



iNNOvative SEDiment
management in the
Danube River Basin



iNNO SED

14th International SedNet Conference 6–10 October 2025, Madrid, Spain

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the European Union



Introduction to iNNO SED

- **Call:**
Danube river basin lighthouse – Demonstration of effective and sustainable management of sediments in the Danube river-Black sea system
TOPIC ID: HORIZON-MISS-2023-OCEAN-01-02
- **Project start date:** 1 September 2024
- **Project end date:** 31 August 2029
- **Project duration:** 60 months
- **Consortium:** 46 Funded Partners and Associated Partners
- **Budget:**
8 765 402,50 € Overall budget
8 103 720,88 € EU contribution



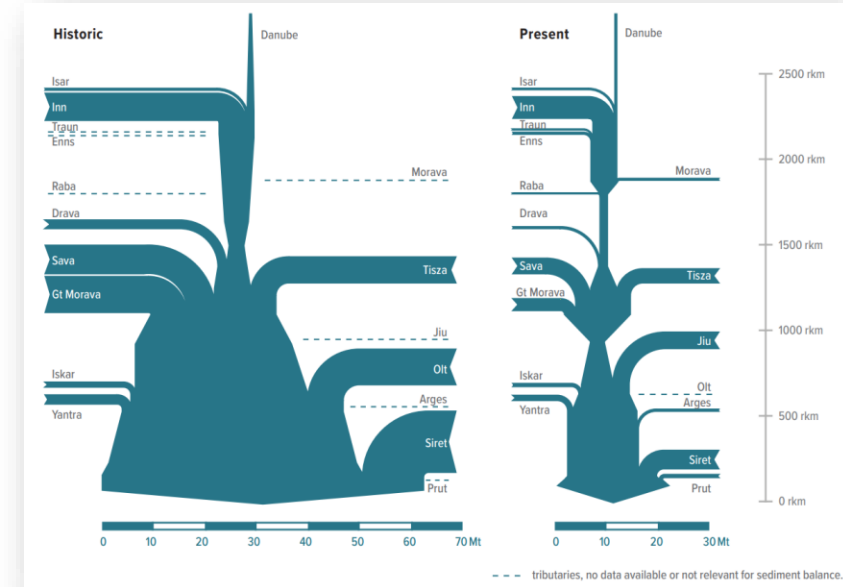
Consortium

- **LP: Budapest Univ. of Technology and Economics**
- 24 partners + 22 Associated Partners
- **countries represented by the partners cover 95% of the DRB area + UK**
- **DanubeSediment** core partners (BME, BOKU, JCWI, OVF, VUVH, WWF HU, TUM)
- **SIMONA** core partners (GeoZS, HGI, JCWI, THC, GI BAS, CHMI, AQUA, MUS_ICH, BME)
- Universities, research institutes, water managers, NGOs, SMEs, national parks, hydropower operators, international river commissions like ICPDR and ICPER, ministries, and waterway administrations
- Direct connections through partners to, e.g.: **Danube4all, DanubeSediment_Q2, MERLIN, DOORS, ...**



Sediment related problems in the Danube River Basin

- River Regulation significantly impacted the sediment balance of the Danube River and its tributaries.
- Extensive engineering significantly shortened and narrowed the river and made it more uniform.
- Bank protection measures hinder the lateral exchange of sediments.
- Transversal structures interrupt sediment continuity to a large extent.
- Danube River is out of balance
- Sediment balance alteration became a new sub-item under the existing Significant Water Management Issue “Hydromorphological alterations” in the 2021 Update of the Danube River Basin Management Plan.
- No standard sediment QUALITY monitoring exists, limiting our understanding of risks.



