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Sustainability of project results – Experiences and good practices from Austria


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Workshop on the sustainability of the SWARM results

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Strengthening of master curricula in water resources management for the Western Balkans HEIs and stakeholders
Project number: 597888-EPP-1-2018-1-RS-EPPKA2-CBHE-JP




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Experiences and good practices from Austria


Sustainability in ...

1. An international capacity-building project: UNIDO_CB
2. A national climate change research project: PURIFY
3. An EU-funded research and infrastructure project: SEDDON II

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Capacity Building for National Staff of the University of Mosul (Iraq) – Dams & Water Resources Department

Courses and exercises delivered online in the subjects:

1. Integrated Flood Risk Management
2. Fundamentals of hydraulics
3. Computer-based river modelling

- Courses delivered in March – July 2020
- Around 30 participants: 15 staff from University of Mosul, 12 federal employees, 3 others

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Capacity building: Impression from the course



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Capacity Building: Visibility

At BOKU's main page ...

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Capacity Building: Visibility


... and also at UNIDO's main page

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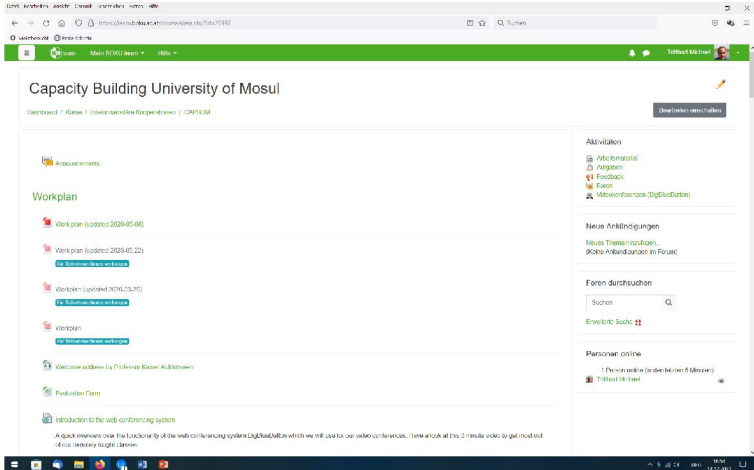


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Capacity Building: Sustainability

Continued access for U.Mosul staff to the e-learning course:




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Capacity Building: Sustainability


➔ *Unexpected result:* Updated curriculum using/including the delivered course materials designed in 2021:

	Subject's Name: Numerical modelling in water resources	اسم المادة : النمذجة العددية في الموارد المائية
		التخصص : ماجستير- موارد مائية
	The Syllabus in English	المناهج الحالية باللغة العربية
7-	1- Types of Water Engineering models □ Physical models □ Mathematical Models 2- Introduction to mathematical models □ Spatial discretization. Types of meshing □ Boundary conditions and initial conditions □ Numerical methods: finite difference □ (FD) and finite volume (FV) □ Computational Fluid Dynamics (CFD) □ Temporal Discretization: explicit and implicit methods □ Convergence and stability. Limitations Calibration models 3- Numerical models in river hydraulics Governing Equations □ Transport of sediments and	-انواع النماذج في هندسة الموارد المائية - النماذج الفيزيائية - النماذج الرياضية 2-مقدمة الى النماذج الرياضية -التقطيع المكاني وأنواع الربط والتعتيق -خروط التحدود والحالة الأولية - الطرق العددية: FE و FD - ديناميكا السوائج الحسابية CFD - التقطيع الزمني: الطرق الفاصية والحدودية - كتلة واستقرارية النماذج، المحددات ومعادلات النماذج. 3- النماذج العددية في هيدروليكية الأنهار -التقليل الرسوبيات والتلوث - تمثيل امتداد الفيضان باستخدام نماذج ثنائية البعد. 4- النماذج العددية في تمثيل حركة الماء داخل النهر -المعادلات المستخدمة في النمذجة


➔ Capacity-building course has led to a permanent improvement of the curriculum

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PURIFY – Effects of desiccation on the self-purification capacity of headwater streams: Consequences for the stream management

Objectives


- Analysing the medium- and long-term effects of intermittent flow on stream ecosystems’ structures and functions determining the water quality of intermittent streams in Austria
- Quantifying potential effects of desiccation on the self-purification capacity of the sediment surface and the hyporheic zone
- Identifying factors which determine the resistance and resilience to desiccation
- Modelling potential consequences of drought for the water quality and related ecosystem functions in selected streams in Austria

