

Morphological impacts on flood peak damping (assessment with the FEM-Method)

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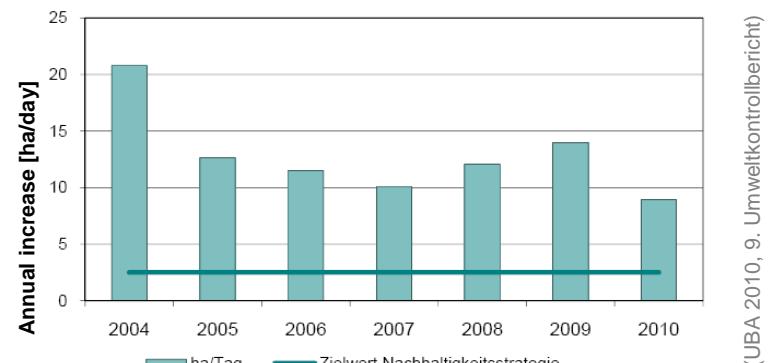
Overview

- 1. Introduction and current situation**
- 2. Objectives**
- 3. Methods**
- 4. Catchment area**
- 5. Results**
- 6. Discussion**
- 7. Conclusion**

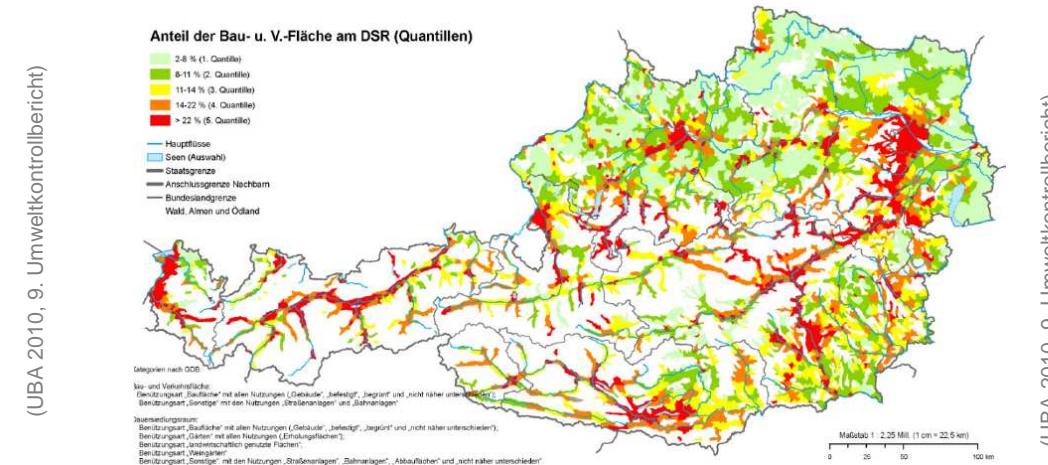
Introduction and current situation

EU-floods directive → preservation and restoration of natural inundation areas

Daily consumption of land for construction and traffic

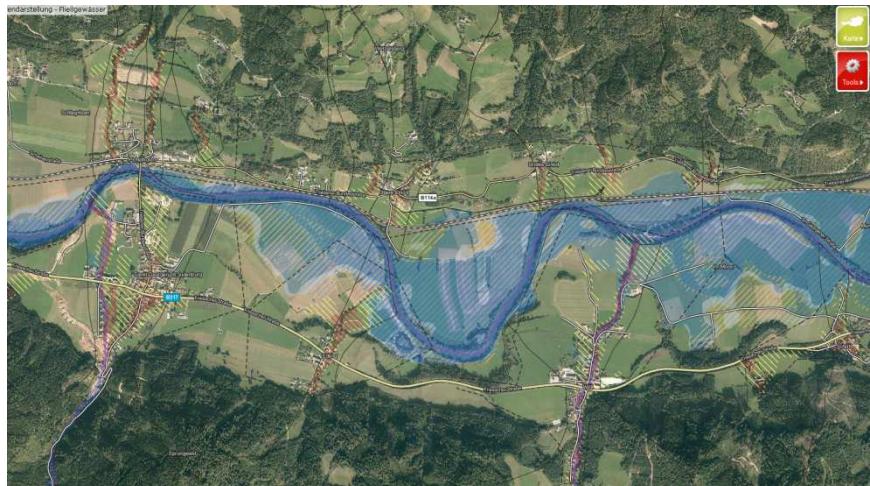


Percentage of construction and traffic areas of the potential permanent settlement area



Objectives

- Testing and improving of a method to evaluate and compare floodplains.
- Qualitative assessment of floodplain retention effectiveness
- Support for land use planning



(<http://www.hora.gv.at>)



(<http://www.freiland.at>)

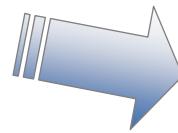
FEM-Methode

HYDROLOGY



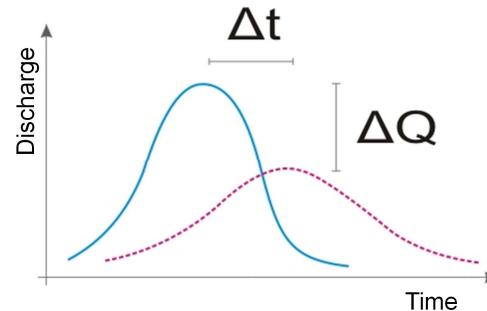
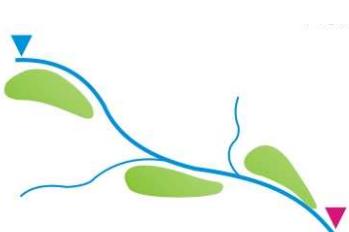
FEM

Floodplain Evaluation Matrix

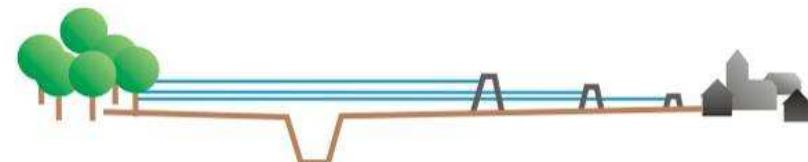


HYDRAULICS

Parameter: Flood peak reduction (ΔQ)
Flood wave translation (Δt)



Parameter: Waterlevel (WSP)
Flow velocity (v)
Shear stress (τ)
Specific discharge



