
River Basin Specific Pollutants Selection and Monitoring

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International
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zum Schutz
der Donau



Danube Case

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- ➔ Convention on Co-operation for the Protection and Sustainable Use of the Danube River (DRPC)
 - ➔ Signed 1994
 - ➔ Enforced 1998
 - ➔ Danube Declaration 2004
 - ➔ 10 year anniversary of DRPC
 - ➔ Statement of new goals
 - ➔ Implementation Water Framework Directive

Introduction

Table 1: Basic characteristics of the Danube River Basin District.

DRBD area	807,827 km ²
DRB area	801,463 km ²
Danube countries with catchment areas >2,000 km ²	EU Member States (8): Austria, Bulgaria, Czech Republic, Germany, Hungary, Slovak Republic, Slovenia, Romania. EU Accession Country (1): Croatia Non EU Member States (5): Bosnia & Herzegovina, Moldova, Montenegro, Serbia and Ukraine.
Danube countries with catchment areas <2,000 km ²	EU Member States (2): Italy, Poland. Non EU Member States (3): Albania, FYR Macedonia, Switzerland.
Inhabitants	approx. 80,5 million
Length of Danube River	2,857 km
Average discharge	approx. 6,500 m ³ /s (at the Danube mouth)
Key tributaries with catchment areas >4,000 km ²	Lech, Naab, Isar, Inn, Traun, Enns, March/Morava, Svatka, Thaya/Dyje, Raab/Rába, Vah, Hron, Ipel/Ipoly, Siò, Drau/Drava, Tysa/Tisza/Tisa, Sava, Timis/Tamiš, Velika Morava, Timok, Jiu, Iskar, Olt, Yantra, Arges, Ialomita, Siret, Prut.
Important lakes >100 km ²	Neusiedler See/Fertő-tó, Lake Balaton, Yalpug-Kugurlui Lake System, Razim-Sinoe Lake System (Lacul Razim and Lacul Sinoe, which is also a transitional water body)
Important groundwater bodies	11 transboundary groundwater bodies of basin-wide importance are identified in the DRBD.
Important water uses and services	Water abstraction (industry, irrigation, household supply), drinking water supply, wastewater discharge (municipalities, industry), hydropower generation, navigation, dredging and gravel exploitation, recreation, various ecosystem services.

Source: Danube River Basin District Management Plan, ICPDR 2009

ICPDR Monitoring Strategy

Table 1 Overview of surface water monitoring programmes in the Danube River Basin District and their use in fulfilling WFD monitoring requirements)¹

	International Part A		National Part B
	TNMN	JDS	National monitoring schemes
Surveillance monitoring I - monitoring of surface water status	X	---	X
Surveillance monitoring II - monitoring of specific pressures	XX	XX	X
Operational monitoring of water bodies at risk	X	---	X) ²
Investigative monitoring	---	XX	X

X = data collection on status; XX = joint monitoring

Source: Summary Report to EU on monitoring programmes in the Danube River Basin District designed under Article 8 , ICPDR 2007

Trans National Monitoring Network

- In operation since 1996
- Based on national monitoring networks
- Has been adapted to WFD requirements in March 2007
- Includes both surface and ground waters
- Annual SW monitoring focuses on water matrix and includes load assessment programme
- AQC programme controls data reliability
- Results published in annual TNMN reports