Interreg
Danube Transnational Programme
SIMONA

PROJECT MAIN ACHIEVEMENTS

Bottom Sediment

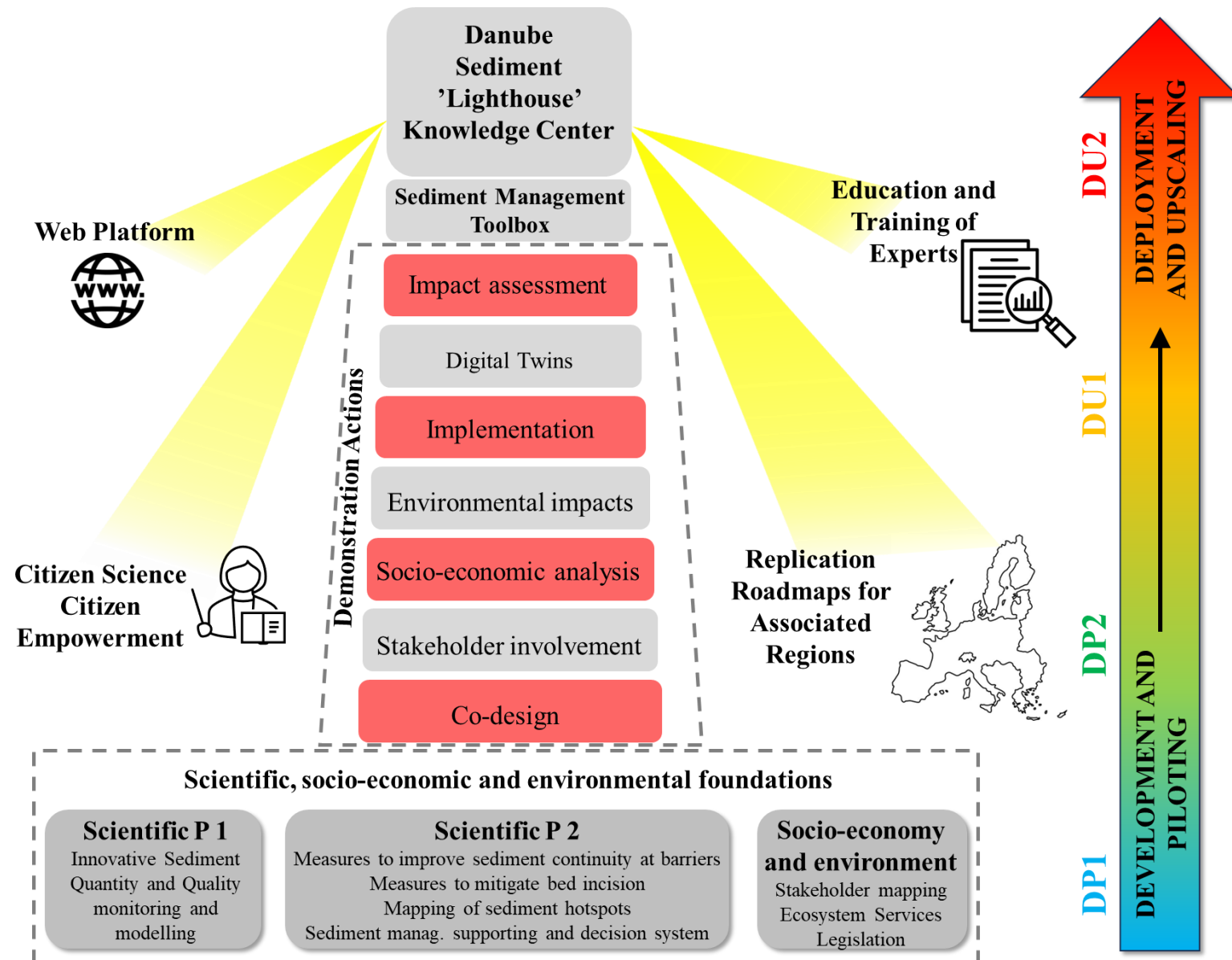
Overbank Sediment

1st SIMONA TRAINING EVENT
(25th March 2021, online)

Suspended Sediment

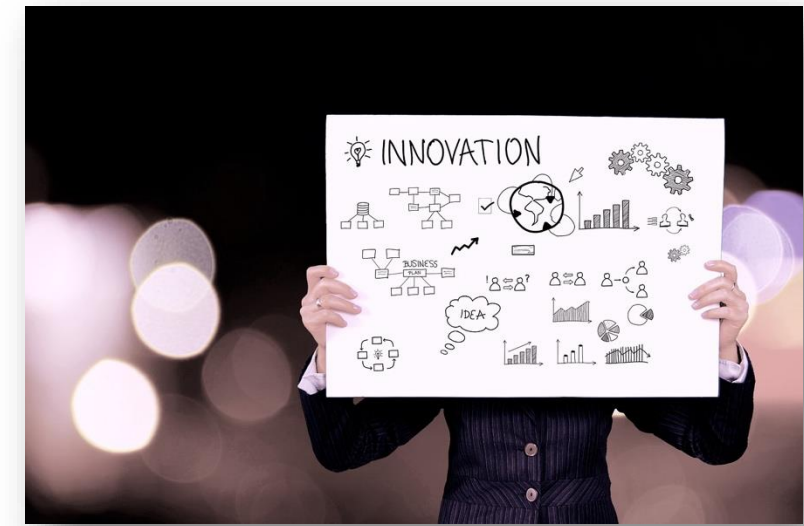
Project objective

- The primary objective of iNNO SED is to establish the **Danube Sediment 'Lighthouse' Knowledge Centre** and provide a generally applicable Sediment Management Toolbox, building on the outcomes and core contributors of the DanubeSediment and SIMONA projects, the CIS document, as well as engaging relevant stakeholders, to offer a range of innovative sediment management solutions, employing a holistic approach.