Organisational Framework


- Research project funded by the Austrian Climate Research Programme, April 2018 – September 2021
- 2 national partners, 2 international partners

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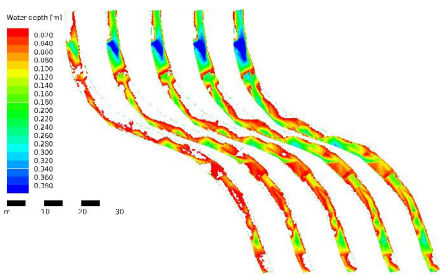
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Selected results of the PURIFY project

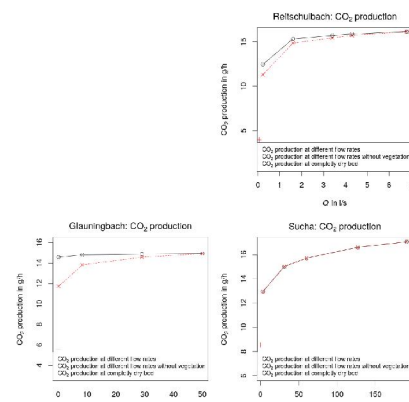


Water depth (m)

0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
-0.010
-0.020
-0.030
-0.040
-0.050
-0.060
-0.070

Water depths in selected rivers for low flow discharge regimes when falling dry

CO₂ production for various river reaches as a function of discharge and vegetation cover scenarios



Reitschulbach: CO₂ production
Glanungbach: CO₂ production
Sucha: CO₂ production

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How to achieve sustainability in a research project?

→ Main research results summarized in a guideline for river managers (practitioners)

→ Suggestions for the practice, e.g.: consider tall vegetation near river banks as the shading improves the self-purification capacity of biogeochemical cycles in river bed sediments

powered by 

Vorschläge für intermittierende Fließgewässer zur Risikoabschätzung einer Verschlechterung der Wasserqualität infolge von Trockenperioden – Erkenntnisse aus dem Projekt PURIFY

Dieses Projekt (PURIFY, B.769828) wurde aus Mitteln des Klima- und Energiefonds gefördert und im Rahmen des Programms „ACRF2017, 10P call“ durchgeführt.

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Interreg Austria-Hungary 
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SEDDON II

Sediment Research and Management at the Danube River II

The project leads to concrete proposals for a new water management strategy to improve the ecological status and flood risk management of water bodies in the Upper and Middle Danube, with sediments playing an important role.



The new hydraulic engineering laboratory as an open research center as well as joint monitoring and modeling provide the basis for targeted and efficient measures to improve ecological status and flood risk management.



SEDDON II ATHU10

The aim of SEDDON II is the gain of knowledge and knowledge transfer from research to water management.

Project budget in EUR: **10.735.567,50**
 ERDF funding in EUR: **7.500.232,37**
 Project duration: **04/2016-12/2020**
<http://www.interreg-athu.eu/seddon2>





Contact:

Name of institution
 Contact person
 E-mail address



This project is supported by 





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SEDDON II Project overview

- continues the basic achievements reached in SEDDON
- focuses on the implementation of the suggested improvements
- aims to improve knowledge and knowledge transfer from science to river management
- studies based on longer-term programs will lead to targeted and efficient measures in order to improve the ecological status and flood risk management
- exchanging knowledge between AT and HU

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SEDDON II Key Outputs

- Hydraulic engineering laboratory in Vienna
- Joint monitoring and modelling strategy
- Guideline for joint river engineering measures

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SEDDON II Partner Structure

- LP1 University of Natural Resources and Life Sciences, Vienna BOKU
- PP2 Budapest University of Technology and Economics BME
- PP3 North Transdanubian Water Directorate ÈDUVIZIG
- PP4 BOKU - Wasserbaulabor Errichtungs- und Betriebs-Gesellschaft m.b.H.
- SP5 Federal Agency for Water Management, Vienna BAW

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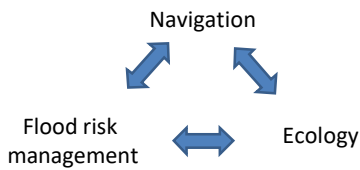
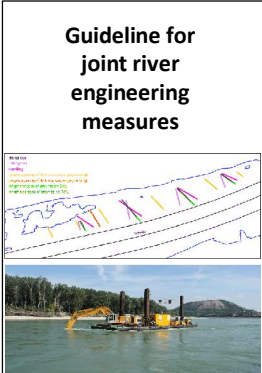
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Sustainability: policy document