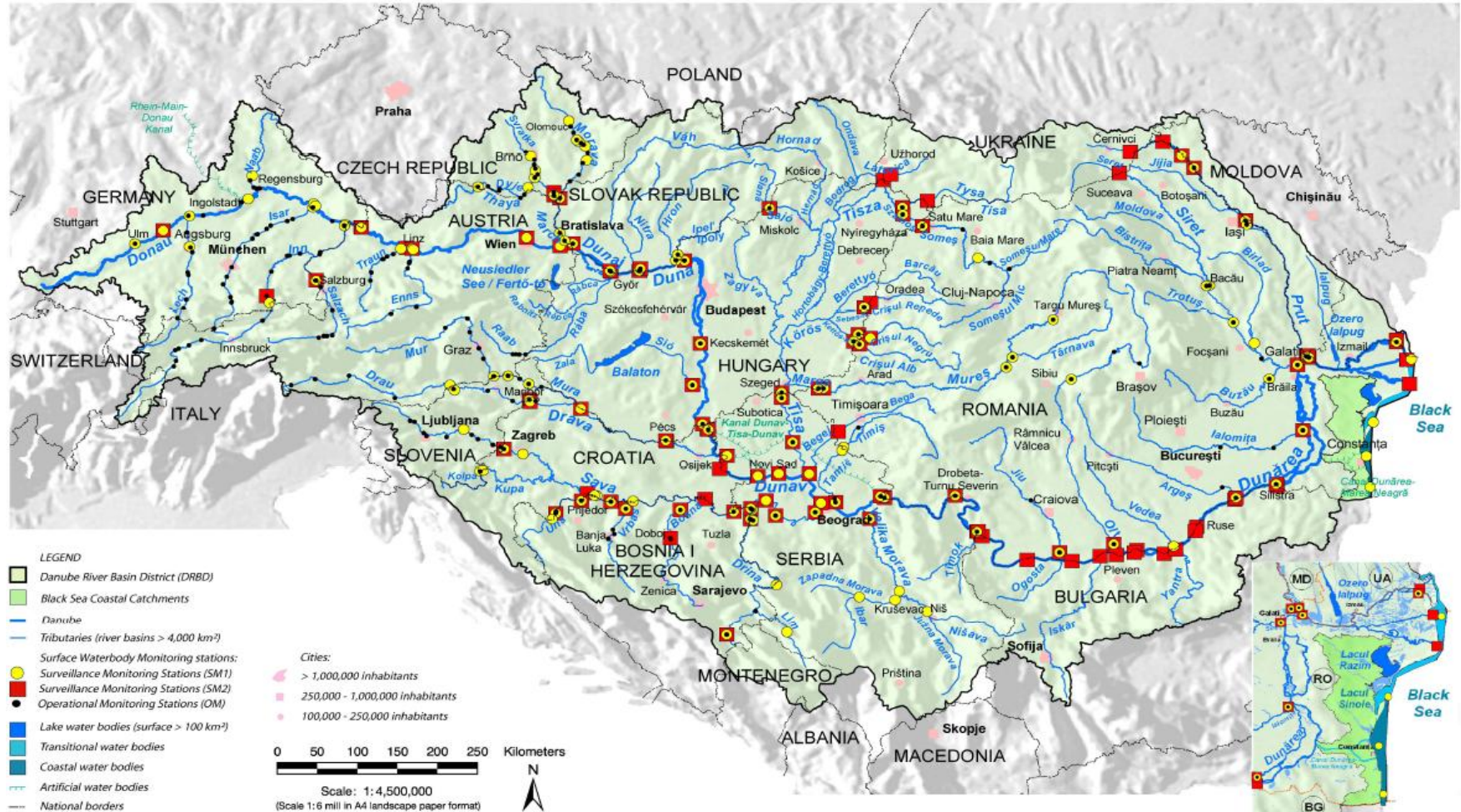
Trans National Monitoring Network

New setup for surface waters

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Joint Danube Surveys

- ➔ International longitudinal ship survey for the whole of the length of the Danube River including the major tributaries
- ➔ So far 2 Surveys organised
 - ➔ 2001 – JDS 1
 - ➔ 2007 – JDS 2

Joint Danube Surveys

General objectives

- ➔ To undertake on a short-term basis an international longitudinal ship survey that would produce a homogeneous information on water quality for the whole of the length of the Danube River including the major tributaries.
- ➔ To provide information necessary for the implementation of the EU Water Framework Directive (ecological & chemical status)

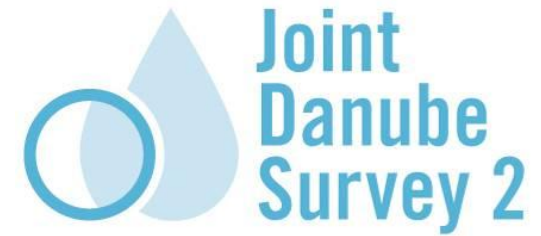
Joint Danube Surveys

Specific objectives

- ➔ Screening for wide range of substances in all relevant matrices;
- ➔ Microbiological analysis
- ➔ Radioactive contaminants & isotope hydrology
- ➔ Biological validation of the Danube typology;
- ➔ Ecological assessment of the Danube River in line with the EU WFD
- ➔ Contribution to the Danube Intercalibration Exercise
- ➔ Providing a forum for riparian/river basin country participation for sampling and intercomparison exercises;
- ➔ Facilitating specific training needs and improve in-country experience;
- ➔ Promoting public awareness