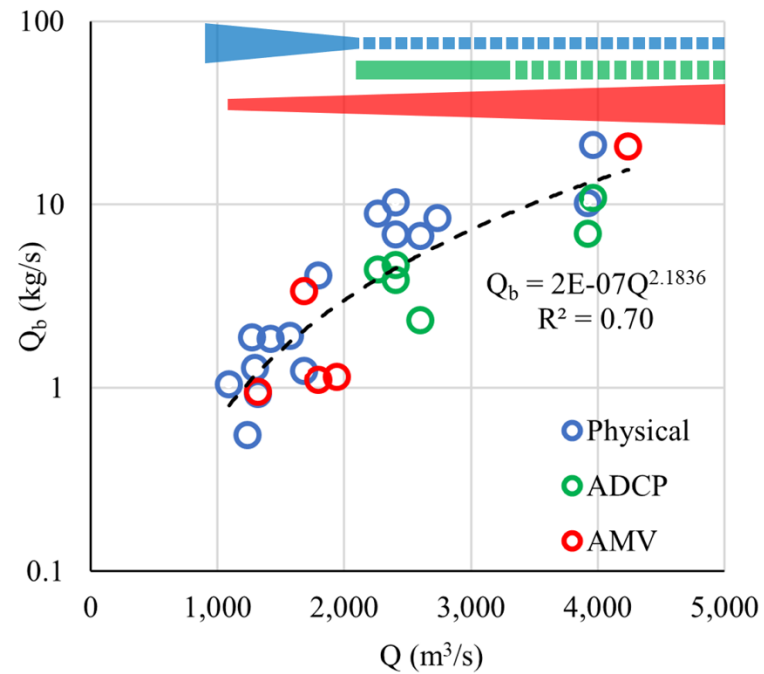
Innovations

ID	Innovation	Resp. partner	starting TRL	final TRL
I1	Sediment multi-assessment platform	AQUA	4	6
I2	New Sediment Transport Formula	BOKU	4	7
I3	Bedload analysis tool	BME	5	7
I4	Macroplastic detector	BME	3	5
I5	Sediment Q2 numerical tool	BME	3	5
I6	Digital Twin demonstrator	CNR	3	6
I7	Citizen-Science Sediment tool 'Site-seeing'	GEOEC OMAR	3	5
I8	EO-based sediment products for Danube	USTIR	3	6
I9	Sediment Atlas for DRB	BME	3	5
I10	Environment-friendly improvement of sediment transport at impounded river sections	BOKU	5	7
I11	NbS for sediment flow improvement at river confluences	UNIZAG	3	5
I12	Eco-friendly bedload management across river barriers	TUM	6	7
I13	HydroEcoSedimentary Tool to quantify the effects of fine sediment deposition in streambeds	TUM	6	7



Innovations (examples)