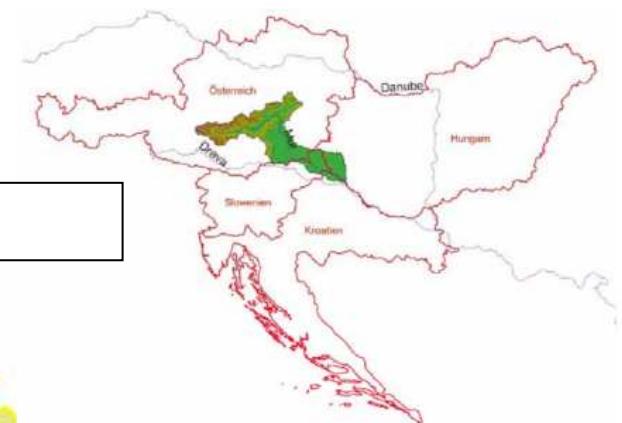
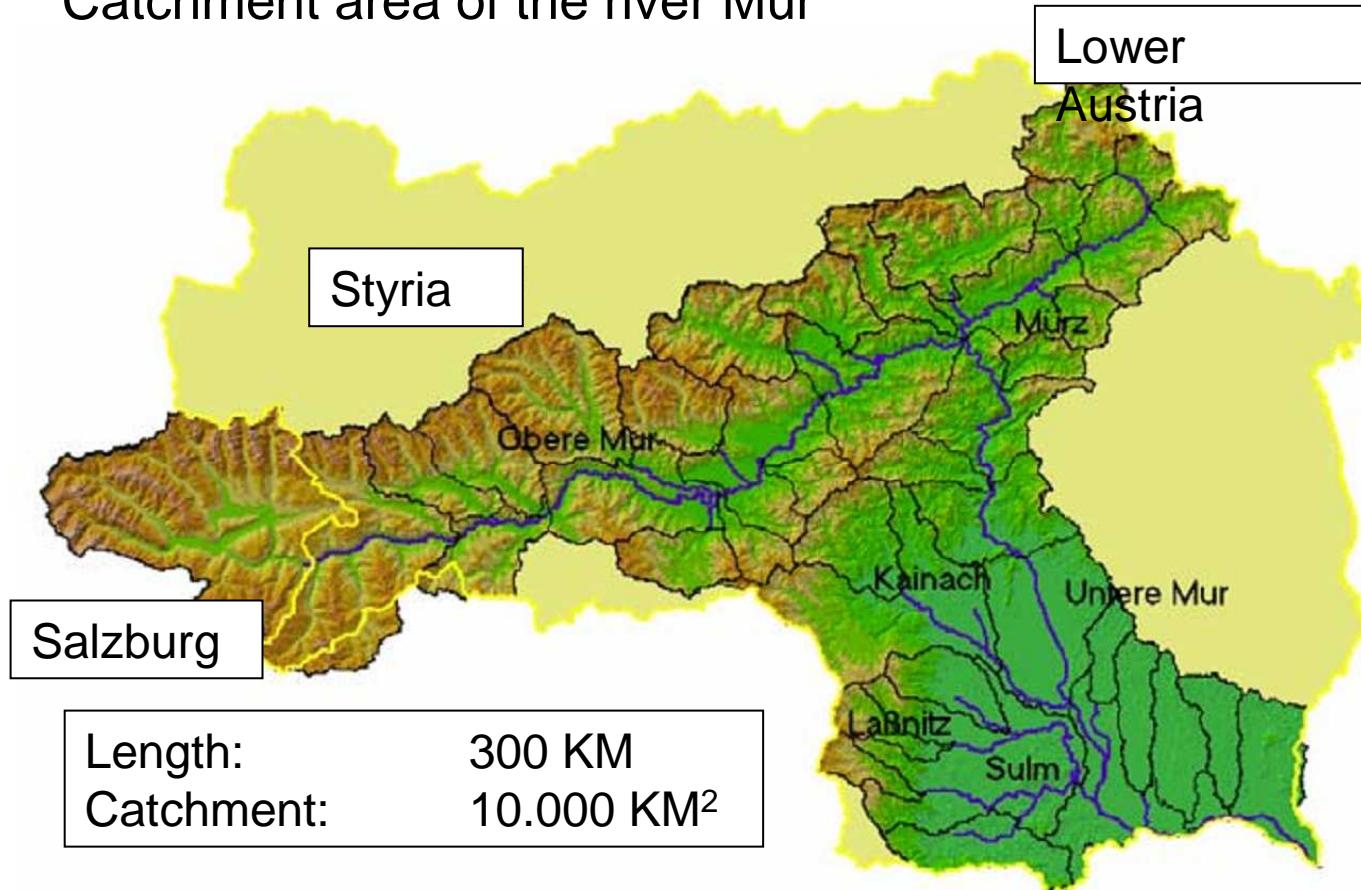
Danube catchment



(Shannon, 2010)