JDS2

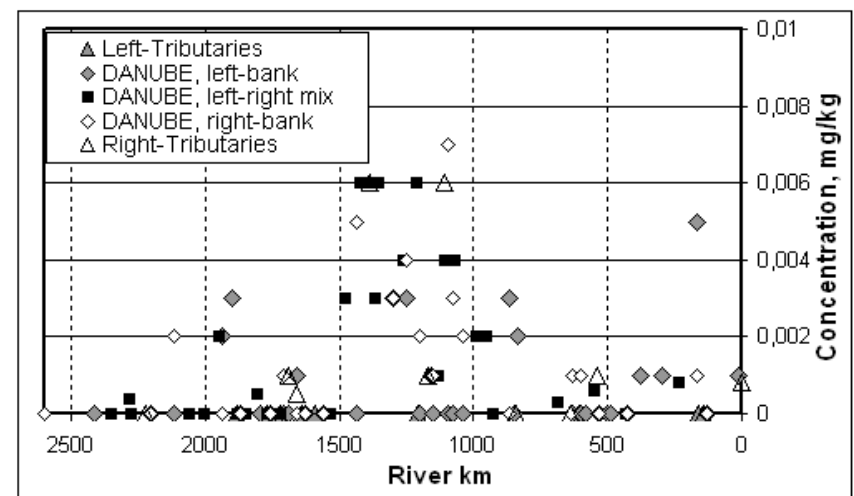
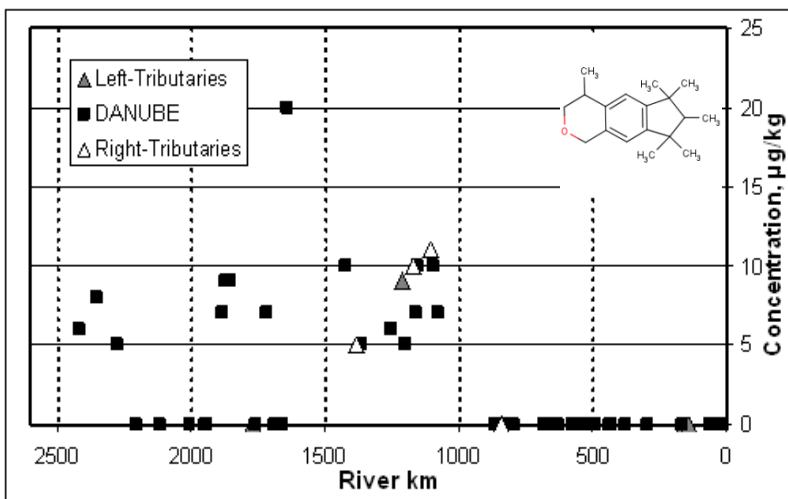
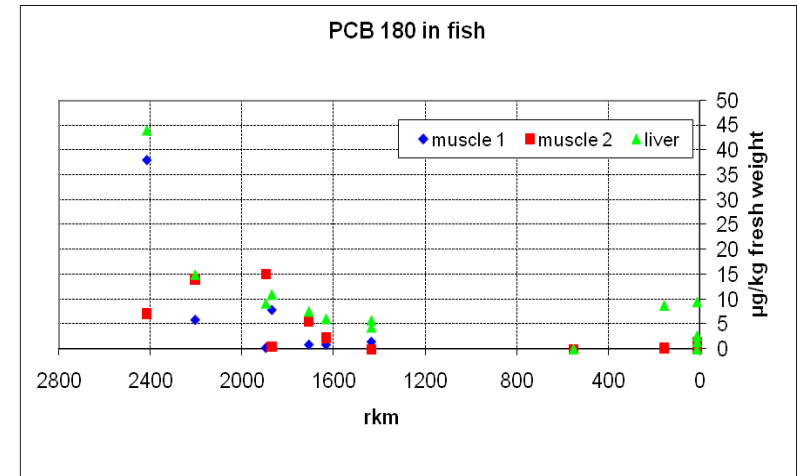
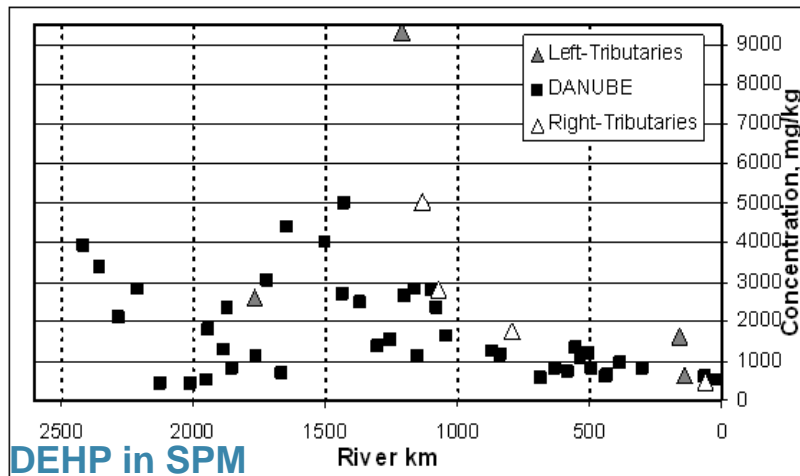
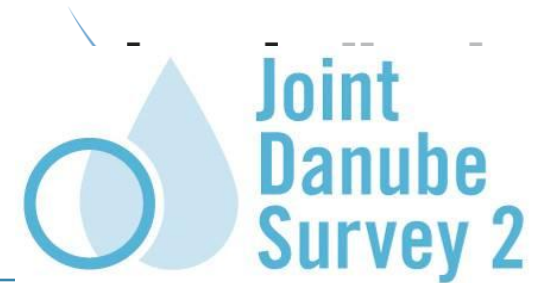
Sediments & SPM