Bedload analysis tool

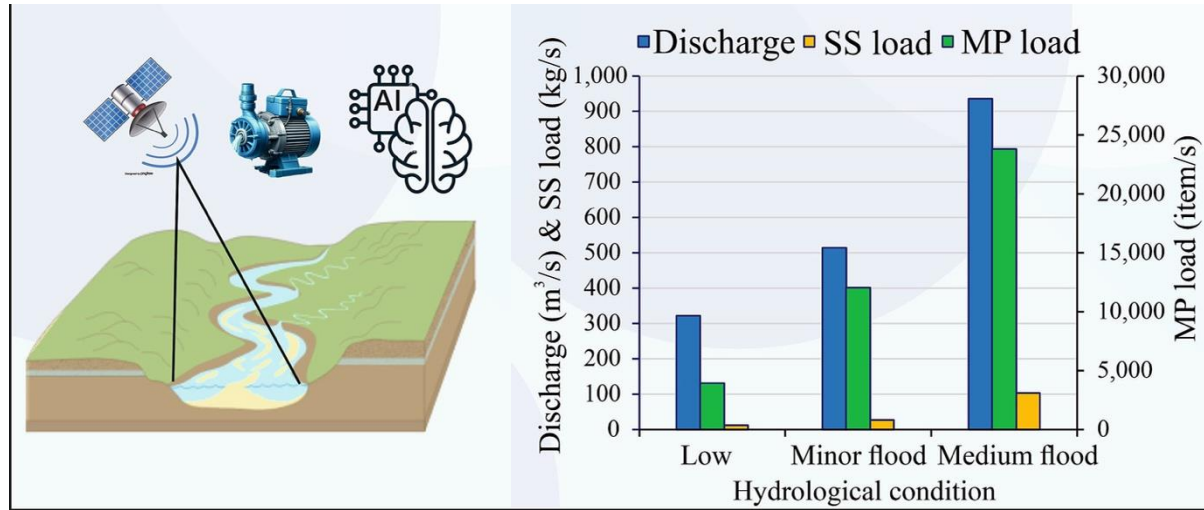


UAV for sediment

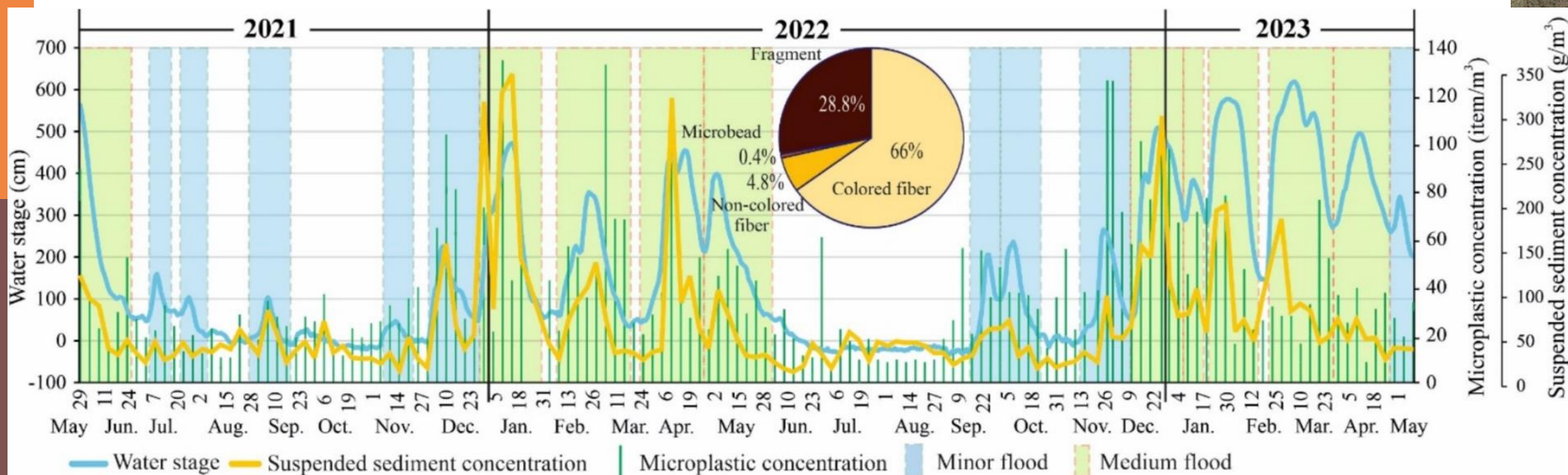


Innovations (examples)