Catchment area

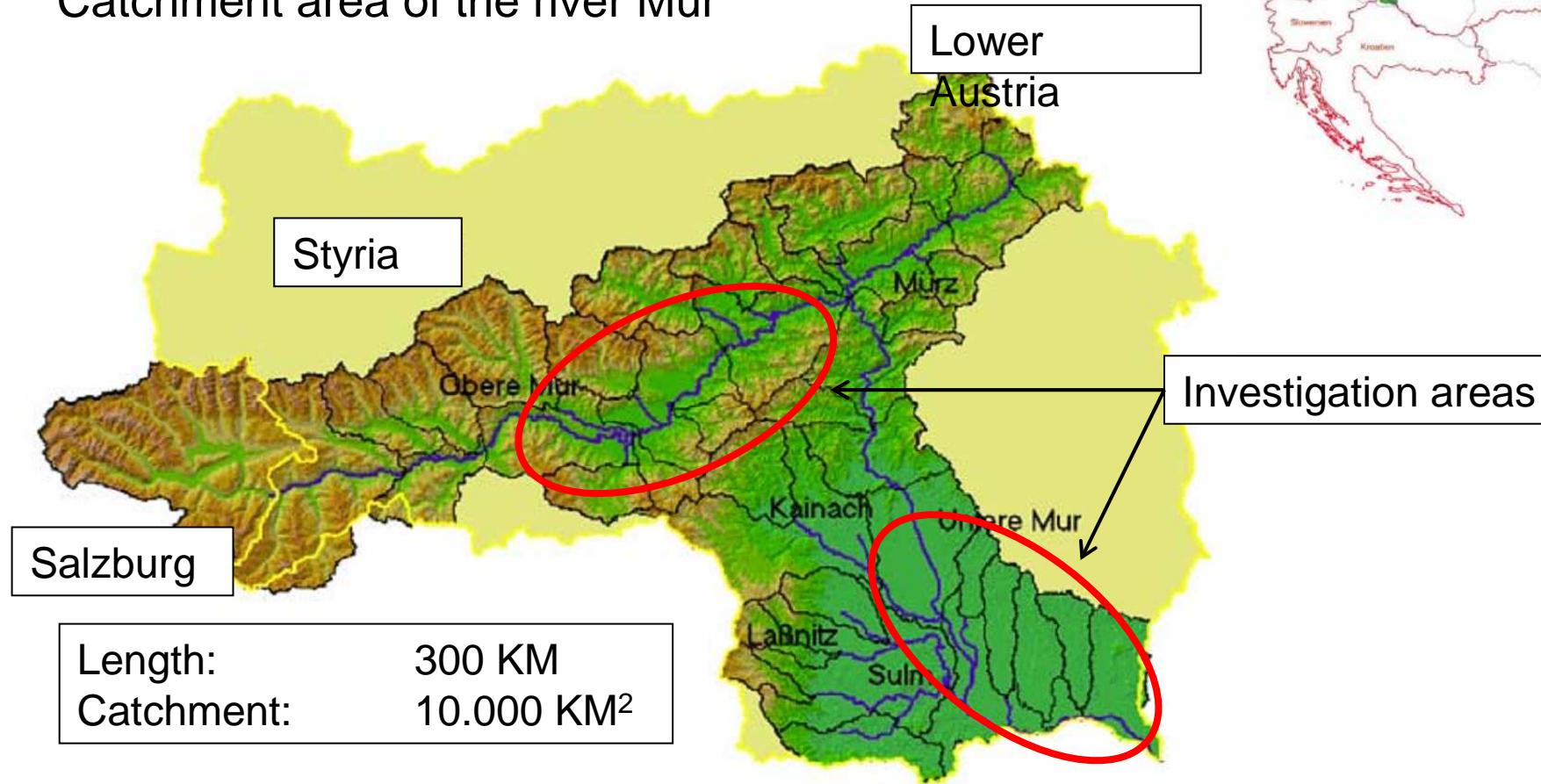
Catchment area of the river Mur

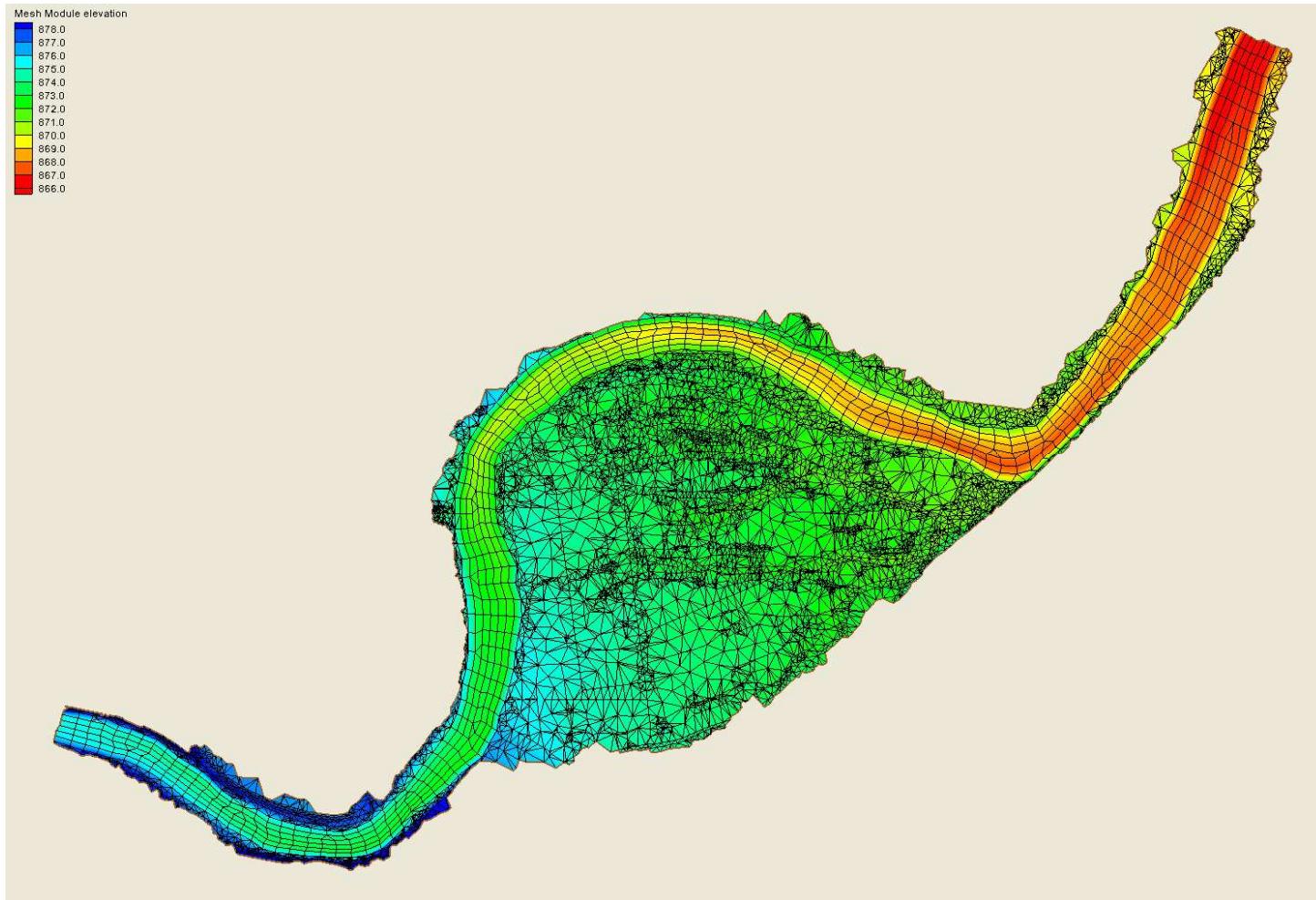


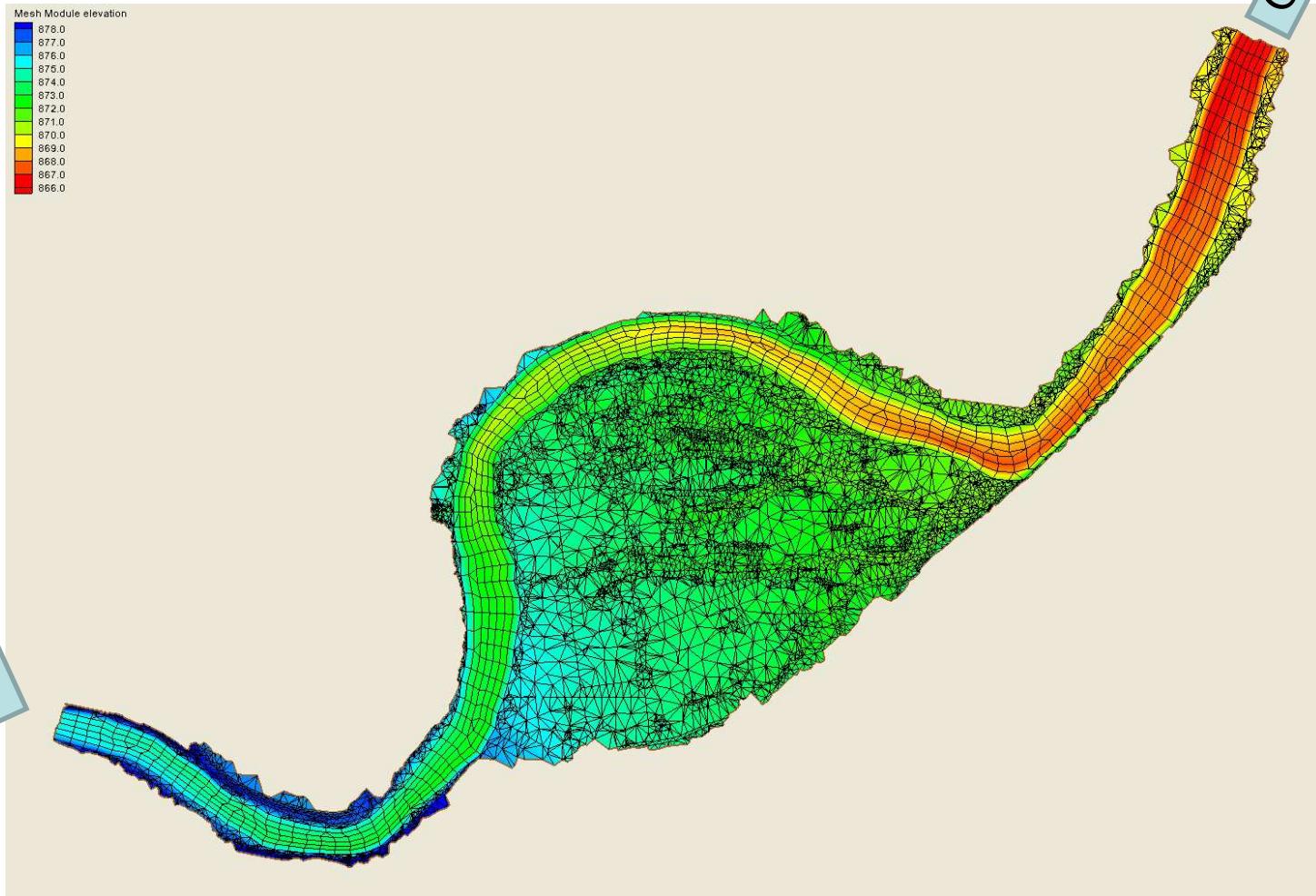
(INTERNATIONALES HOCHWASSERPROGNOSEMODELL MUR)

