BOKU's hydromorphological laboratory model

Mario Klösch, Johannes Schobesberger, Julia Sandberger, Christine Sindelar and Helmut Habersack
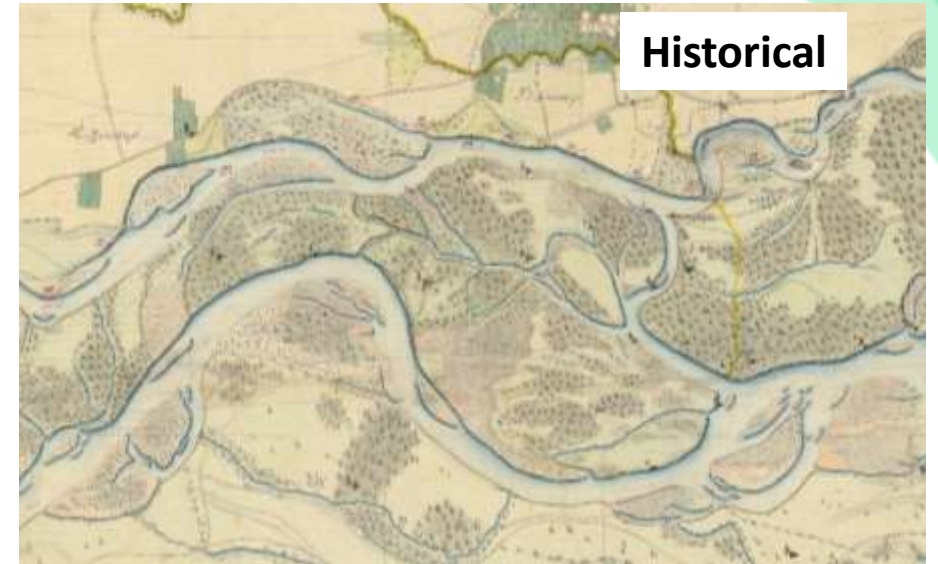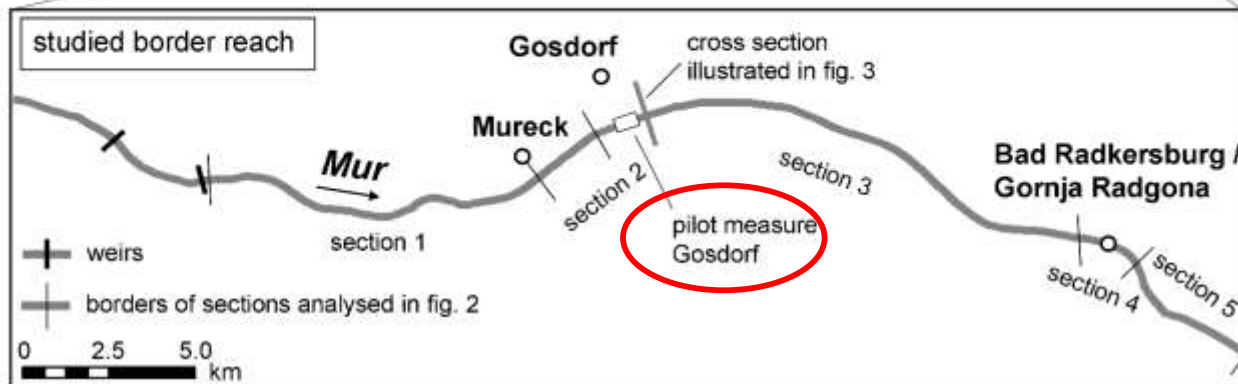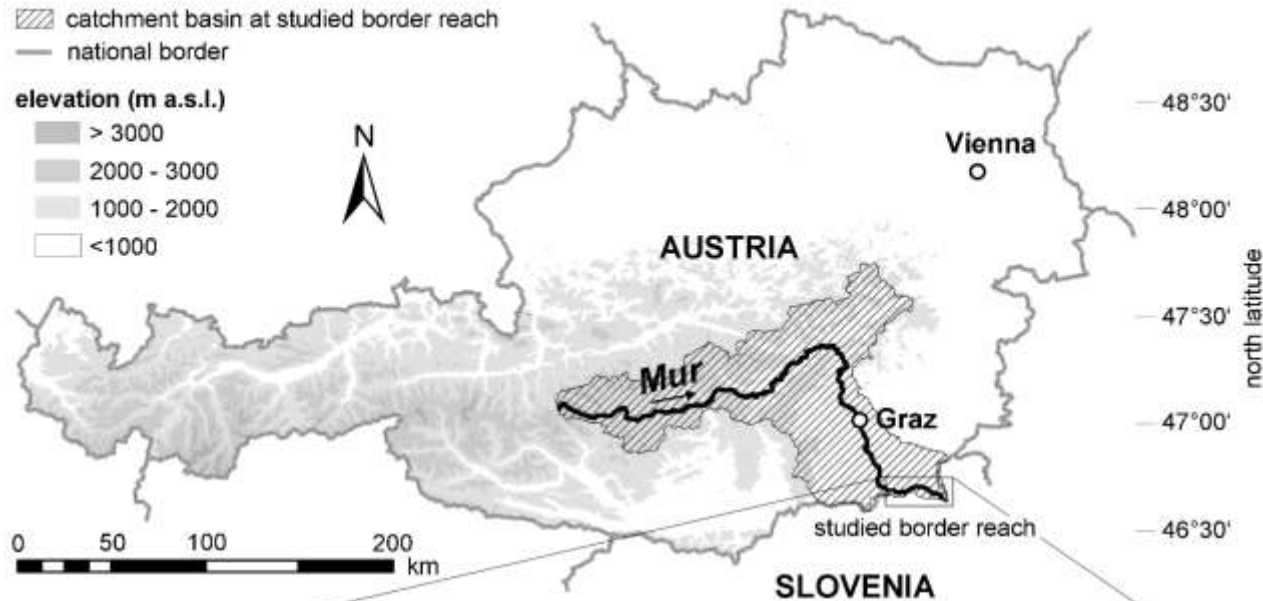
IWA, BOKU