Sentinel-2 imagery, and machine learning

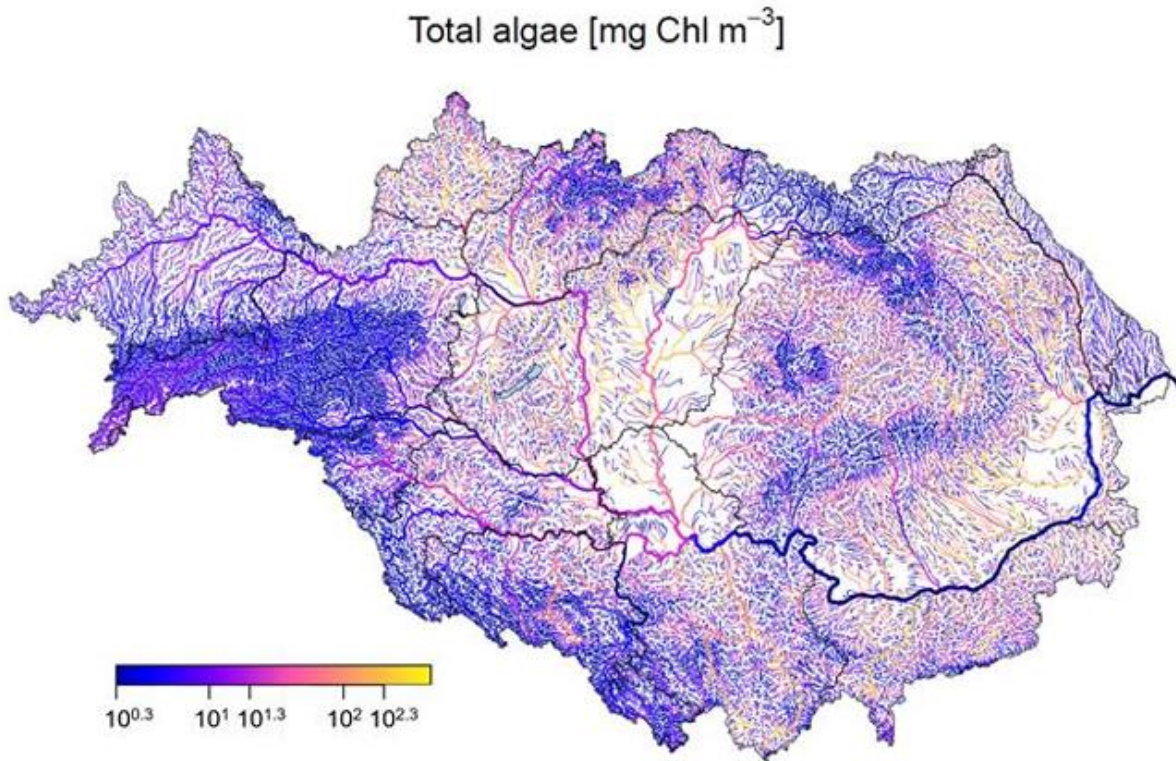


Macroplastic detector

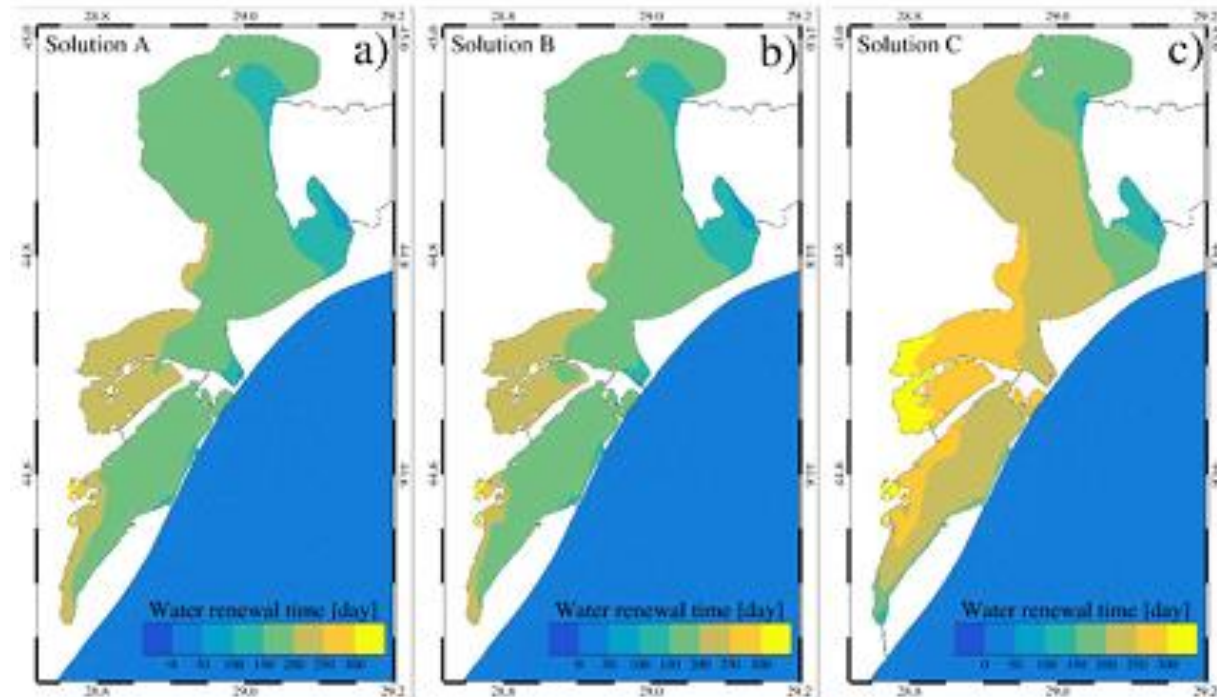


Innovations (examples)

Basin-wide transport model



Digital Twins



Demonstration Actions

DS1: Iller River (Germany)



DS2: Danube River at Aschach (Austria)