- The results for organochlorine compounds do not indicate that these substances are relevant pollutants in the Danube, which is a clear improvement of the past situation as described in the Danube Roof Report 2004.
- PAH values in sediments were about one order of magnitude lower than those typically found in the Elbe.
- Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs) and dioxin-like PCBs were more than one order of magnitude lower when compared to the Elbe and only one site slightly exceeded the “safe sediment value” for PCDD/Fs. EC-6 PCBs did not exceed the German quality standards in sediment.
- The results of the ecotoxicological analysis of the Danube sediments showed no significant toxic effects.

JDS2

Sediments & SPM & biota

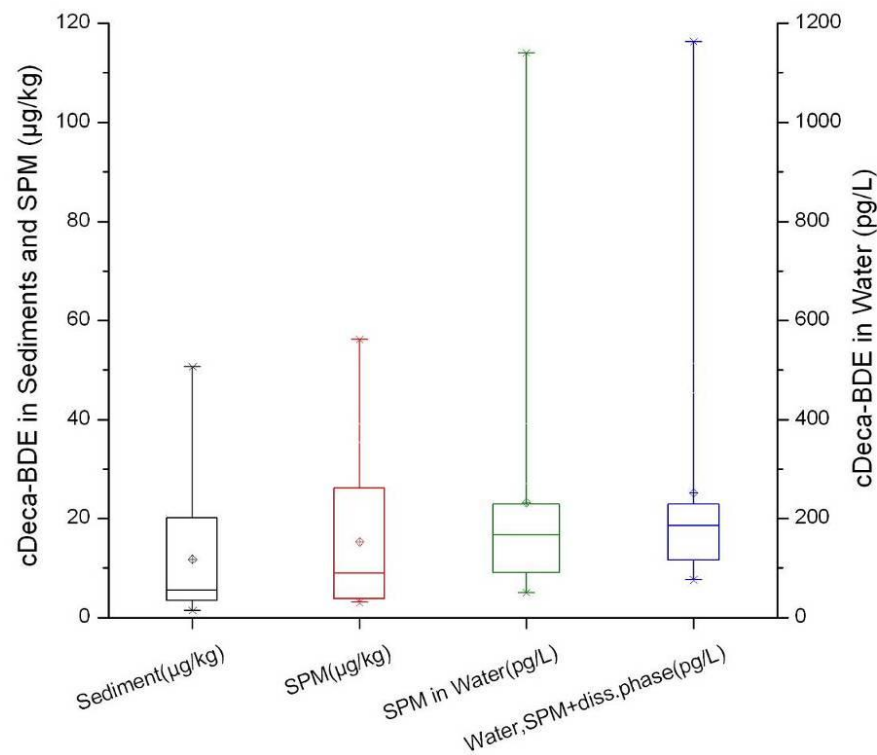
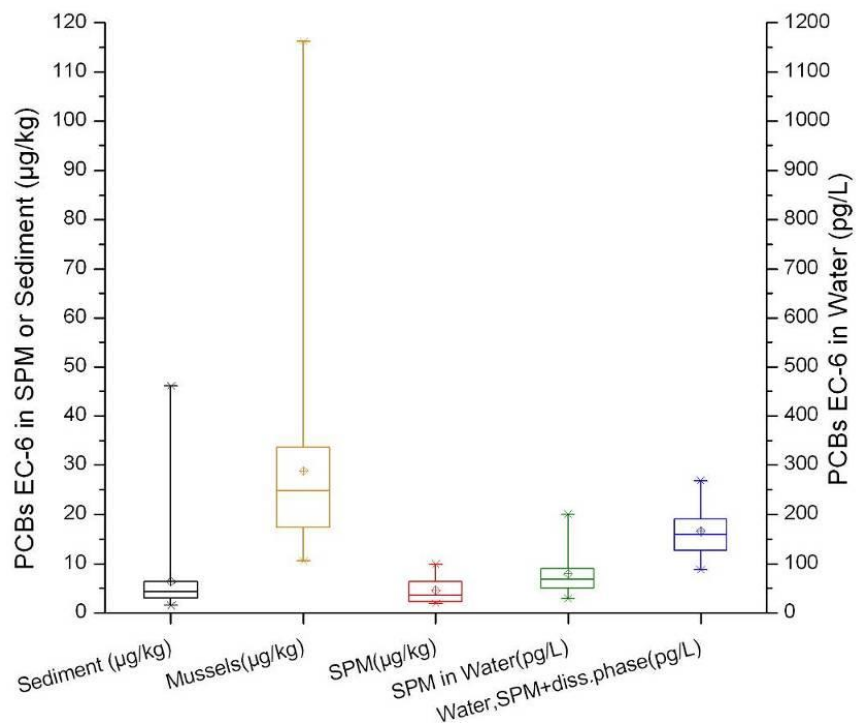
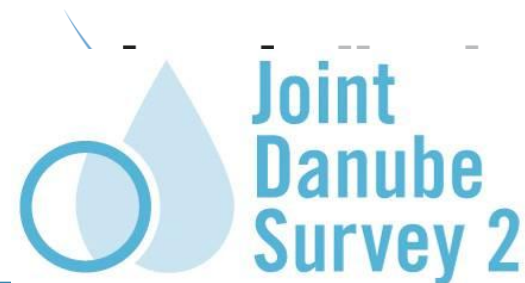


