DANUBE REGION strategy

MINISTRY OF FOREIGN AFFAIRS AND TRADE OF HUNGARY

WESSLING Quality of Life

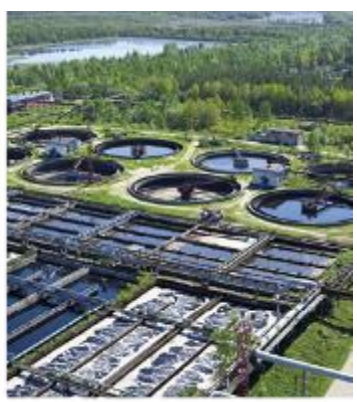
Microplastics in wastewater treatment plants

Gábor Bordós

project manager

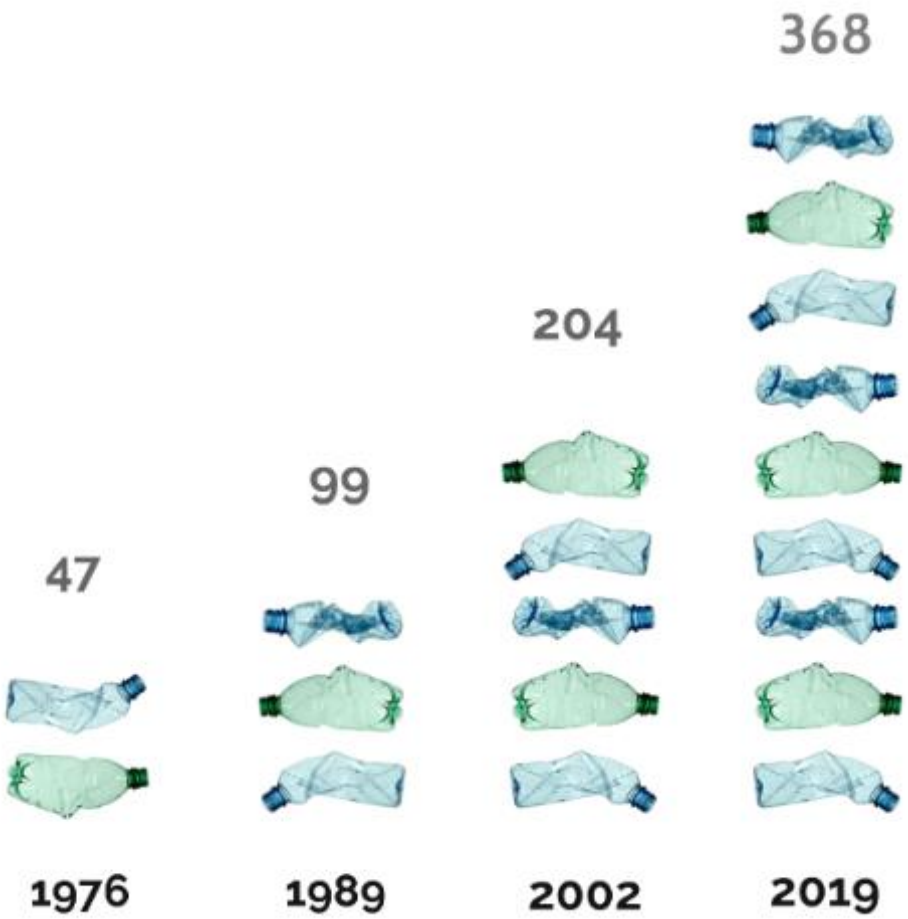




Plastic use

Global plastic pollution (Mtons)