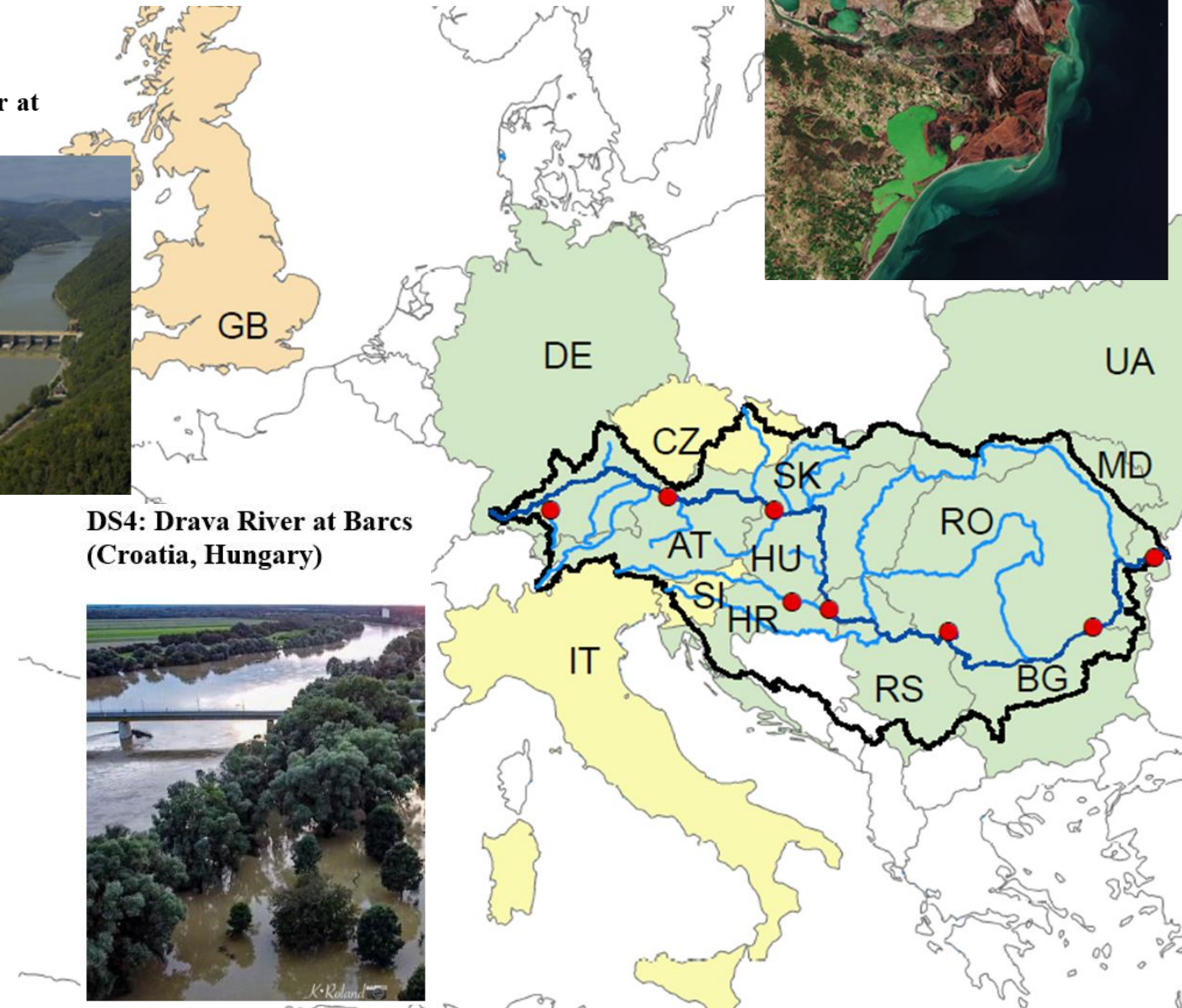
DS3: SK-HU Danube section (Slovakia, Hungary)



DS4: Drava River at Barcs (Croatia, Hungary)



DT2: Danube Delta (Romania)