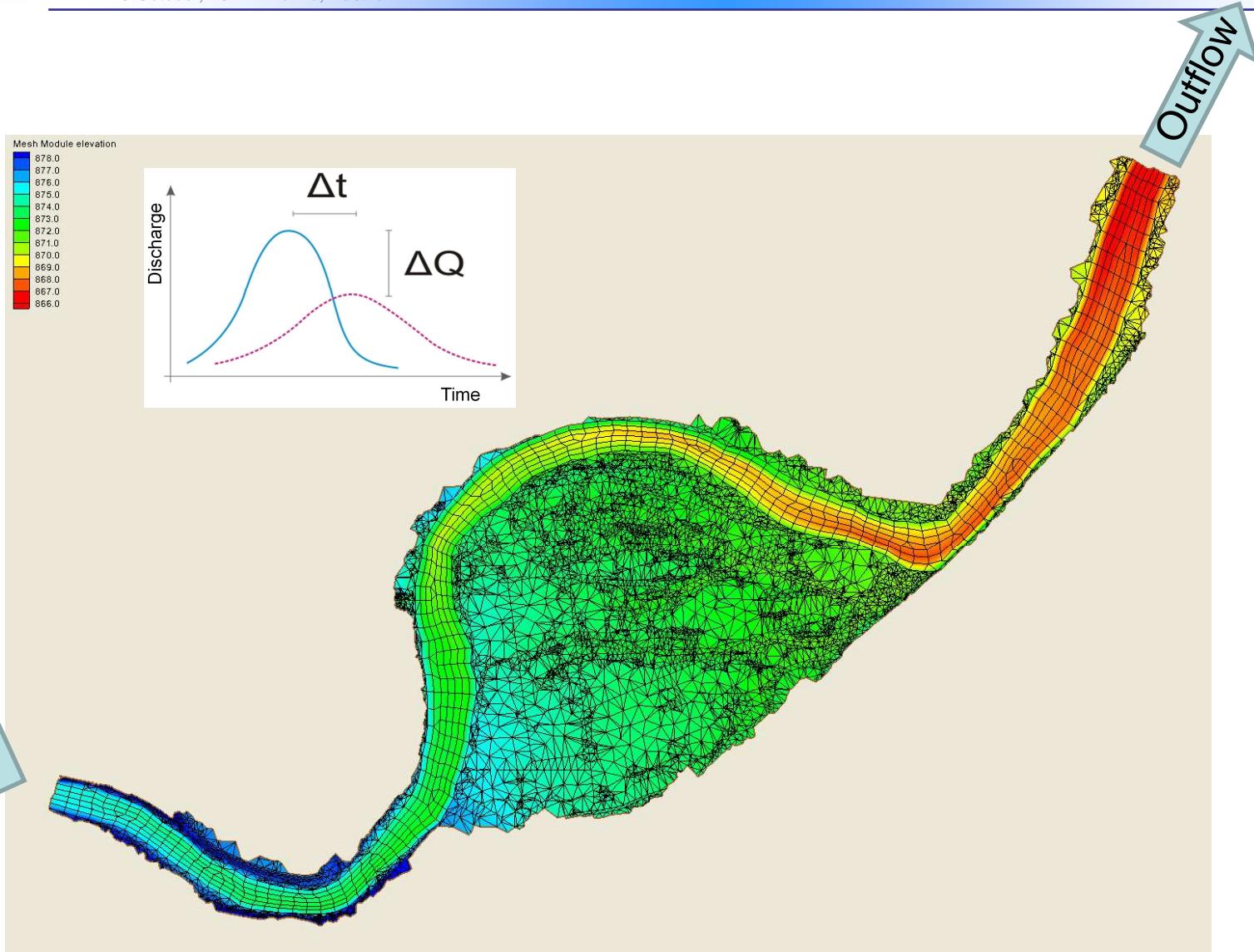
Catchment area

Catchment area of the river Mur





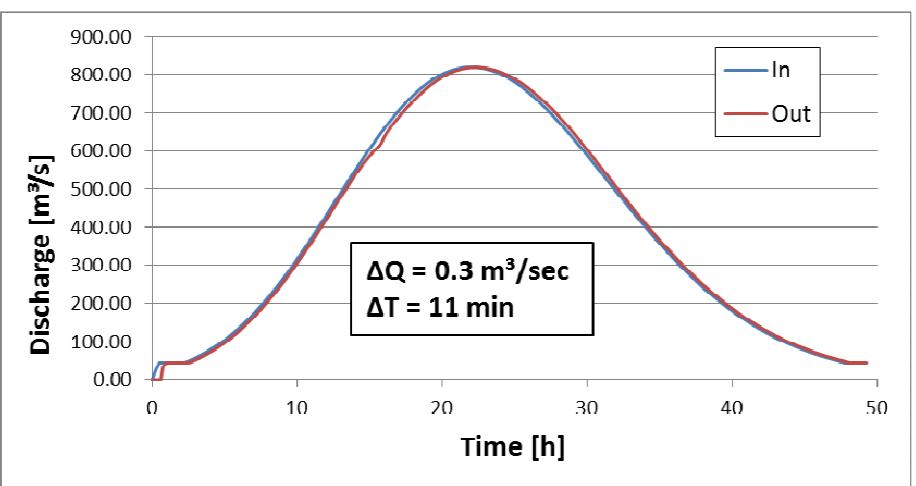
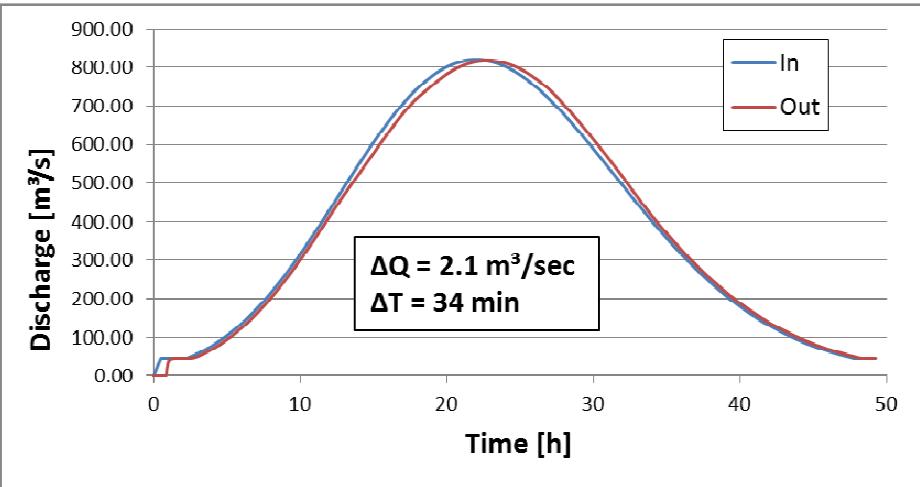
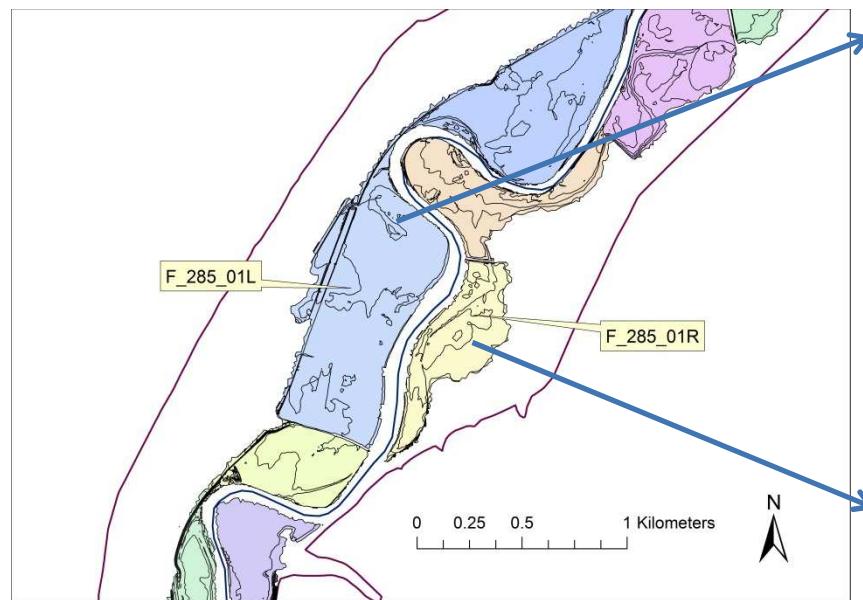