Plastic use

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MPs in the environment

< 5mm

Occurrance

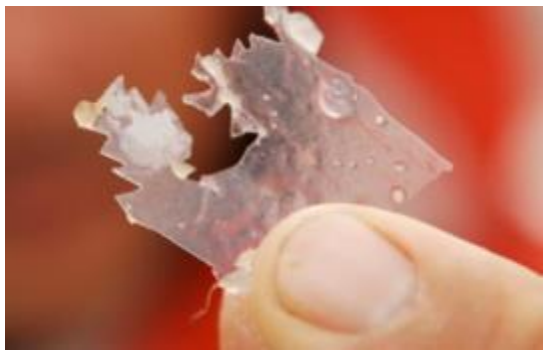
water, sediment, biota

Effects

intake to GI trackt and tissues

pollutant transport

Lack of standard methods



Legal background

Drinking Water Directive (EU 2020/2184)

- emerging chemicals → **MPs**, pharma residues, EDCs
- implementation of watchlist
- BUT! → first methods should be standardised until 12.01.2024.
- report on human health risks until 12.01.2029.

Project background

Action 1: HAZARDOUS & EMERGING SUBSTANCES: Promote monitoring, prevention and reduction of water pollution deriving from hazardous and emerging substances (EU priority substances and watch list candidates as well as Danube basin specific pollutants candidates and others e.g. **microplastics**-plastics, pharmaceuticals, PFOS)

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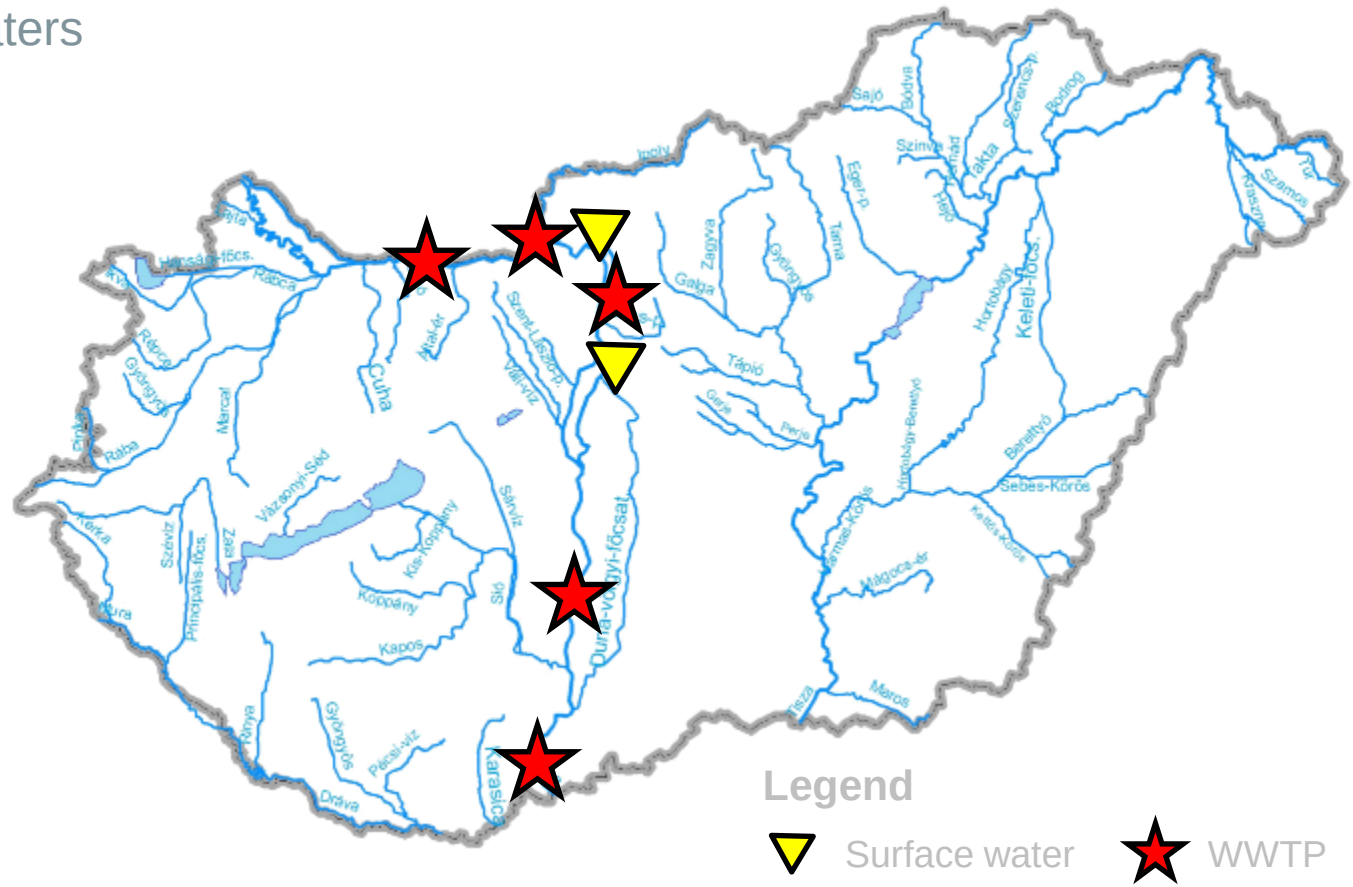
WWTP analysis