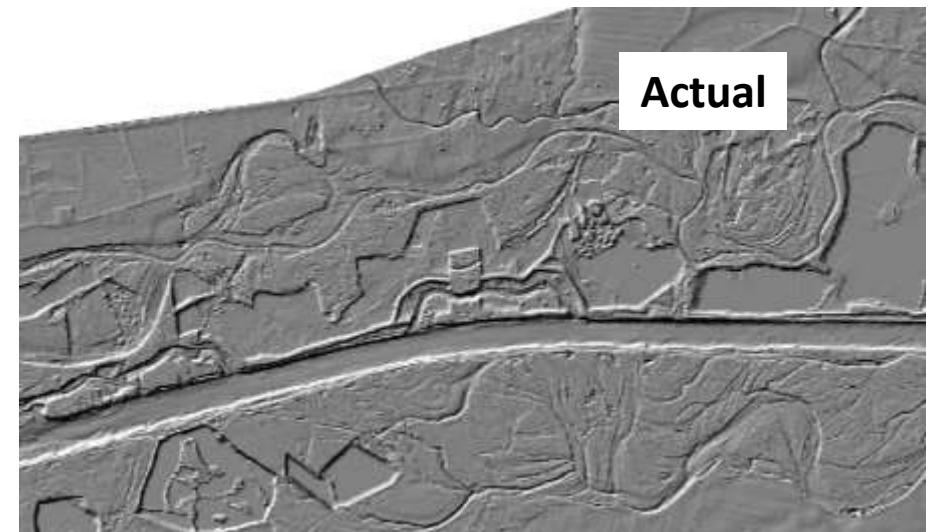Event Lifeline MDD Mid-term conference on 24th & 26th November 2021

Table of content

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- Physical modelling

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Project site

Archiv Graz – Große Murstromkarte (1809-1815)

goMURra Digitales Geländemodell (2019)

Physical modelling

- Physical modelling is used to simulate mostly complex problems in hydraulic engineering

- The processes or rivers are typically down-scaled (rebuilt in a smaller scale) → therefore scaling laws need to be considered and a laboratory is necessary

- The advantage is that in the experiments the boundary conditions can be controlled (e.g., discharge, water level, slope, …) and repeated

- for the "Mur Model" the objectives are → bed stabilization and improvement of morphodynamics for better ecological conditions

- The width will be increased and sediment will be applied → more morphodynamics

Tested model runs

Reducing bedload transport capacity by:

- Providing more width

- Introducing curvature

- Providing a corridor which allows lateral dynamics

$$\tau = \rho g \mathbf{h} I$$

$$\tau = \rho g h \mathbf{I}$$

→ Less bedload supply will be needed in wider and curved channels to stabilize bed and to maintain a balanced budget and sustaining morphology

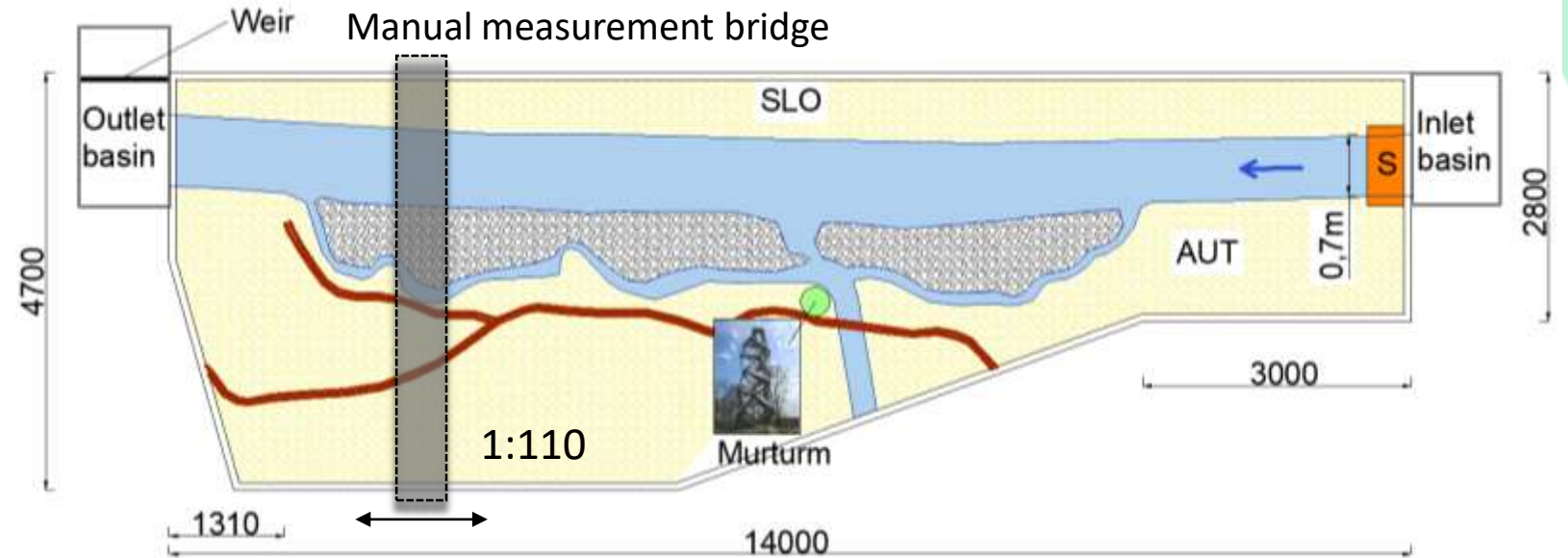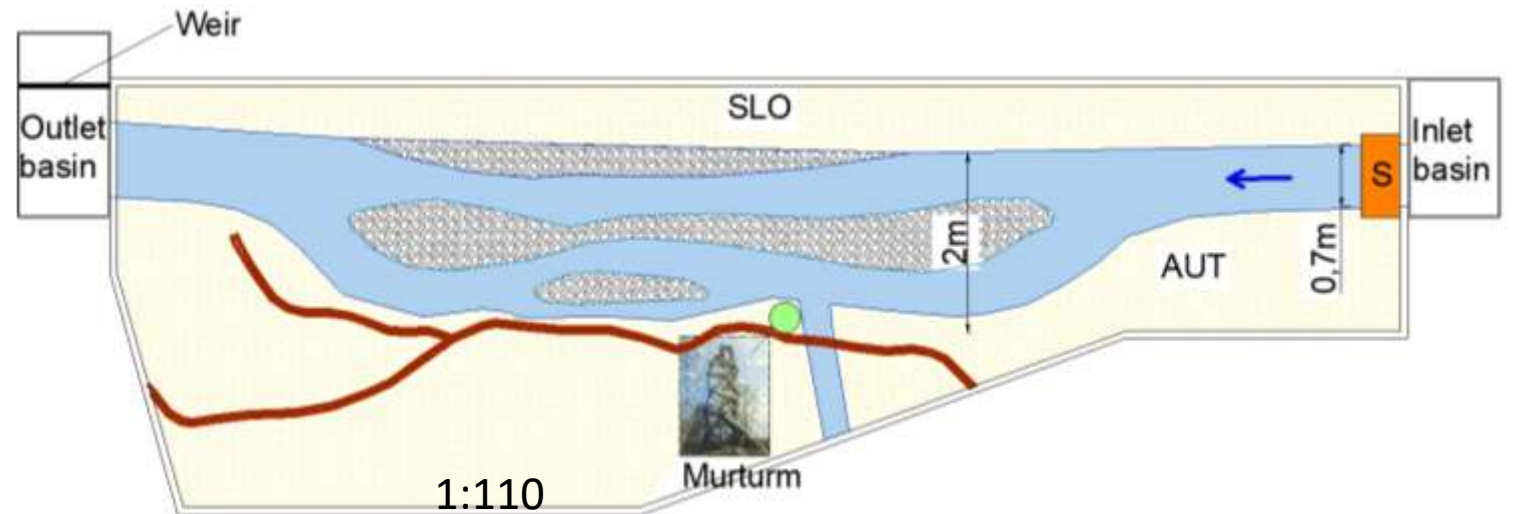|	Width	Sinuosity
Type 0		
Type A		
Type B		
Type C		