- Based on the gained experiences of WP T1 (Modelling) and WP T2 (Measurements)
- Development of optimized river engineering measures
- Integrated approach to improve situation in the field of river engineering

Core Output

Guideline for joint river engineering measures

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Guideline: Examples of best practice projects

- Pilot project Witzelsdorf (2009)

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Guideline: Examples of best practice projects

- Pilot project Witzelsdorf (2009)
 - Improvement of ecological situation
 - Trend of sedimentation higher than expected → navigation restrictions/maintenance
 - Optimisation of groyne structures (2015) after variation 3D-numerical modelling study

Bed level difference (a) 2011/10 - 2007/10 Bed level difference (b) 2017/03 - 2011/10


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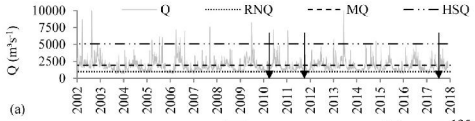
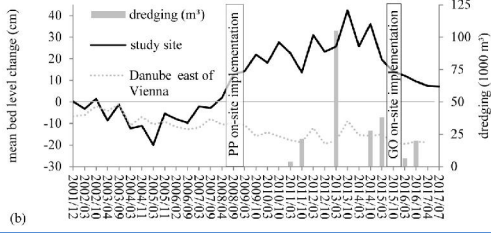


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Guideline: Examples of best practice projects

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Sustainability through infrastructure: Hydraulic Engineering Laboratory



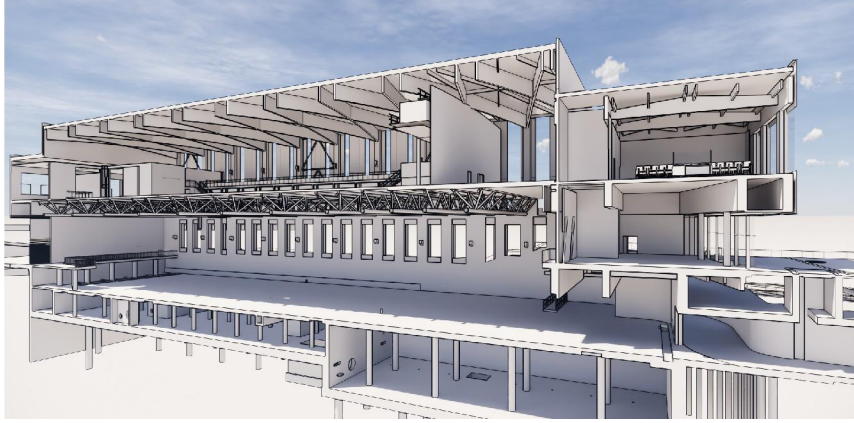
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Sustainability through infrastructure: Hydraulic Engineering Laboratory



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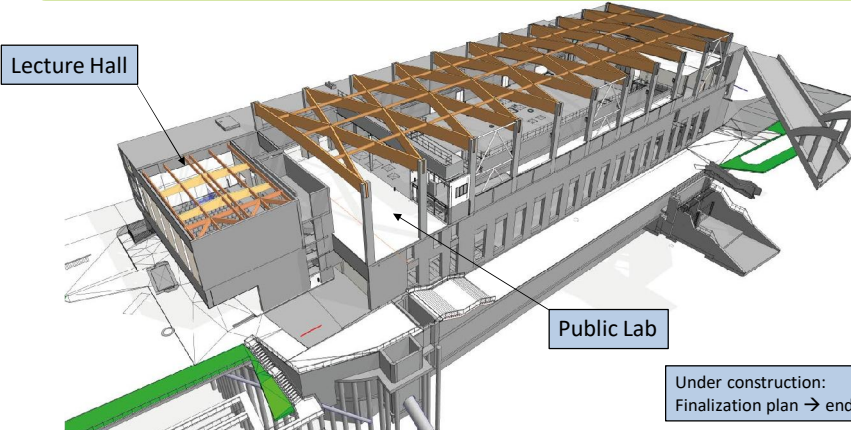
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Sustainability through infrastructure: Hydraulic Engineering Laboratory



Lecture Hall

Public Lab

Under construction:
Finalization plan → end of 2022

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Current status of construction



Photograph: Ferdinand Bakanic, October 2021


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Current status of construction



Photograph: Ferdinand Bakanic, October 2021

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Thank you for your attention!

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