HHCb (Galaxolide) in SPM

Decabromodiphenylether in sediments

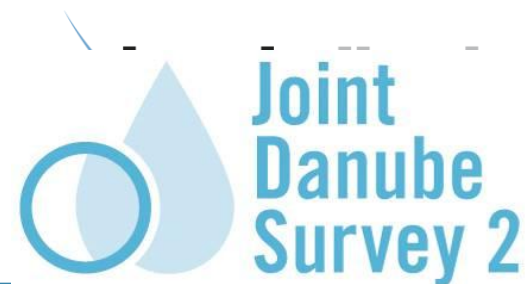
JDS2

Cross matrix inter-comparison of semi-volatile organics

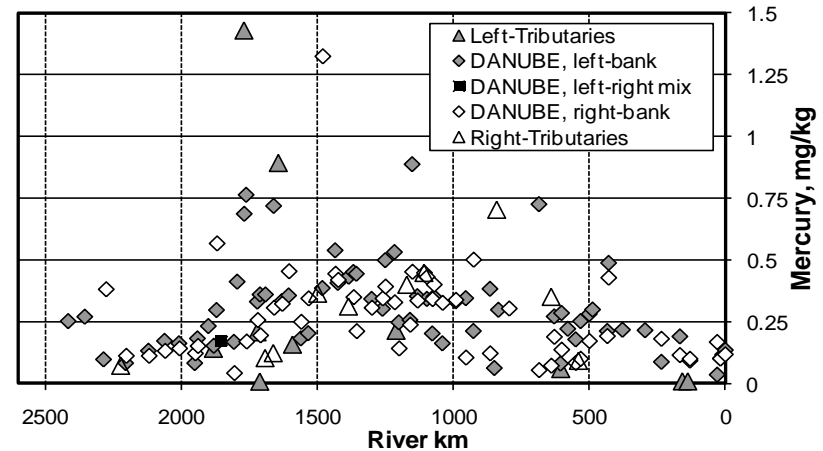
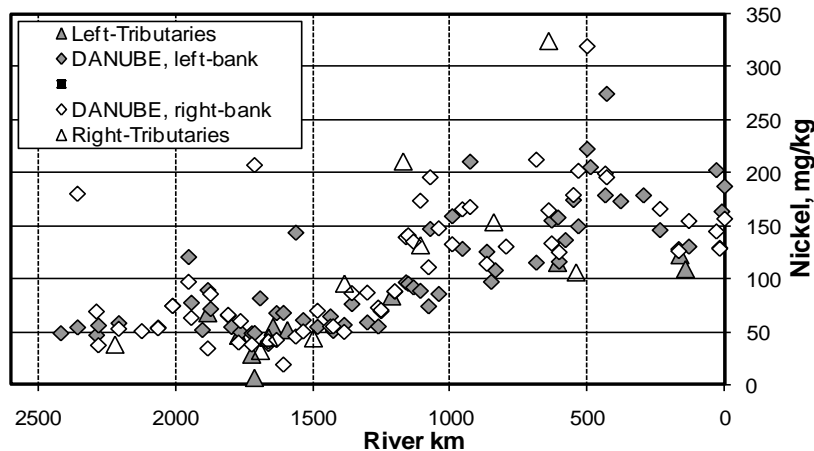
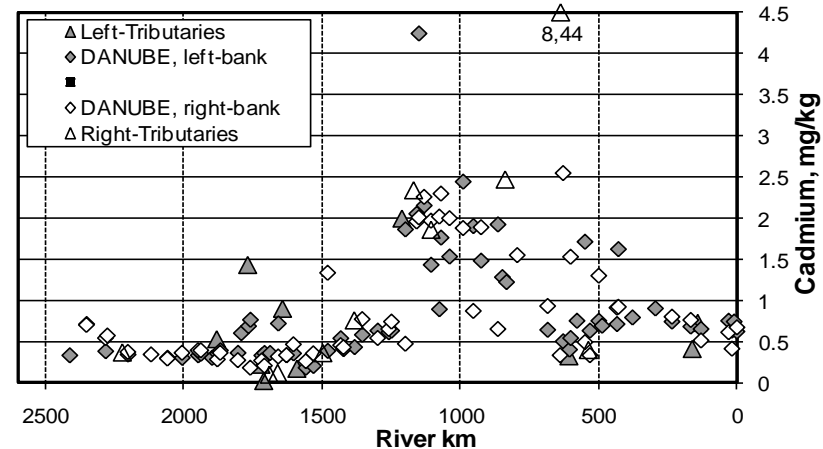
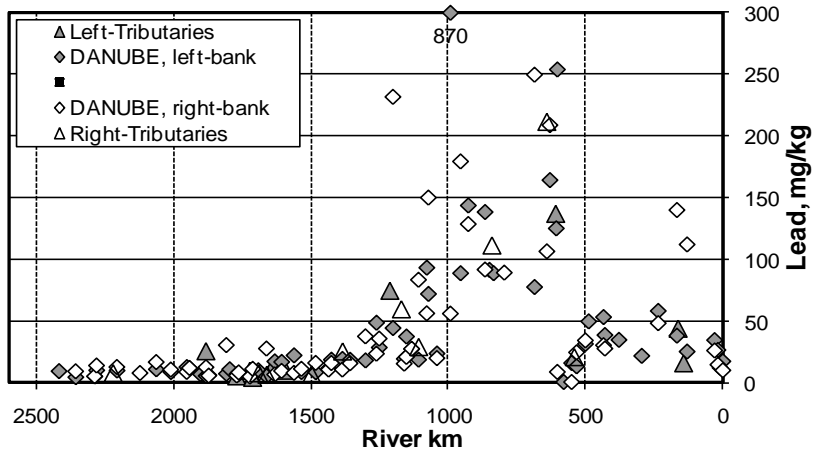