Model of the Mur river section

Status quo

- Straight river reach
- hardly any discharge in the side arm
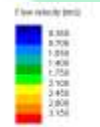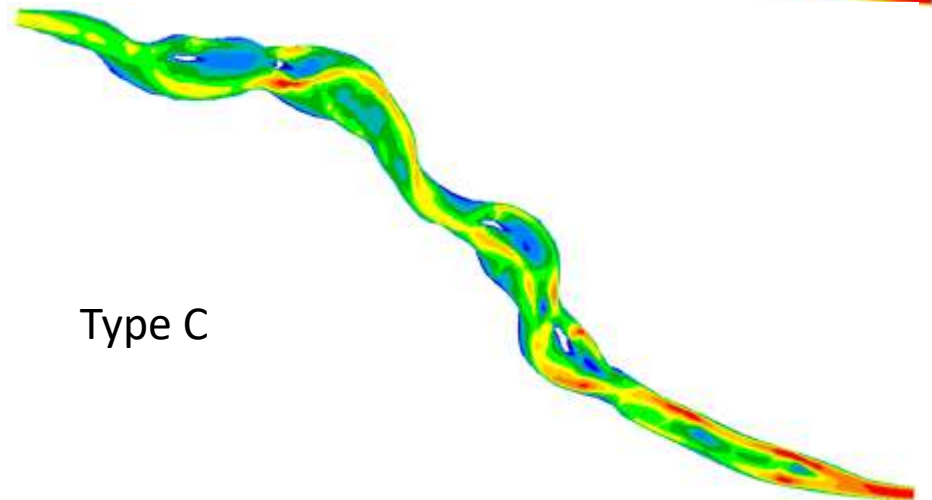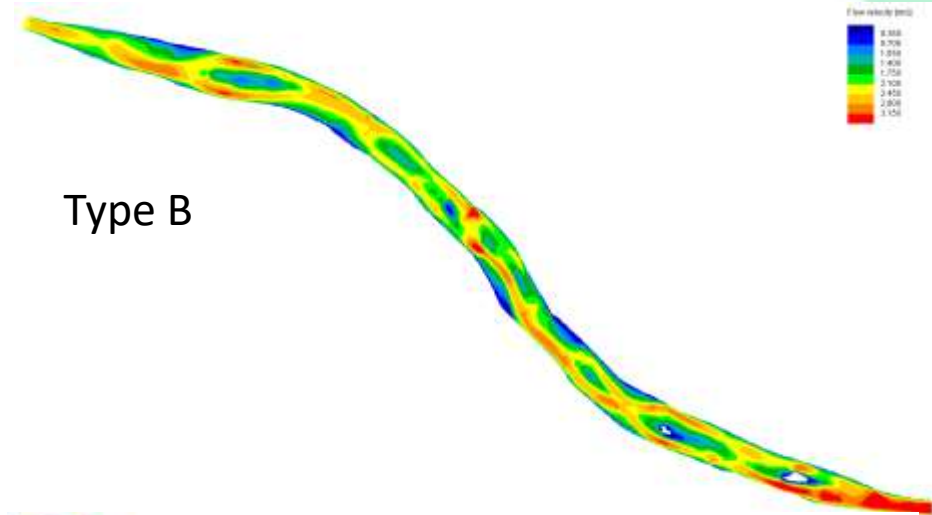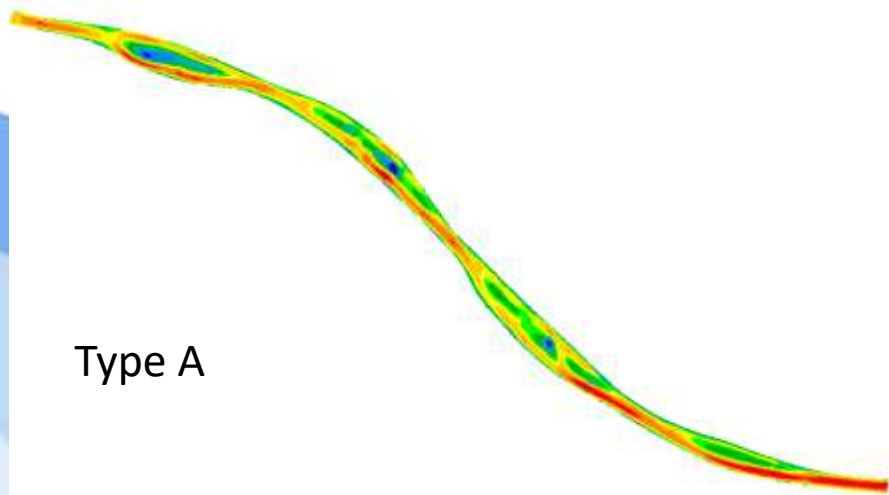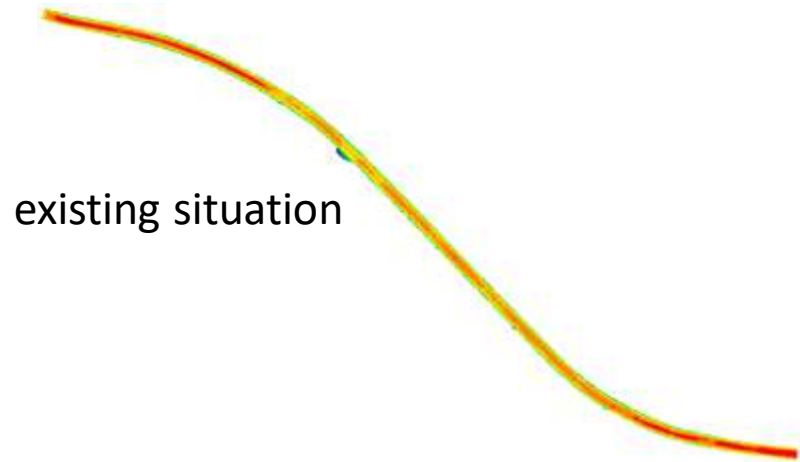- Less sediment supply and high transport capacity

