

# Abundance and distribution of microplastics in water and sediments of the river Elbe, Germany

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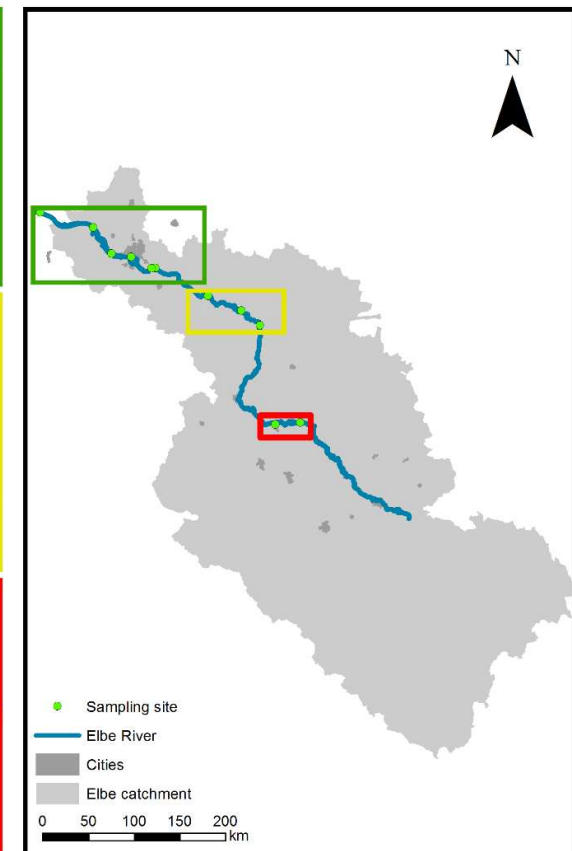
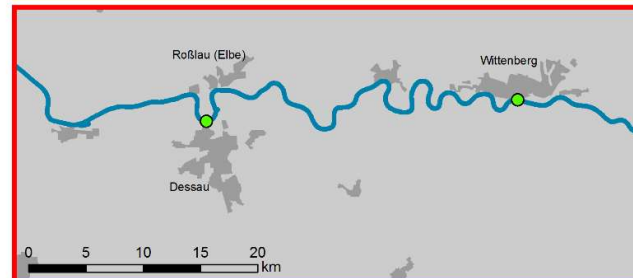
## Goal of this study

- quantify microplastic abundance in water and sediments along the German part of the River Elbe (11 sampling sites)
- better understand sinks and transport mechanism of microplastics

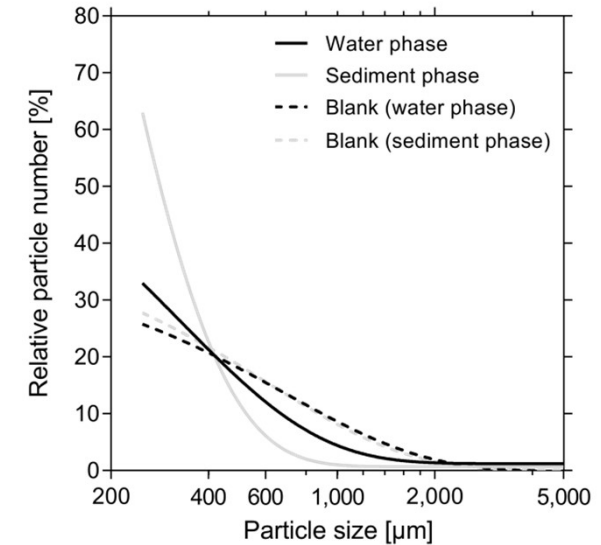
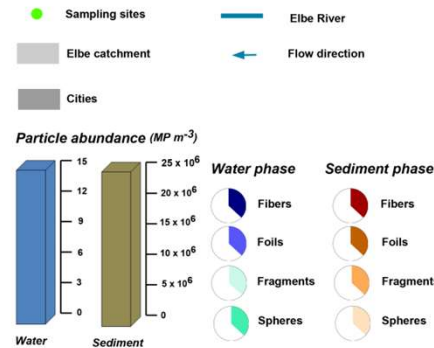
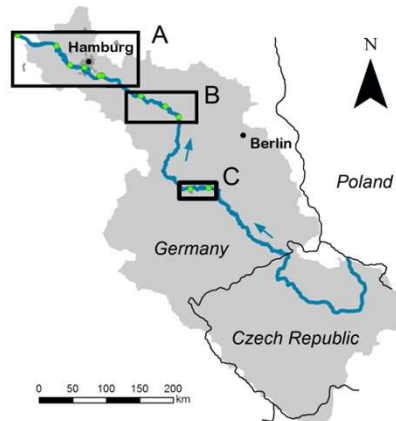