□ Danube basin

— Danube River

— Main tributaries

□ Countries

Partner countries
along the Danube
River

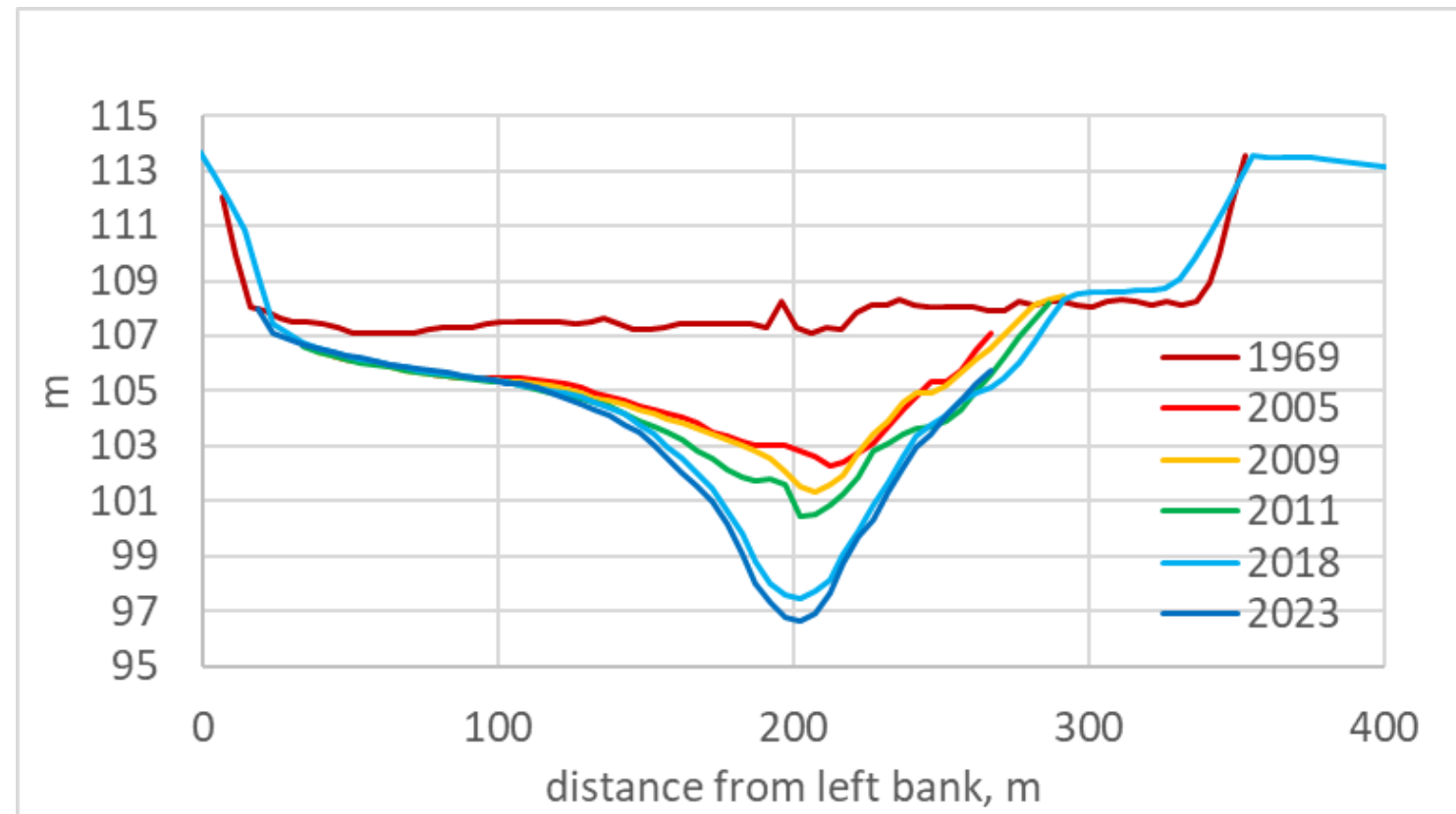
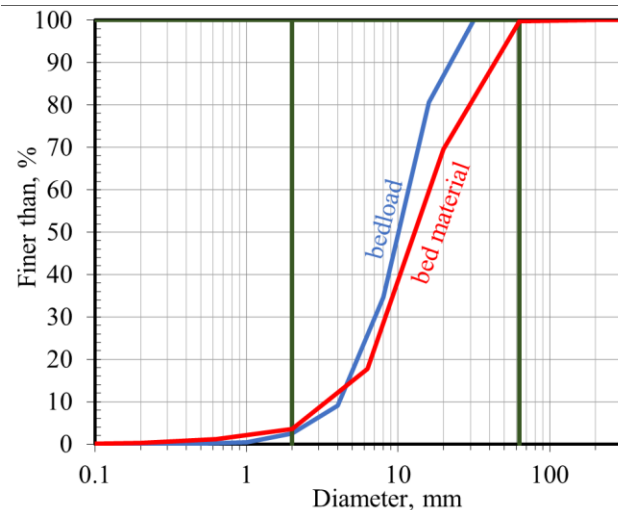
Partner countries
in the Danube
River Basin