Importance of measurements

- Suspected sources for surface waters
- No previous data for Hungary

Methodology

- 5 WWTPs (small, medium, large)
- influent, effluent, sludge
- surface water sampling
- 2-2 samplings (min. 14 day)
- sampling + sample preparation
- FTIR microscopy



Sampling

Treated effluent

Preparation and analysis

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Preparation

- density separation
- oxidation
- filtration

Analysis

- Thermo Nicolet in10MX
- linear array detektor, 25 µm pixel
- transmission
- 1 filter is 8-10 hours, 2 GB data

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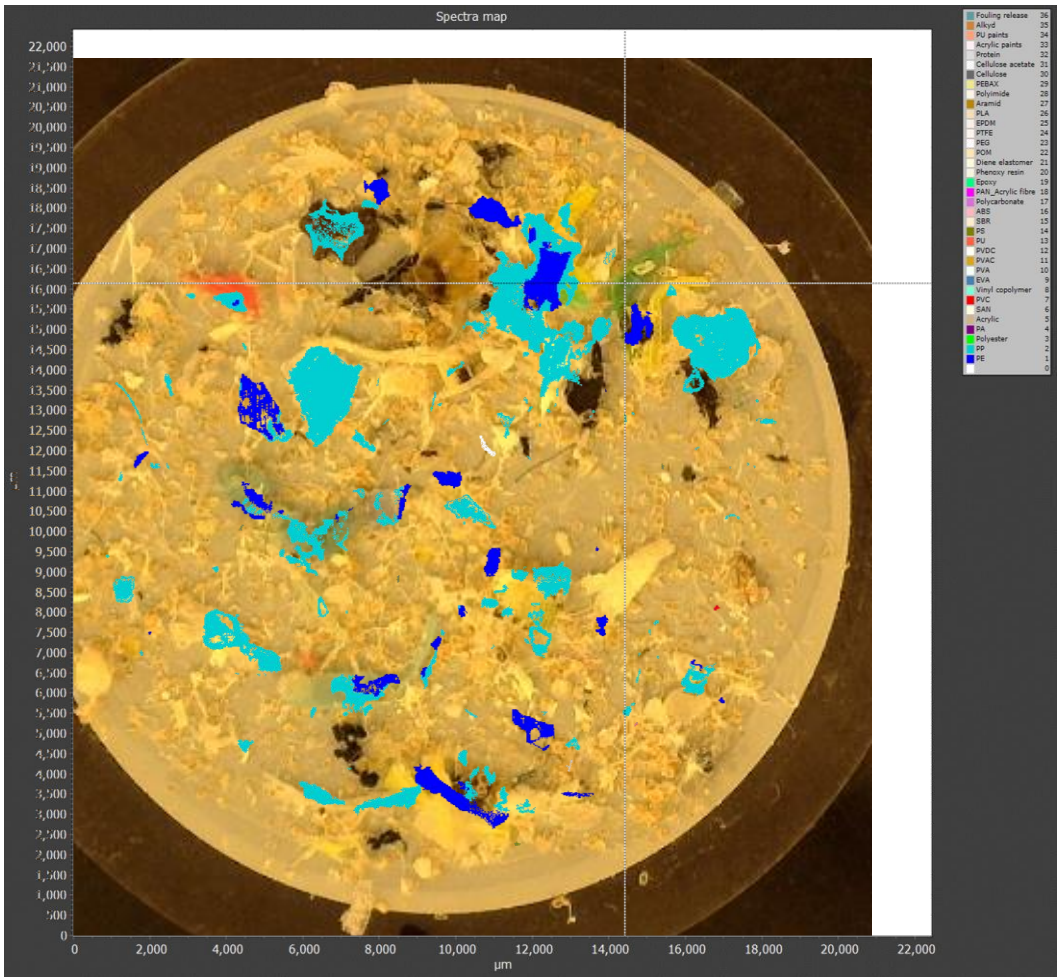
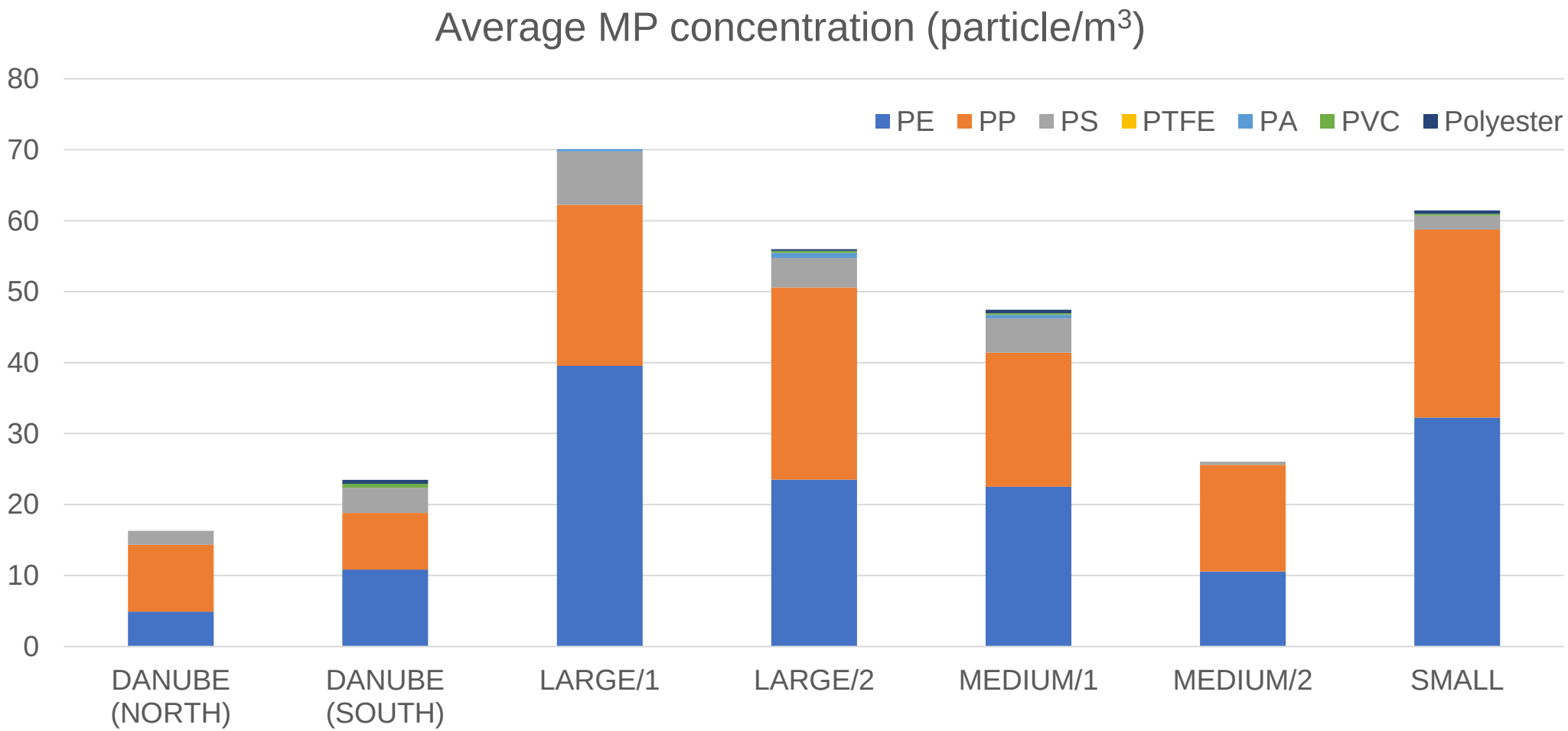
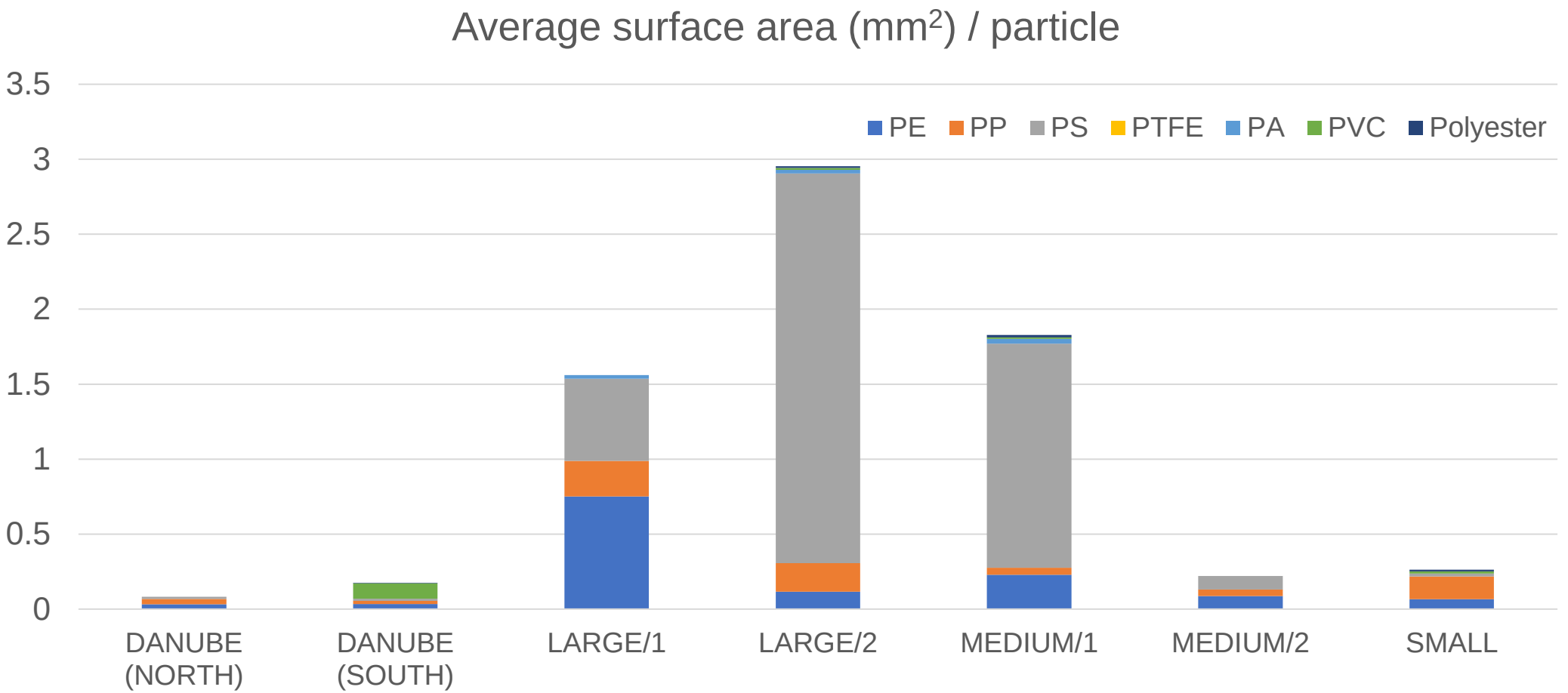