JDS2

Heavy metals

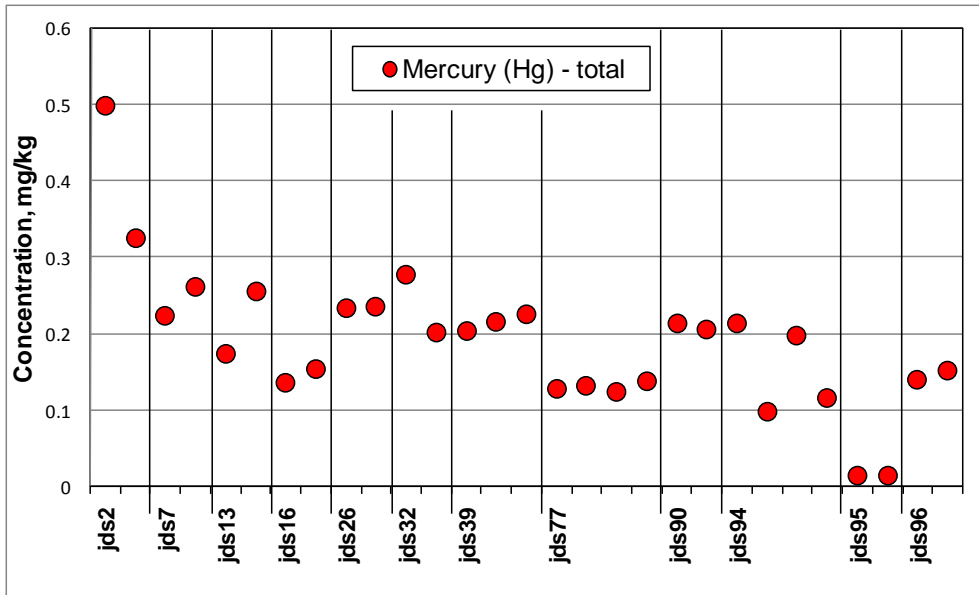


Concentration of Cd, Pb, Hg and Ni in the bottom sediment

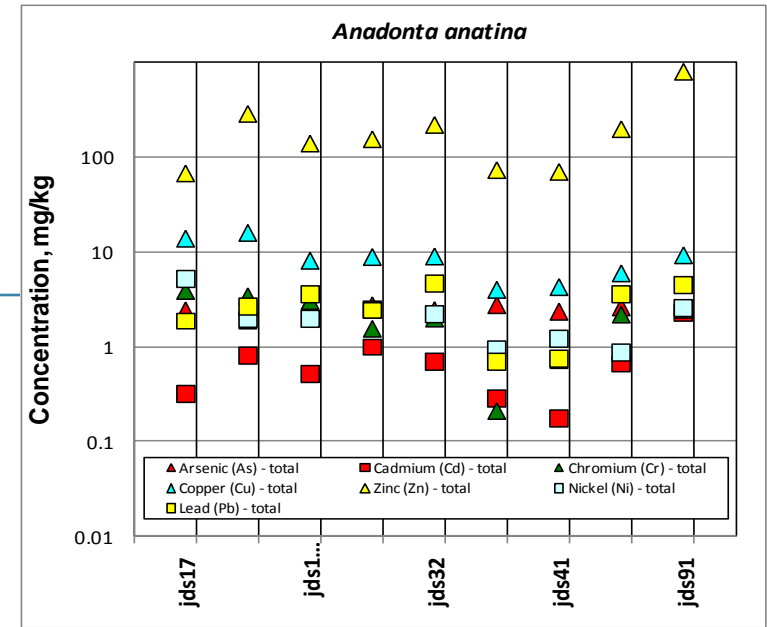


JDS2

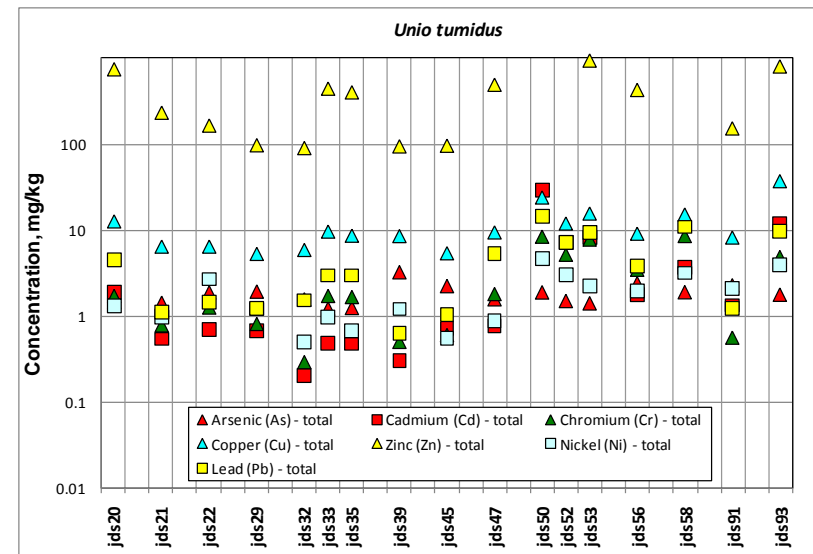
Heavy metals



Total Mercury in *Abramis brama* in the Danube (mg/kg wet weight)

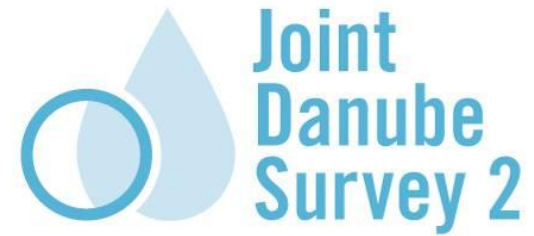


Total heavy metals and As concentrations in the two most abundant mussel species during the JDS2 (mg/kg dry weight)