Partner countries
outside the
Danube River
Basin

• Demonstration
Actions

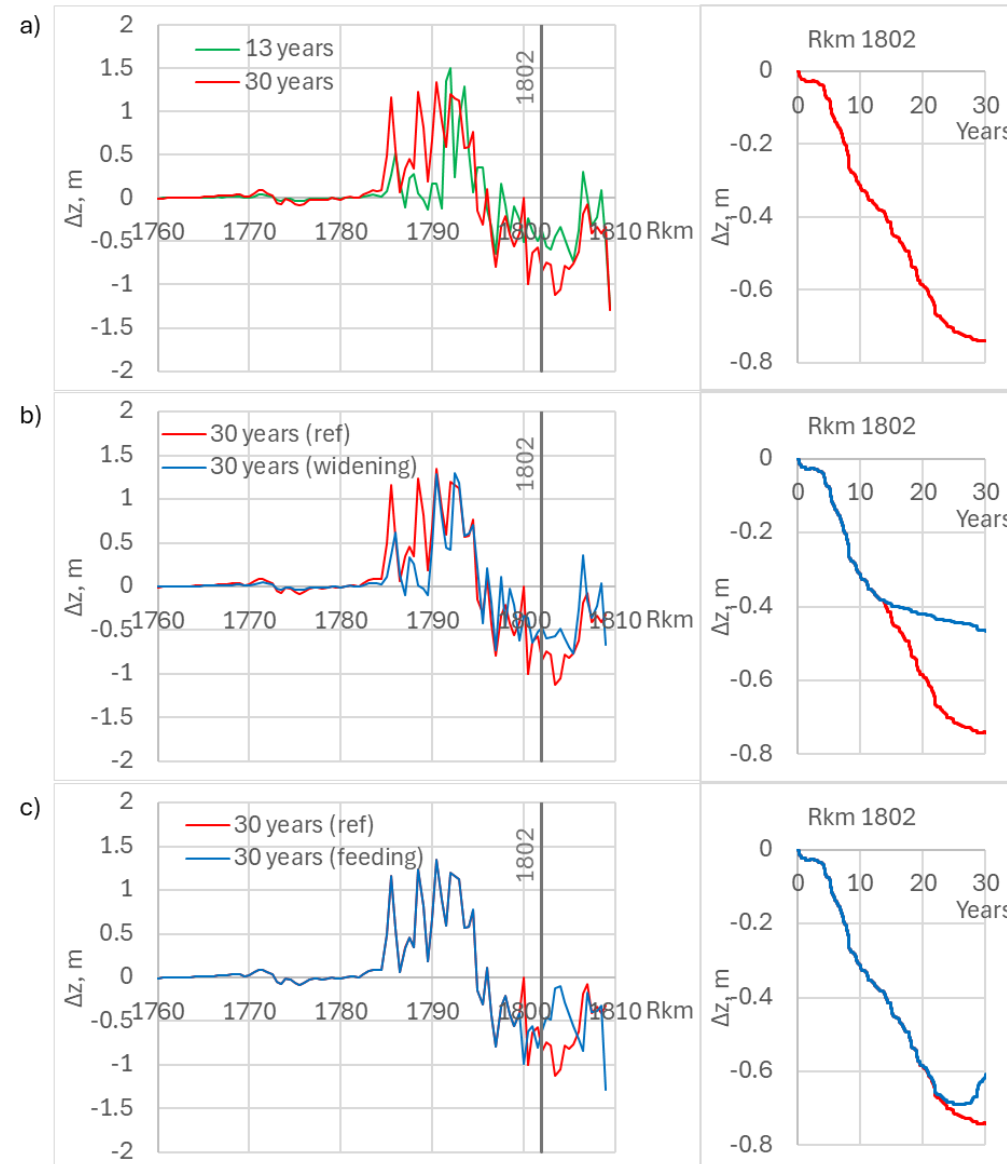
HU-SK Demonstration Action

- Danube River
- Rkm 1810-1790
- Free flowing section
- Gravel dominated
- $Q_{\text{mean}} \approx 2200 \text{ m}^3/\text{s}$
- Slope $\approx 35 \text{ cm/km}$



HU-SK Demonstration Action

- Assessment of sediment management measures
- Large scale 1D models:
 - Current state
 - River widening
 - Sediment feeding



Key Performance Indicators (examples)

- Sediment measures defined for at least 50 sedimentation hotspots and/or 500 river-km
- 10 Nature-based sediment solutions to stop riverbed erosion
- Quantified sedimentation rates at the three most important sediment trapping hotspots in Danube (Aschach, Gabčíkovo, Iron Gates) by direct measurements and/or modelling approaches.
- 2 Digital Twins for sediments (Iron Gates, Danube Delta)
- >500 citizens mobilized with Citizen Science tools
- Sediment Management Toolbox
- 5 replication roadmaps for each Associated Regions



Open call for Associated Regions!!!

Open funding call for associated regions



 **Want to help improve on the status of sediment quantity or quality in your area?**

iNNO SED is looking for funding proposals for up to €100,000 each from at least five local or regional authorities who will work on addressing challenges concerning sedimentary processes in their own river basin.

We are very excited to present this opportunity for local and regional authorities outside of iNNO SED who are interested in working on issues pertaining sediment quality and management. This Open Call offers a unique opportunity for Associated Regions to actively participate in advancing innovative sediment management solutions. Aligned with the project's primary objectives, the Call focuses on two key aspects: knowledge transfer and scalability of sediment-related solutions in various river basins.

If you're interested, download and read the Open Call-document linked to below.

The Call accepts applications until Monday, 17th November 2025 at 16:00 CET.



Closing remarks

- Sediment continuity is still a major challenge in the Danube Basin, influencing navigation, ecosystems, and water management.
- iNNO SED integrates data, models, and stakeholders to create a basin-wide understanding of sediment processes.
- Our innovations – from satellite products and hybrid modelling to citizen science – are being tested in real-world pilot sites.
- The goal is to turn knowledge into practical solutions for river managers and policymakers.
- **Together with the SedNet community**, we aim to scale up these approaches for sustainable sediment management across the World's rivers.





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