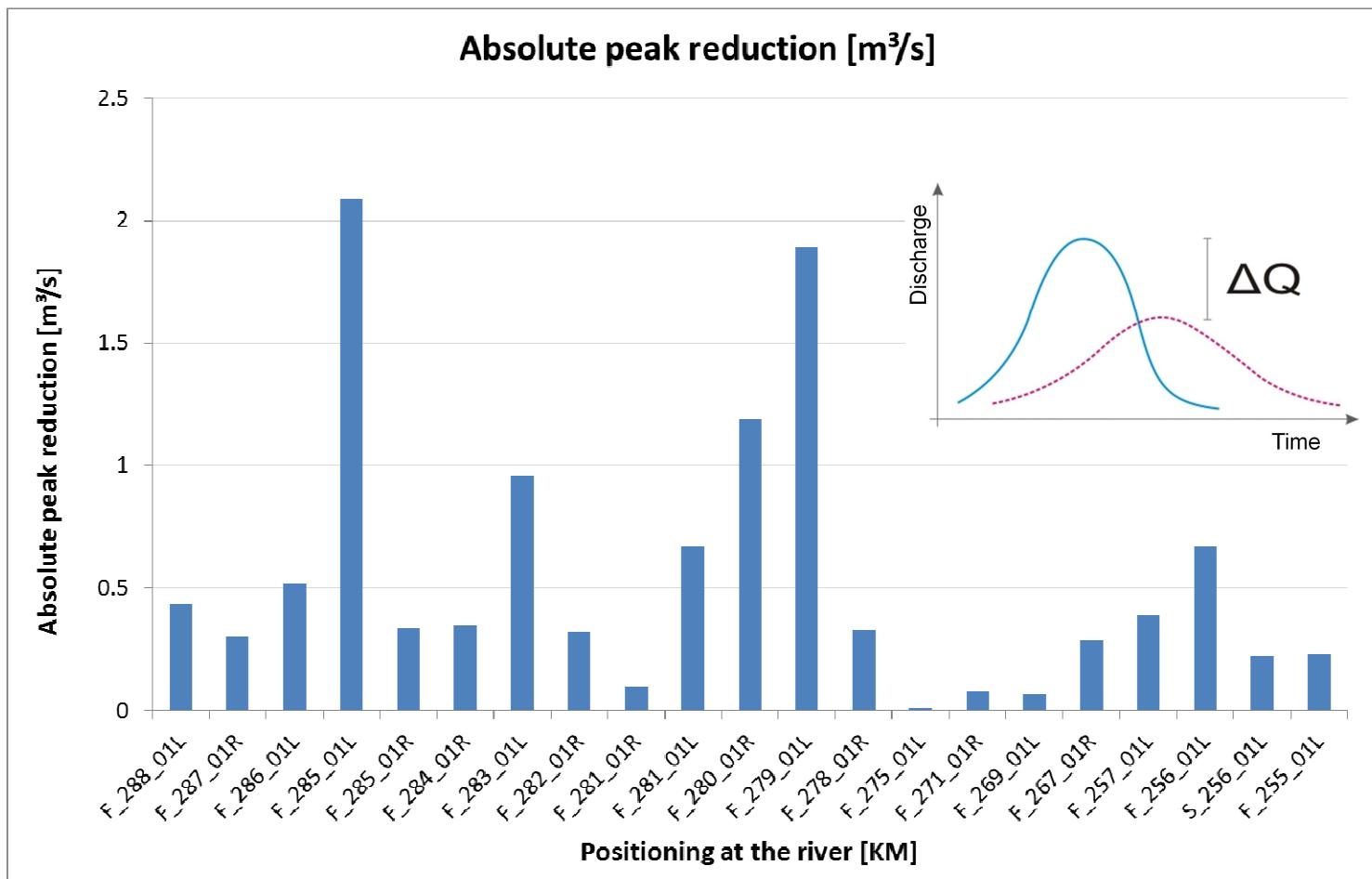


Results Hydrologic effect

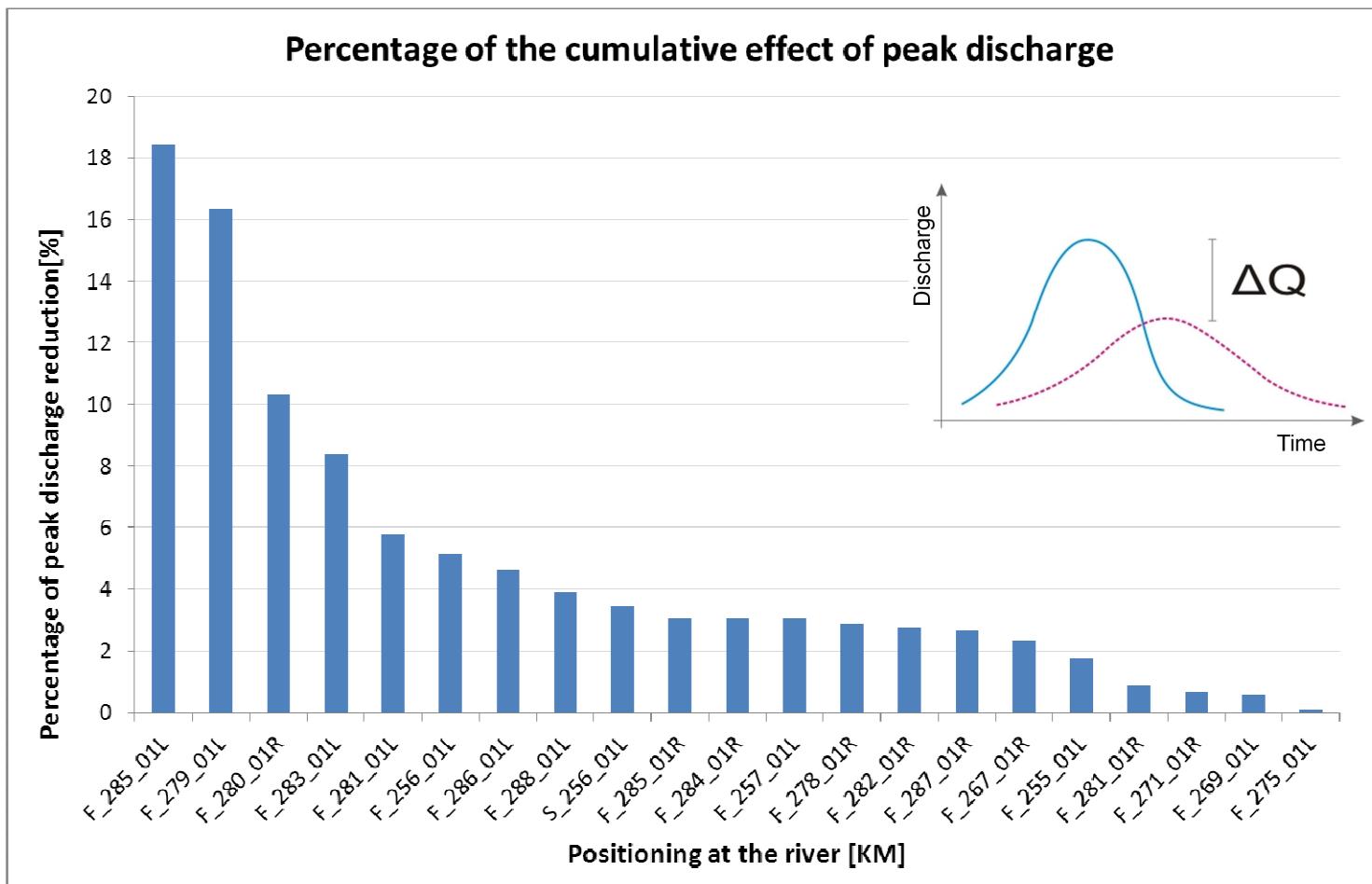
Floodplain map



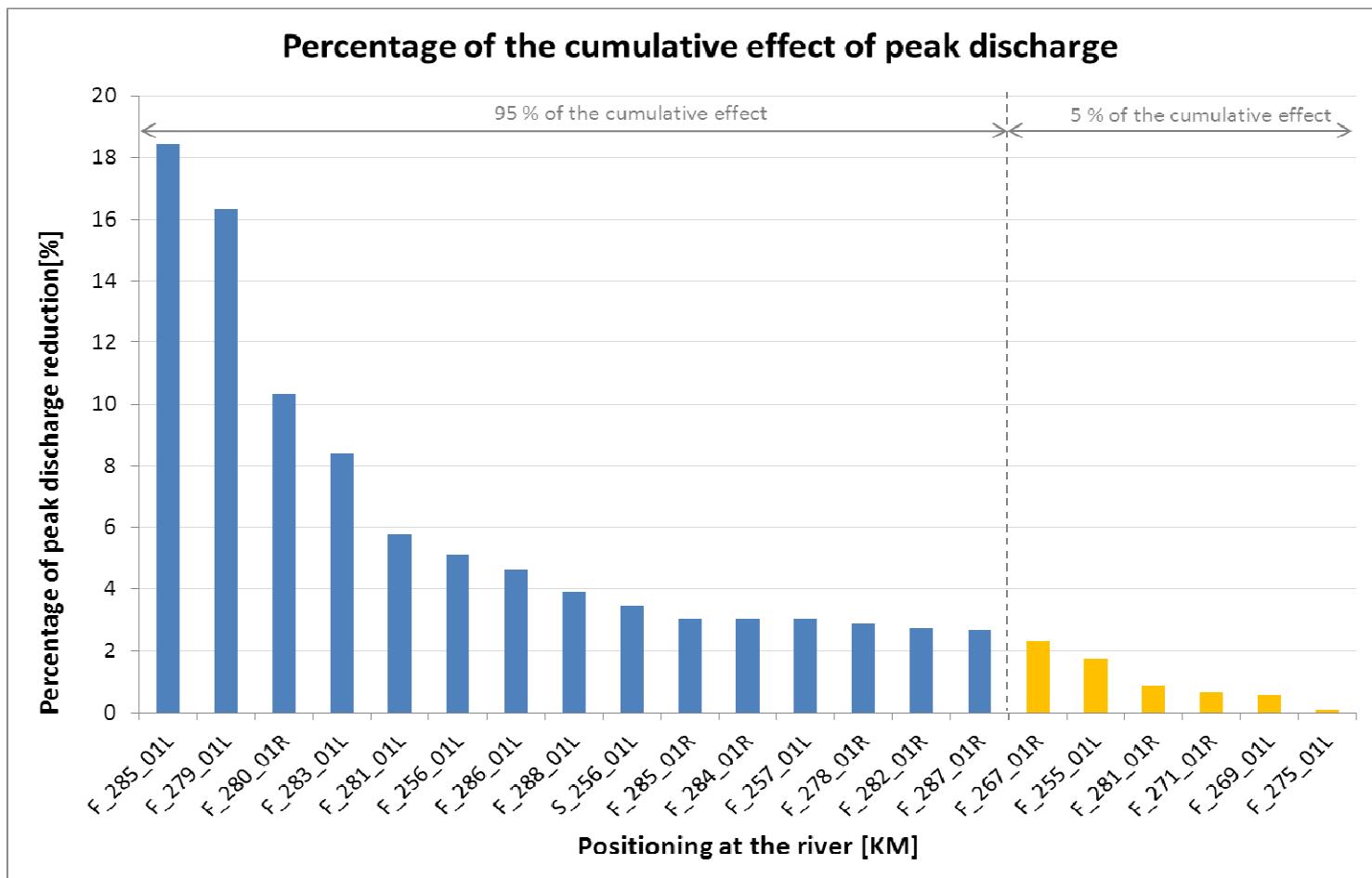
Results Hydrologic effect DQ



