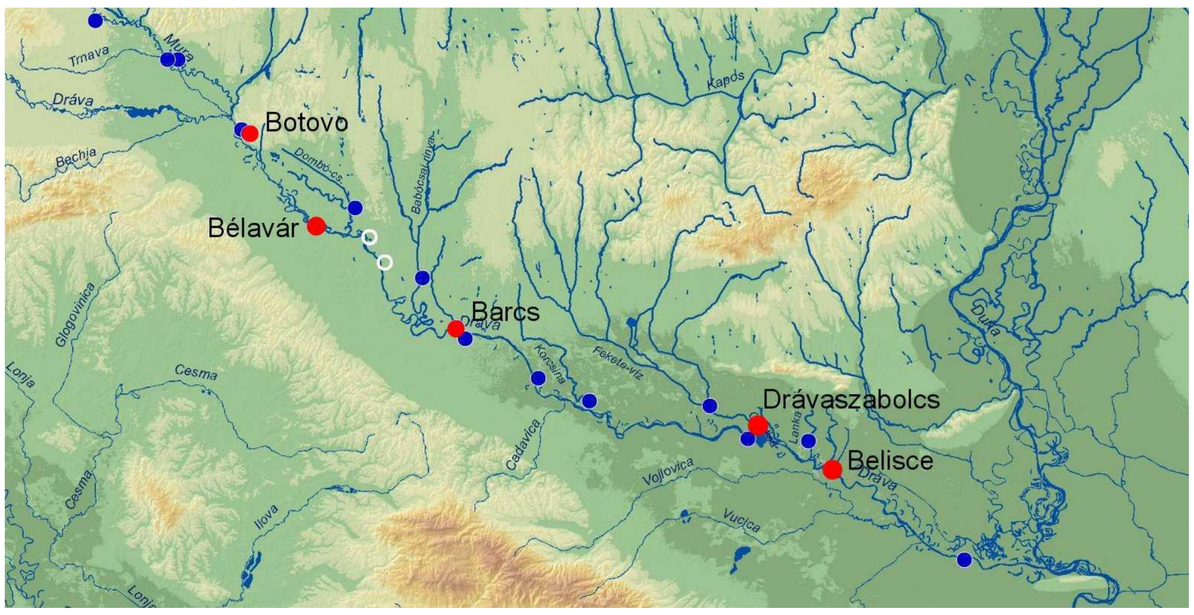

Figure 1. Five selected locations on the Drava river

Figure 2. 5 cross-sections on the Drava river: Botovo (A), Bélavár (B), Barcs (C), Drávaszabolcs (D) and Belisce (E)

MATERIALS AND METHODS

250 km Dráva-reach, 5 sections, suspended load, bed load and bed material, Sampling and in-situ measurements by South-Transdanubian Water Management Directorate, Pécs,
Laboratory analyses by EJF MKK VVI
Suspended load samples
5 sections, 5-5 verticals, 3 sampling periods – concentrations, grain size distributions
Bed-load samples
5 sections, 5-5 verticals, 3 sampling periods – dry weight, grain size distributions
Bed material samples
5 sections, 5-5 verticals, 3 sampling periods – grain size distributions
Bed-load and Suspended load discharges
Longitudinal profile of sediment transport
Changes in the sediment transport of the river

CONCLUSIONS

i. need to establish fixed control sections
ii. need to carry out repeated measurements during flood conditions
iii. Longer data series are needed for all the stations

RESULTS

Out of the 5 cross-sections in the upstream 4 the data of some formerly executed repeated discharge measurements and sediment samplings also from the period 1998 - 2002 were available (VITUKI, 2003). So the results permitted us to examine the yearly amount of flow and sediment based on the flow data during the years 2003-2011, to compare the changes in riverbed conditions between the years 2003 and 2012.

Because of the quick advancements in electronic measurement technologies, we also had the possibility to try and compare different new methods of measurements which were still not available during the previous investigations. The use of an Acoustic Doppler Current Profiler (ADCP) for example has significantly reduced fieldwork investment. We also had the possibility to do a first-time comparatory measurement with the new laser technology sediment measuremet tool (LISST-100) owned by the Technical University of Budapest.

For the determination of the yearly yields we also determined the correlations between discharge and sediment concentrations and water discharge and sediment load.

Based on the data between 1986 and 2003 summarized for suspended sediment load we can state that in the section Botovo the average values have significantly (43%) decreased, supposedly because of the start of operation of the new Donja Dubrava HPP and its sediment settling impact. At Barcs, the average value has increased by approx. 30 %, while it practically did not change for Drávaszabolcs and Letenye. The results measured in 2012 fit (relatively) well to the prvious graphical connection curves.

The amount of transported bed load has drastically decreased for all the four stations where comparison was possible, mainly since 2004. The rate of the change is the greatest at Botovo, and the smallest at the Drávaszabolcs station, where the bed material is sandy and dredging is not so prominent.

