

# Column experiments on the attenuation of organic micropollutants during bank filtration

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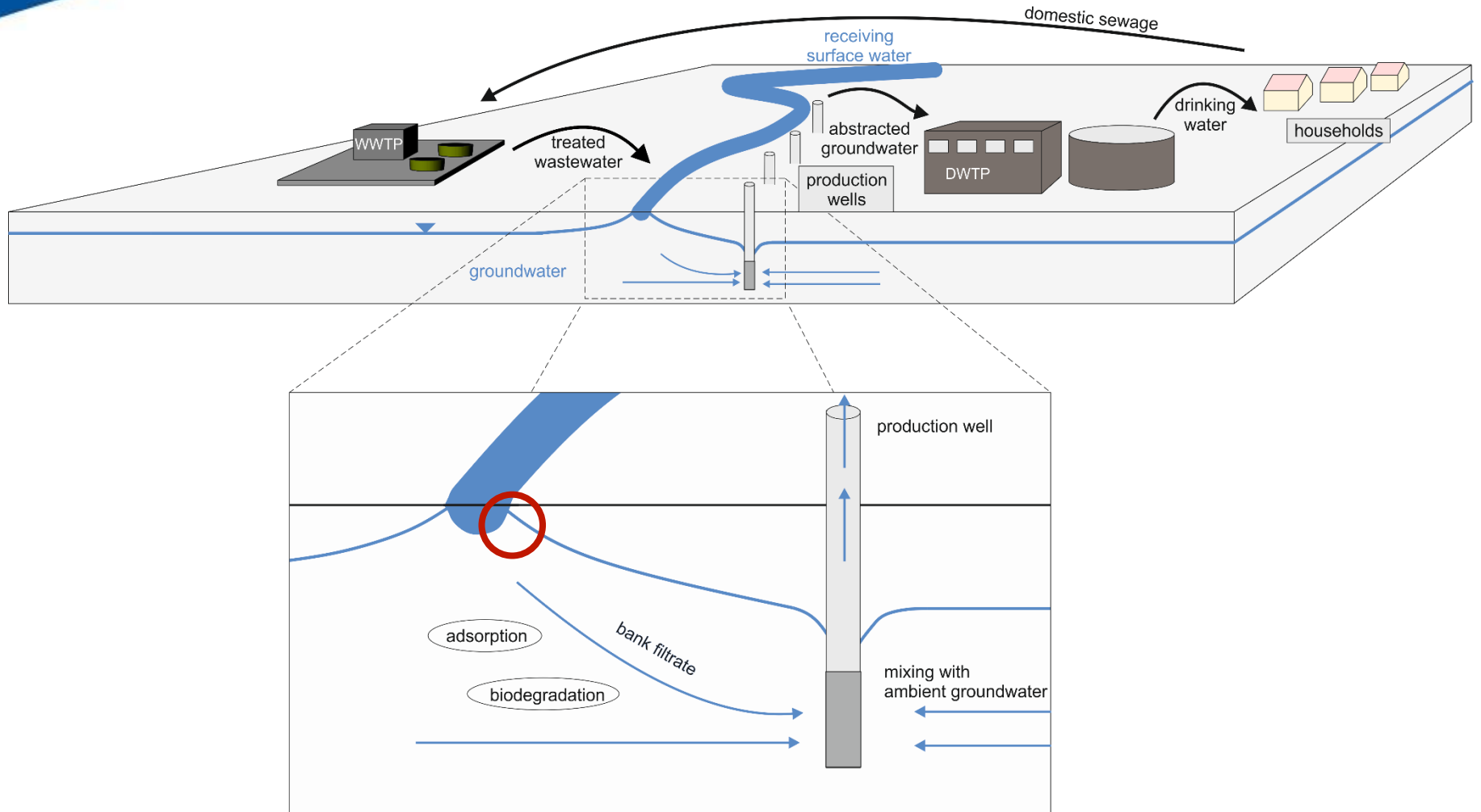
## The relevance of the hyporheic zone

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<sup>1</sup> Carl von Ossietzky University of Oldenburg, Institute of Biology and Environmental Sciences, Working Group Hydrogeology and Landscape Hydrology, D-26111 Oldenburg, Germany