Designed measure

- widening of the side arm
- increased discharge in the bigger side arm → new main channel
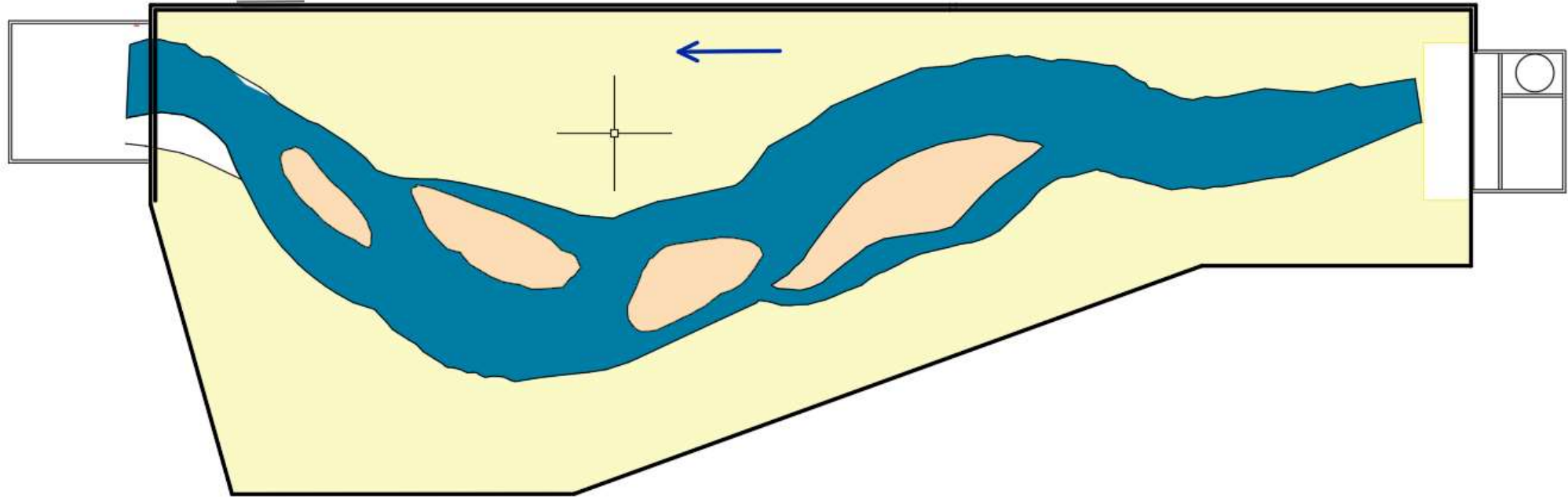- excavated sediment will be applied upstream

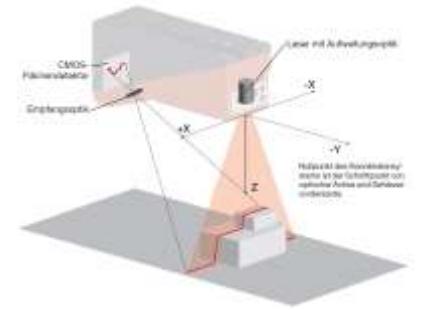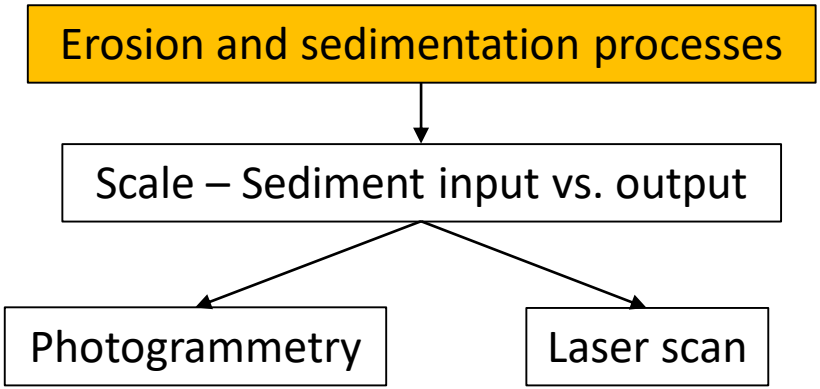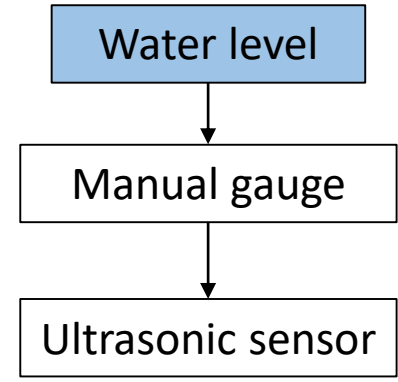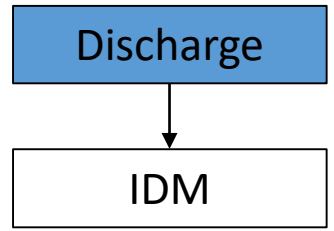# Vision for Border Mura – flow velocities simulated with a 3D numerical model

existing situation

Type A

Type B

Type C

Model of the Mur river section

Typ C in model

Measurement equipment

Thank you!

Live stream – model tour

1. Visit of the main model components
2. Experiment with ink (where does the water flow to?)
3. Watch the sediment transport in real time