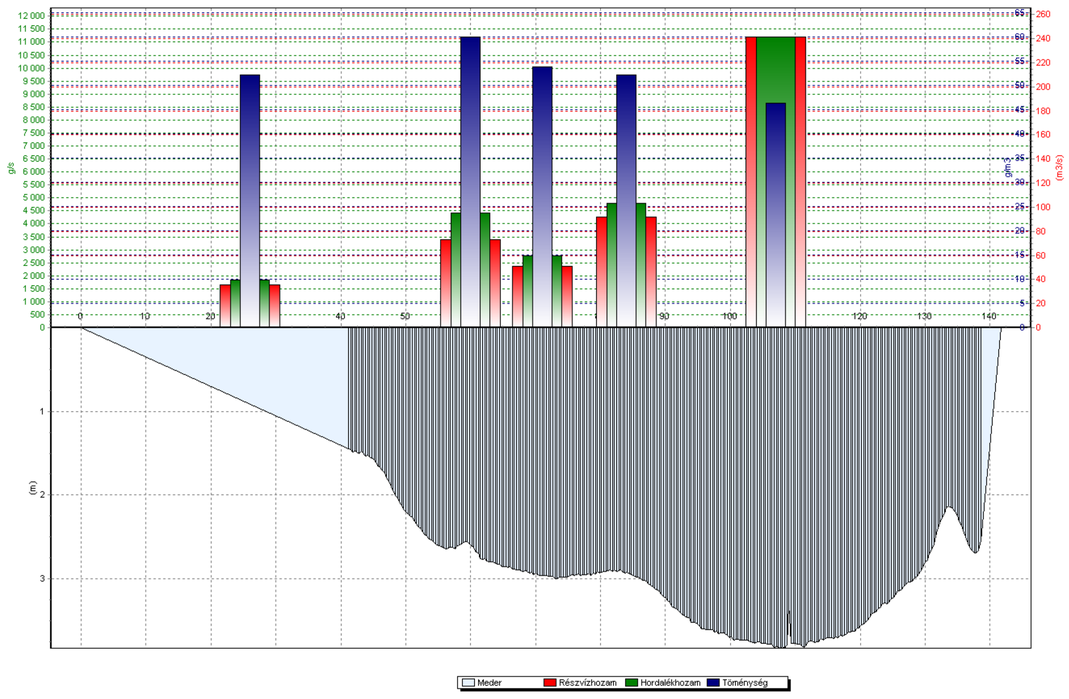

Figure 3. Suspended sediment results – Dráva, Botovo

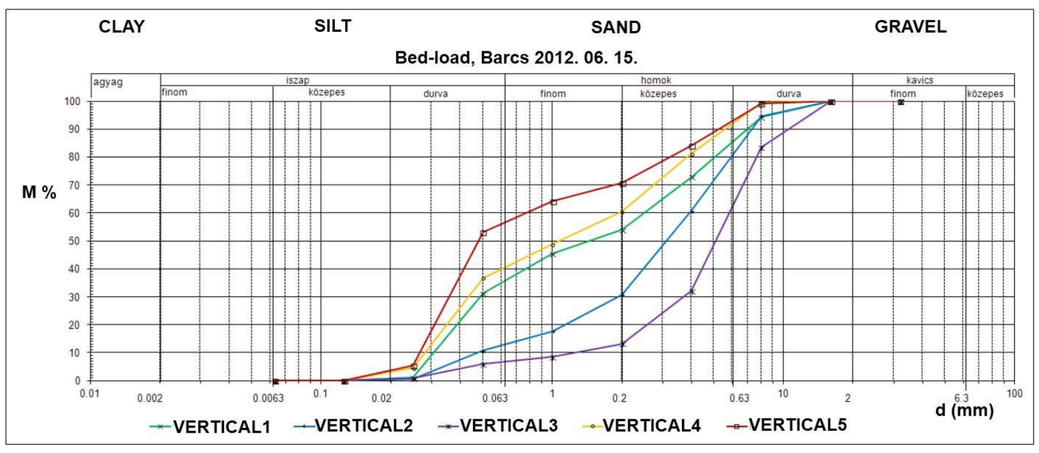

Figure 4. Bed-load, Barcs, 15.06.12 (dd.mm.yy)

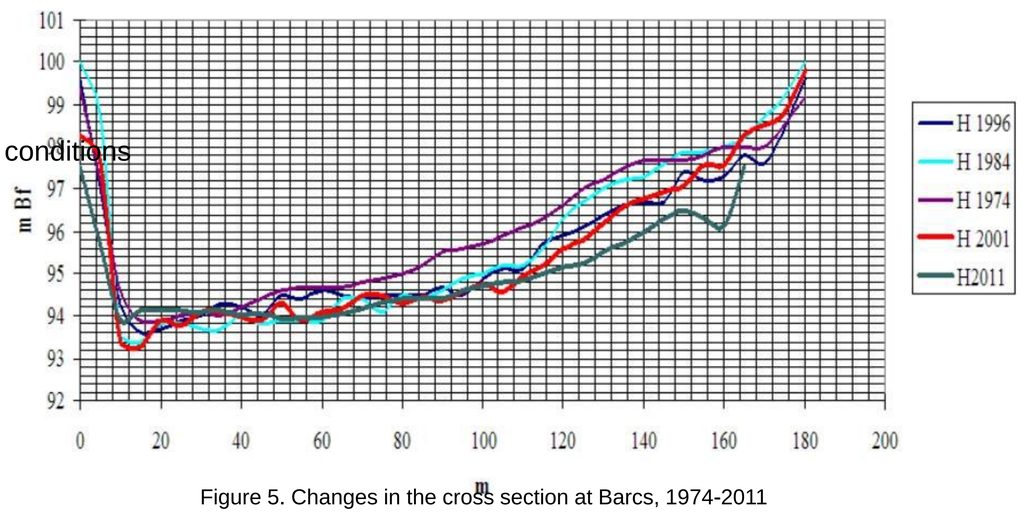

Figure 5. Changes in the cross section at Barcs, 1974-2011

ACKNOWLEDGEMENT

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