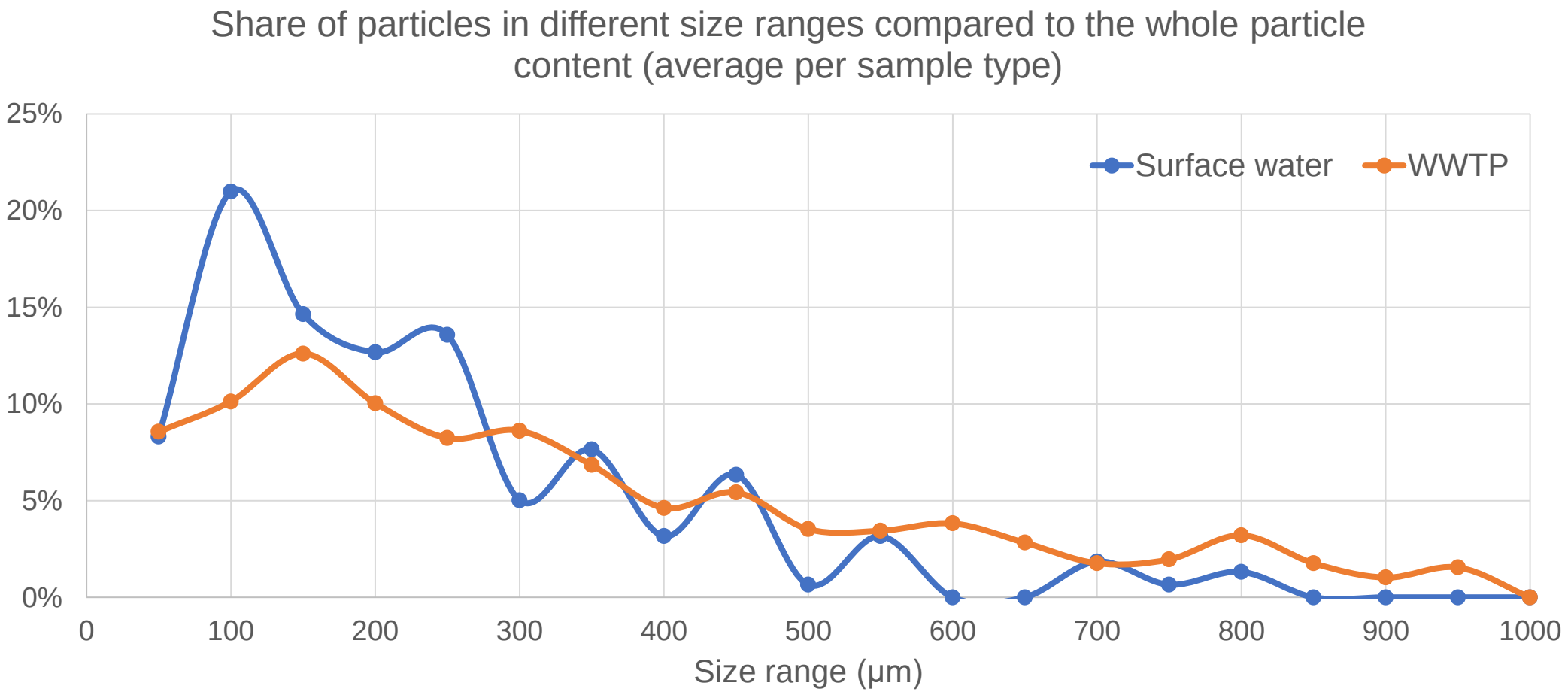
Results – particle numbers



Results – average surface area



Results – particle size range



Experiences, recommendations

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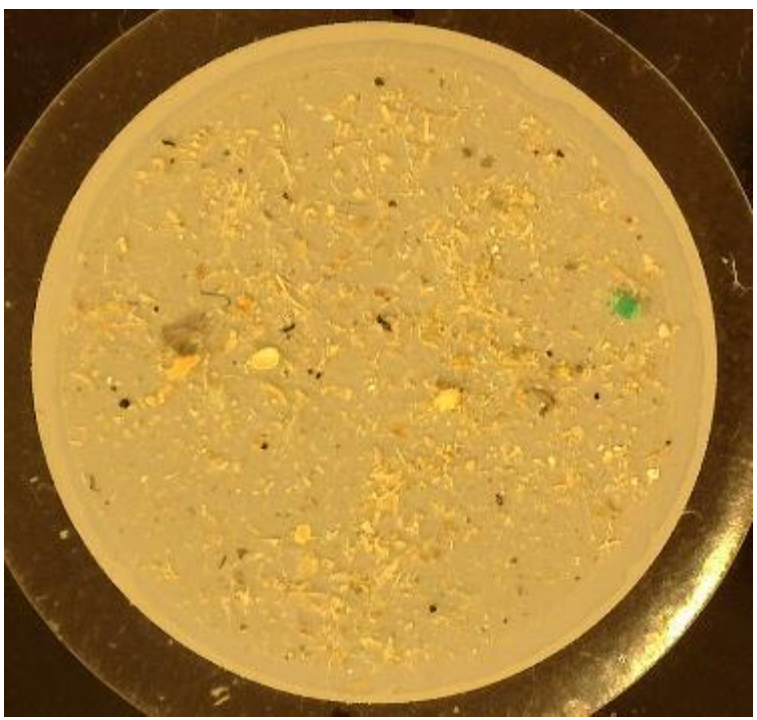
Particle size range

- larger MPs in WWTPs
- thickness complicates identification

WWTP sample

surface water sample



Experiences, recommendations

Particle size range

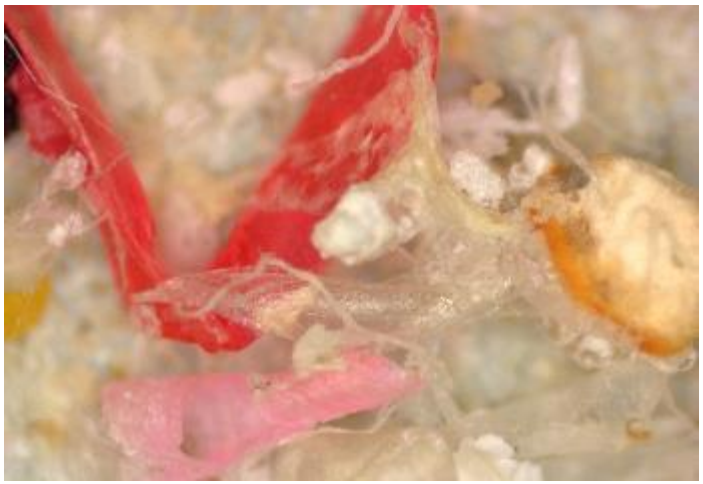
- larger MPs in WWTPs
- thickness complicates identification

Overloaded filters

- overlapping particles
- results: surface area might be important further to particle numbers
- less sample voluem, elongated time to prepare composite samples

Further analysis to define WWTP efficiency

- utilisation of sludge?!
- monitoring programme of effluents



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Thank you for the attention!

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DANUBE REGION strategy
Water Quality

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The project was impelmented in the frame of the EU SDR PA4 „Water Quality" activities in the commission of the Ministry of Foreign Affairs and Trade of Hungary.

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