## Methods

- Sediments: density separation (zinc chloride, Munich Plastic Sediment Separator) followed by organic digestion (10:1 mixture of 30 %  $\text{H}_2\text{O}_2$  and 10 %  $\text{H}_2\text{SO}_4$ , 5 d, 55°C)
- Water samples (150  $\mu\text{m}$  net): organic digestion ( $\text{KOH}$  and  $\text{H}_2\text{O}_2$ ) and density separation (potassium formate)
- Analysis with FTIR (particles >500  $\mu\text{m}$ ) and pyrolysis GC-MC (entire filters)

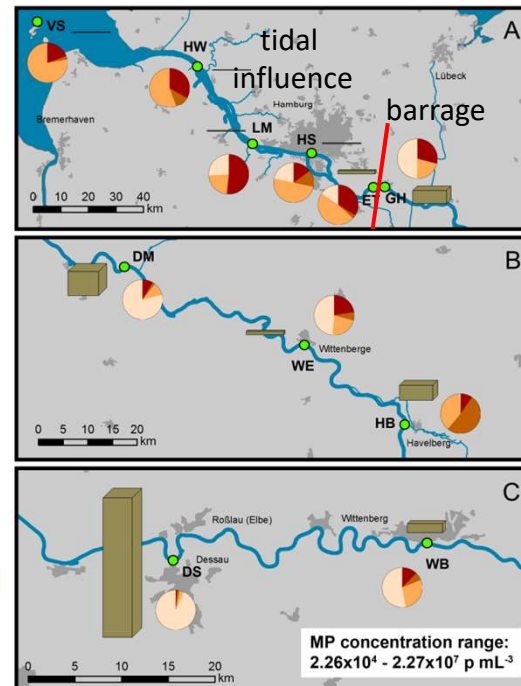
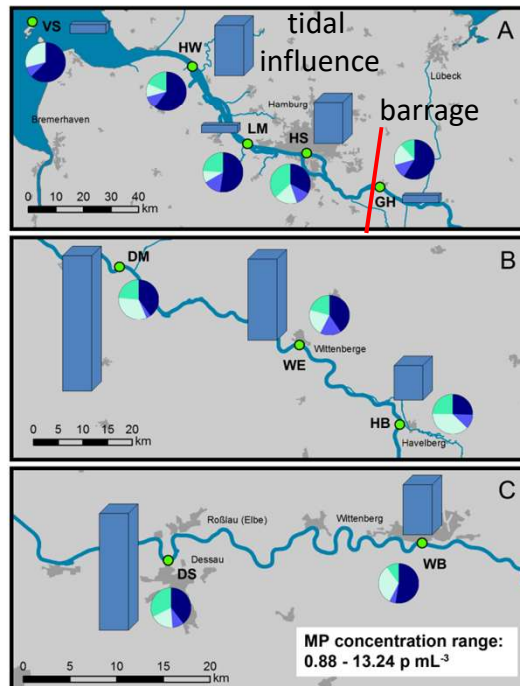