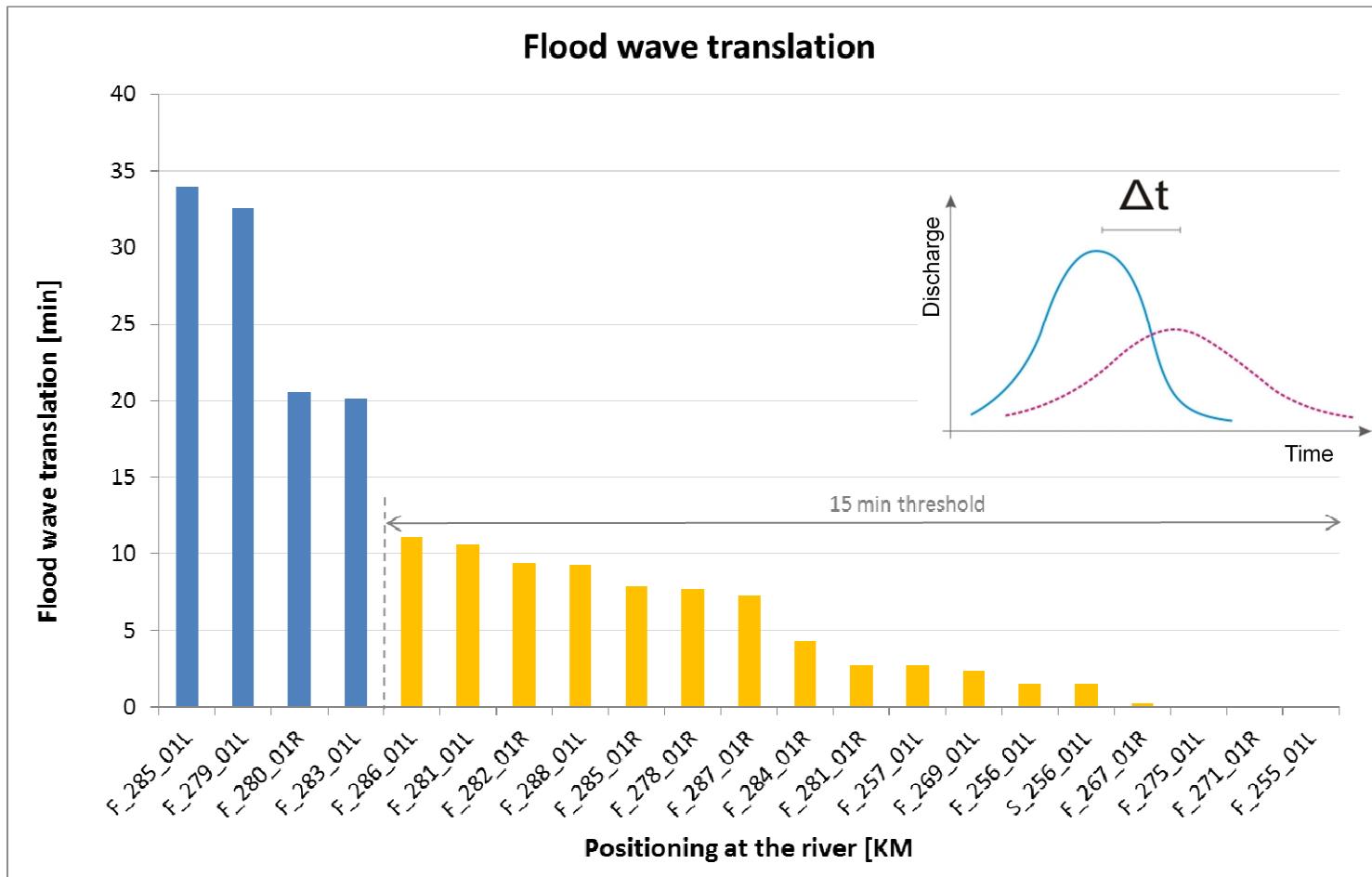
Results Hydrologic effect DQ



Results Hydrologic effect DQ

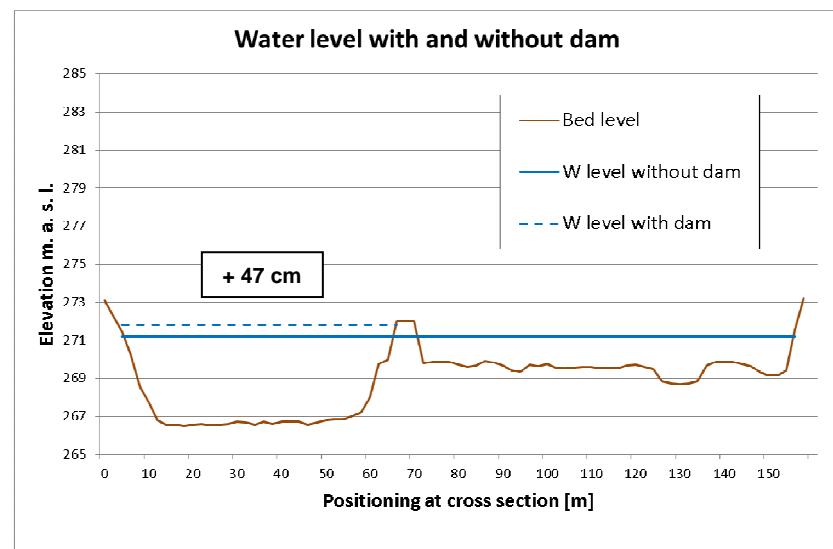
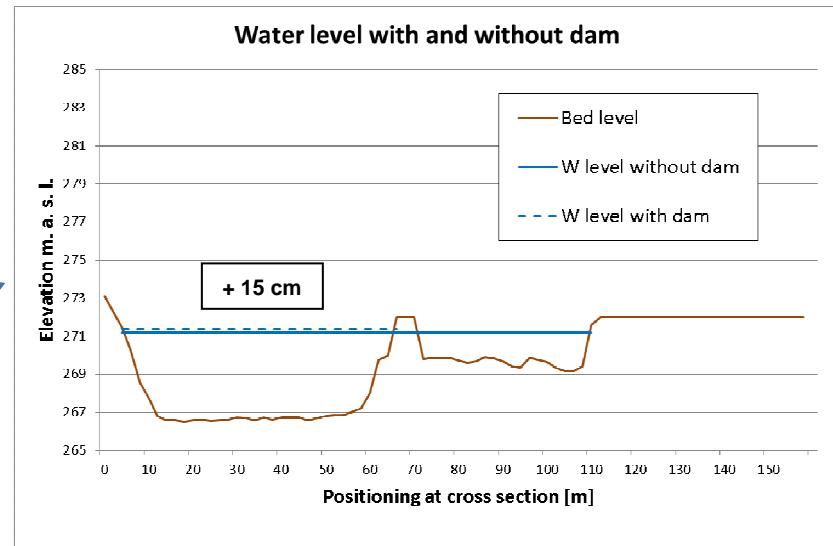
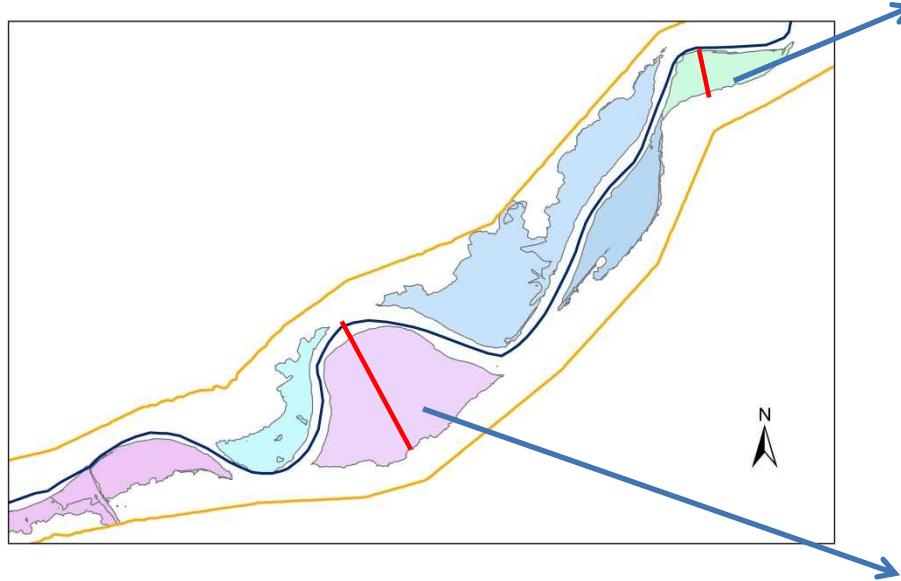