JDS2

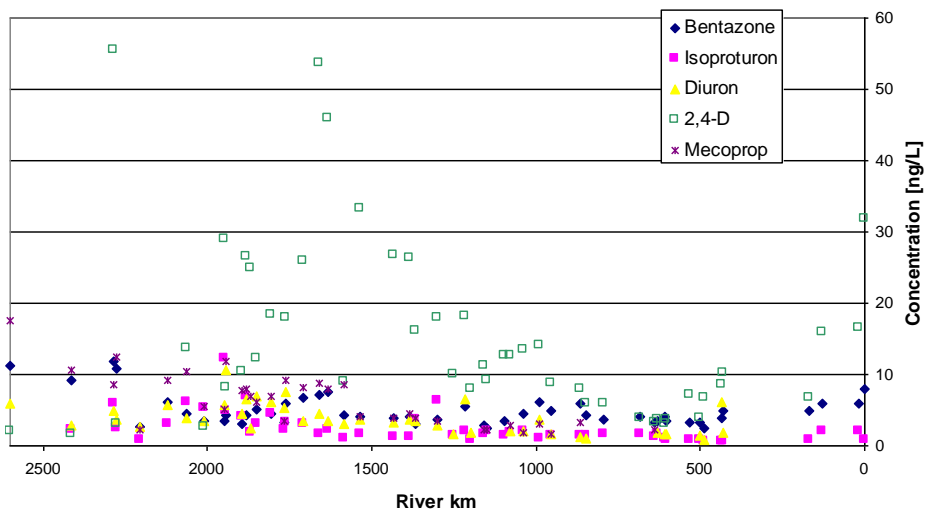
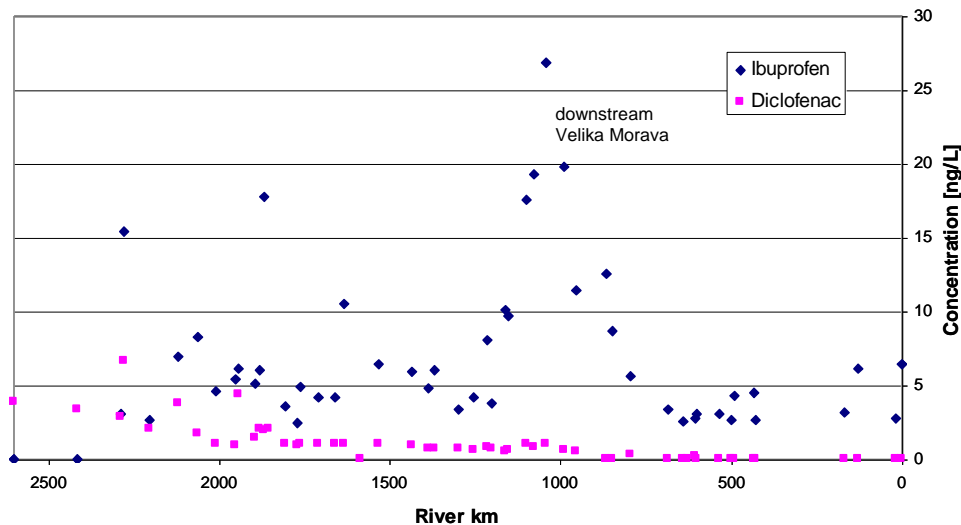
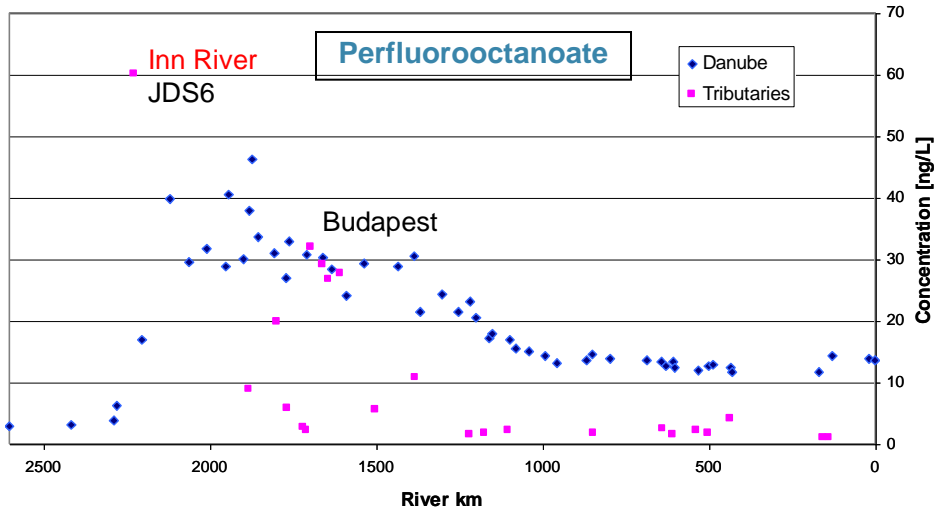
Emerging substances



- The analytical results obtained for polar compounds in the Danube (pharmaceuticals, pesticides, perfluorinated acids - PFOS/PFOA) and phenolic endocrine disrupting compounds) are similar to those in other large European rivers such as the Rhine, Elbe or Po.
- The most relevant polar compounds identified in the Danube River in terms of frequency of detection, persistency and concentrations were anticorrosives benzotriazoles, pesticide 2,4-D, and antiepileptics pharmaceutical carbamazepine.

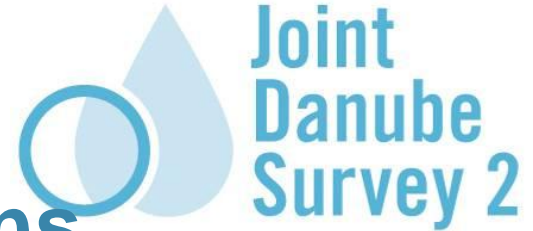
JDS2

Emerging substances



JDS2

Chemistry – general conclusions



- ◉ In general, the average concentrations of priority substances detected during the JDS2 tend to be lower than those measured during the JDS1, especially for organic substances.
- ◉ This indicates that measures taken to reduce their emissions are starting to be successful.
- ◉ However, several priority substances as well as newly emerging substances are becoming of concern in the Danube basin and require measures to be taken to minimise their emissions.

MORE INFO at
www.icpdr.org