## Results



MP in the Elbe water phase

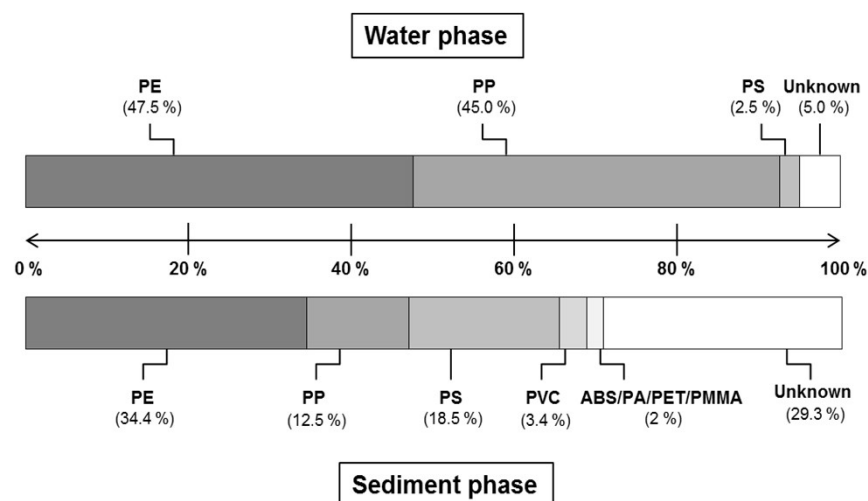
MP in Elbe sediments



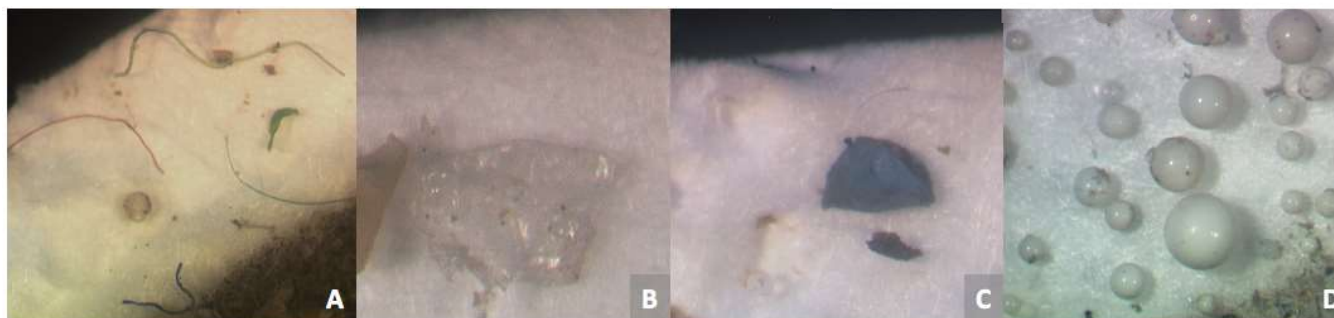
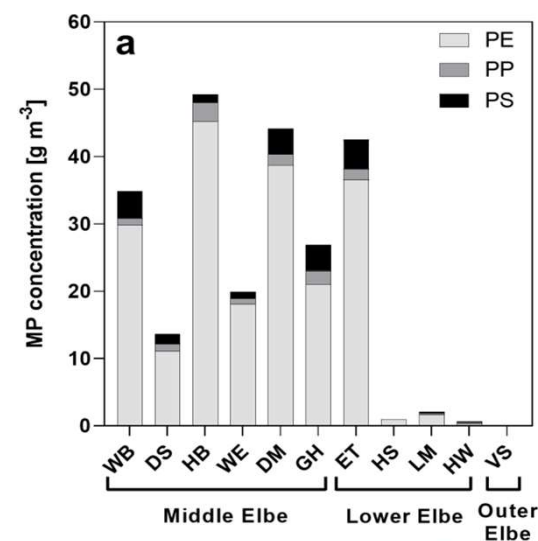
- more microplastics in sediments ( $2.26 \times 10^4$  -  $2.27 \times 10^7$  p/m<sup>3</sup>) than in the water phase (0.88 - 13.24 p/m<sup>3</sup>)
- lower abundance in the tidal influenced area (ET to VS)
- size: increase exponentially with decreasing particle size
- Dessau (DS): 93 % spheres – probably from industry in the environs

## Results

### FTIR, all particles >500 $\mu\text{m}$

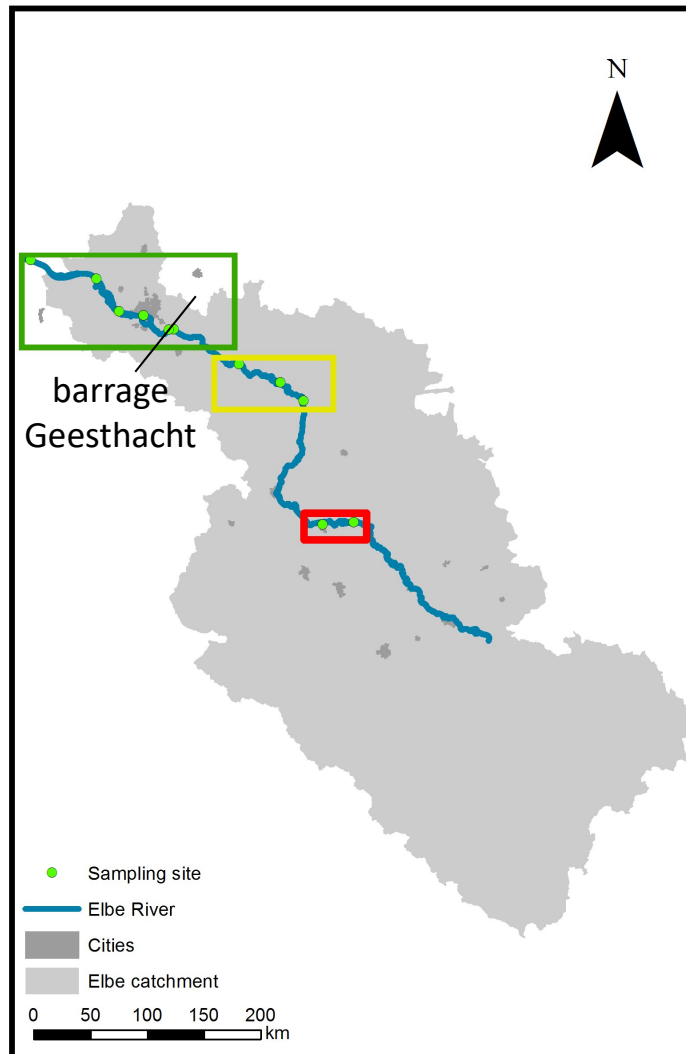


### Pyrolysis GC-MS (sediments 125-5000 $\mu\text{m}$ )





## Discussion and conclusion



- abundance of microplastics is site dependent
- in general: lower abundance in the tidal influenced area and downstream a barrage
- more microplastics in sediments than in water
- Higher microplastic abundance in more densely populated areas and close to industry (Dessau 93% spheres)
- Polymers esp. Polyethylene (PE), Polypropylene (PP) and Polystyrene (PS)
- higher diversity of polymers in sediments