Results Hydrologic effect Dt

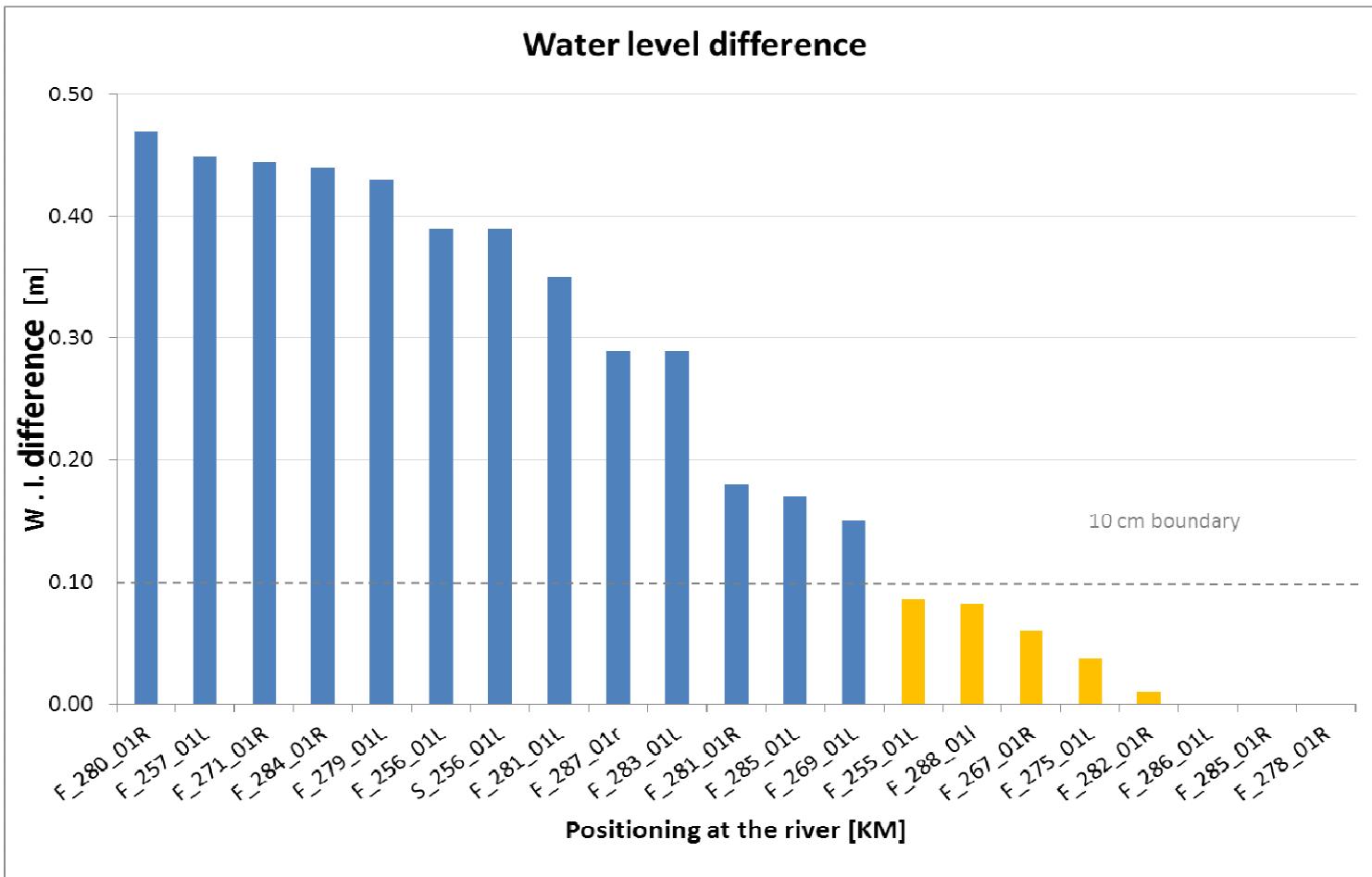


Results Hydraulic effect

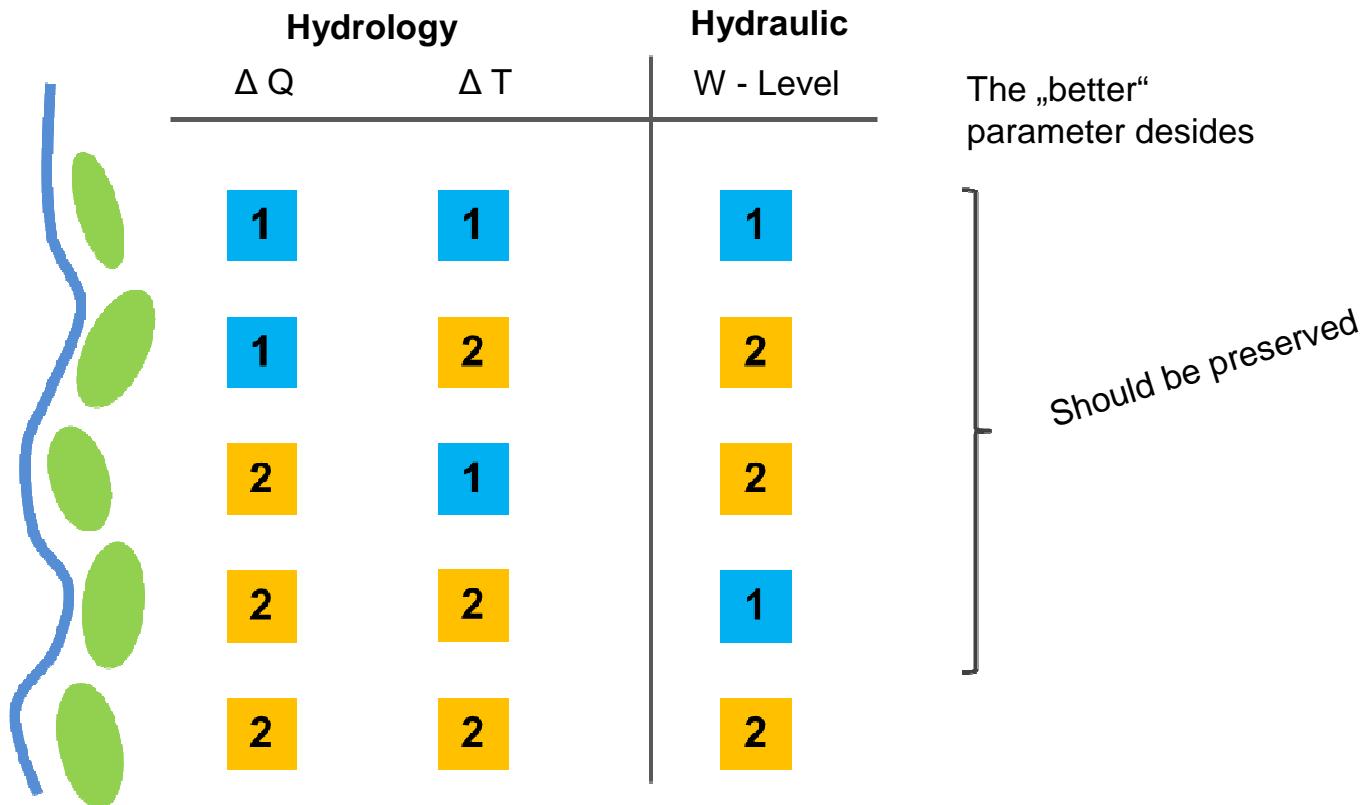
Floodplain map



Results Hydraulic effect

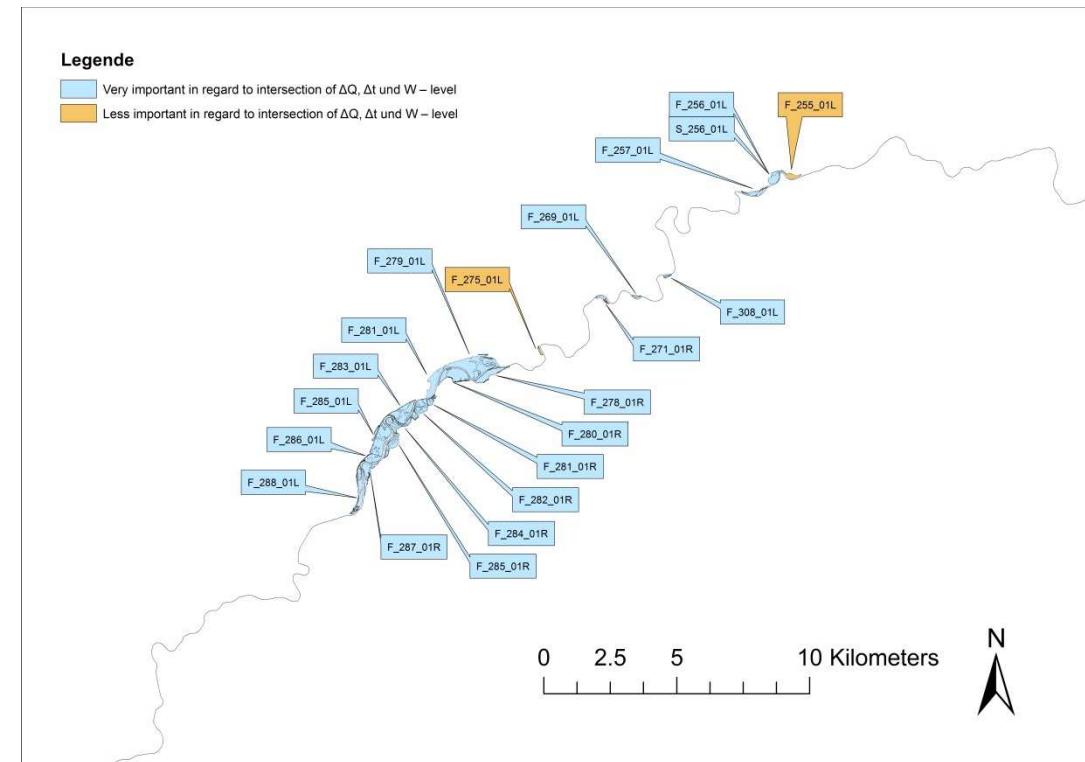


Intersection of Hydrological und Hydraulic parameters

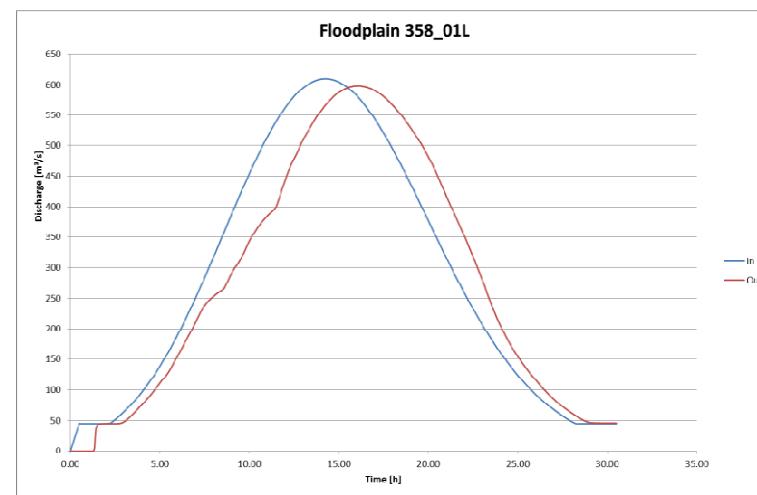
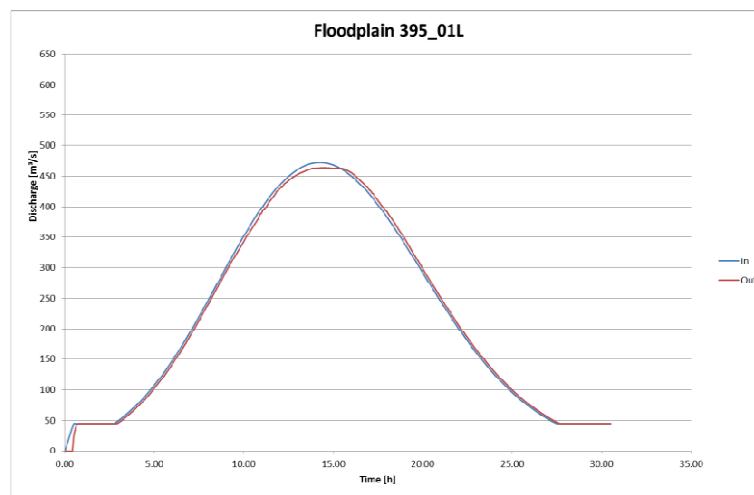
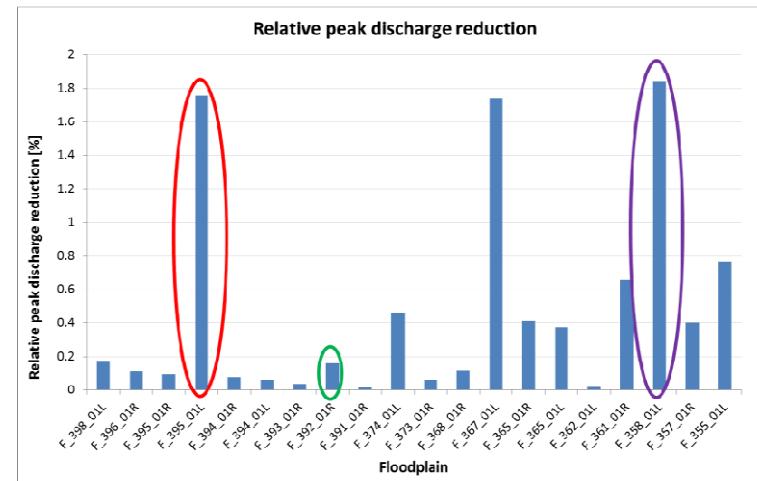
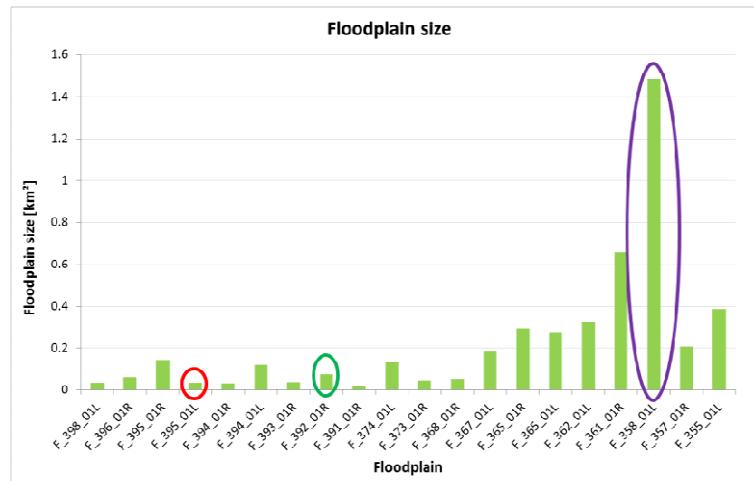


Intersection of Hydrological und Hydraulic parameters

Positioning at the river	Peak dis. Reduction $\Delta Q_{\text{rel}/\text{Reach}} [\%]$	Temporal translation $\Delta t [\text{min}]$	Water level change $\Delta WSP [\text{cm}]$	Assesment
F_288_01L	3.90	9.28	0.08	
F_287_01R	2.67	7.25	0.29	
F_286_01L	4.62	11.08	0.00	
F_285_01L	18.42	33.95	0.17	
F_285_01R	3.03	7.89	0.00	
F_284_01R	3.03	4.28	0.44	
F_283_01L	8.38	20.13	0.29	
F_282_01R	2.75	9.38	0.01	
F_281_01R	0.87	2.78	0.18	
F_281_01L	5.78	10.55	0.35	
F_280_01R	10.33	20.55	0.47	
F_279_01L	16.33	32.58	0.43	
F_278_01R	2.89	7.68	0.00	
F_275_01L	0.07	0.00	0.04	
F_271_01R	0.65	0.00	0.44	
F_269_01L	0.58	2.35	0.15	
F_267_01R	2.31	0.23	0.06	
F_257_01L	3.03	2.78	0.45	
F_256_01L	5.13	1.50	0.39	
S_256_01L	3.47	1.50	0.39	
F_255_01L	1.73	0.00	0.09	

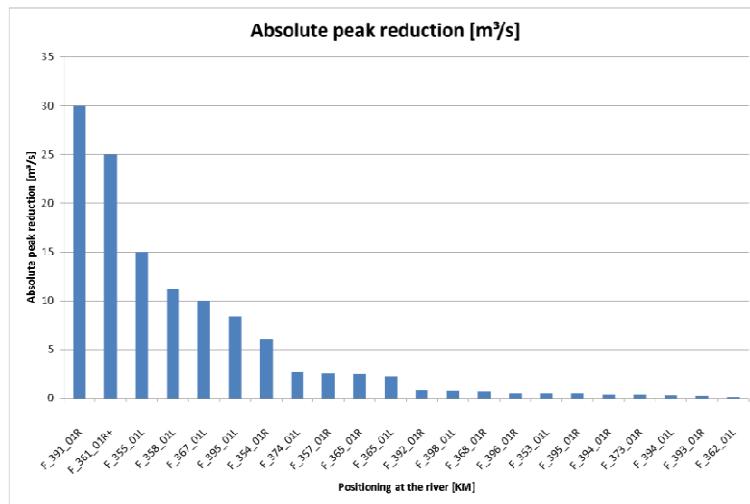


Discussion



Conclusion

- The method can be used in everyday practice
- Qualitative assessment of floodplain retention effectiveness
- Support for land use planning



(<http://www.egg-raumplaner.at>)

Thank you for your attention!

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Discussion