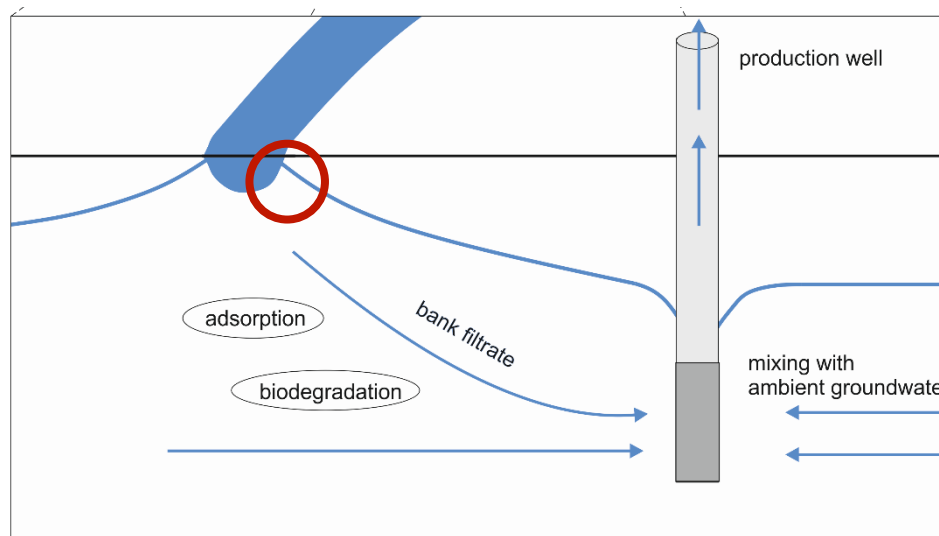
<sup>2</sup> Department of Laboratories, Berlin Water Company, 10864 Berlin, Germany

# Bank filtration

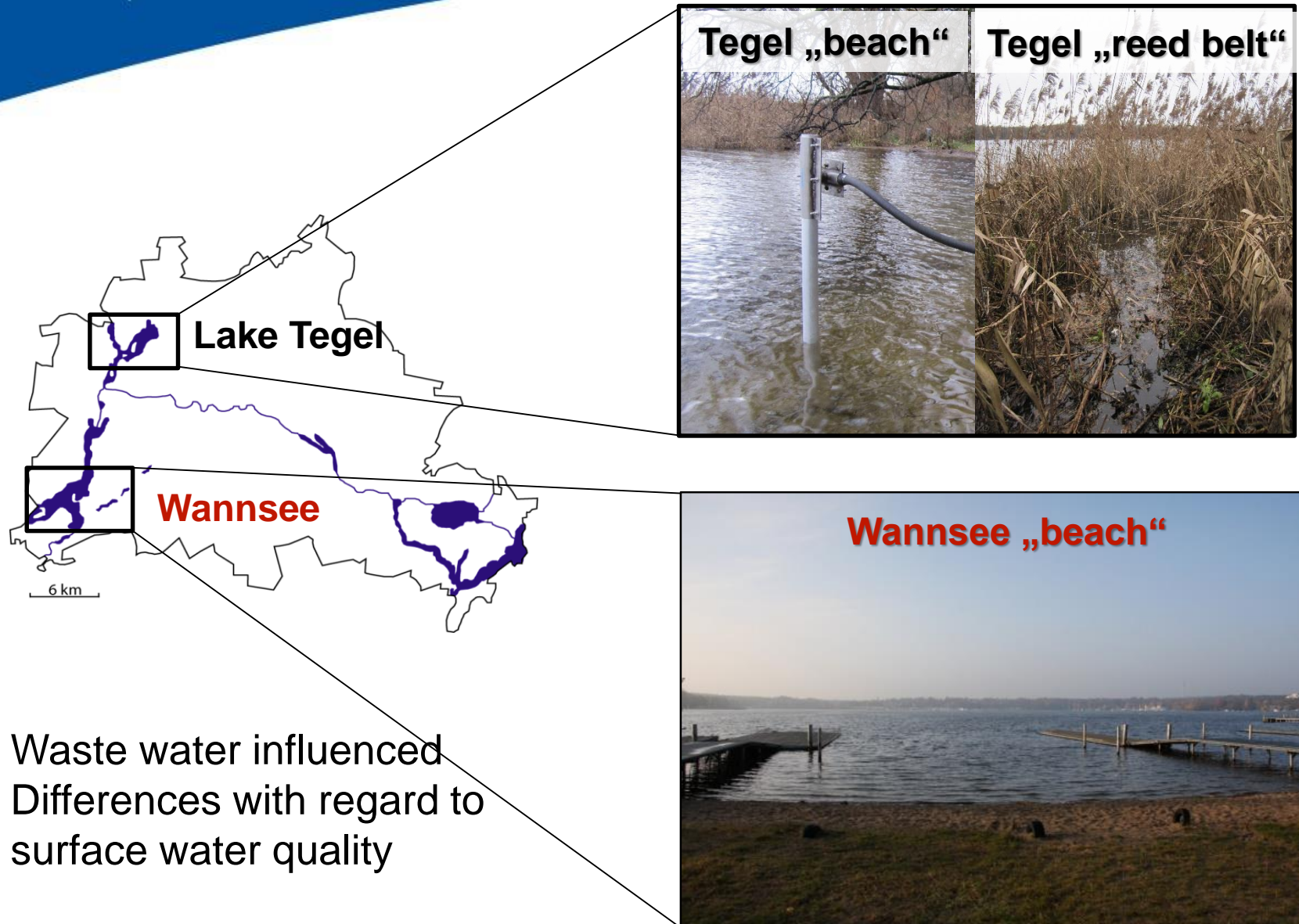


## Aim of the study

# Identification of similarities and differences in the attenuation potential of different field sites



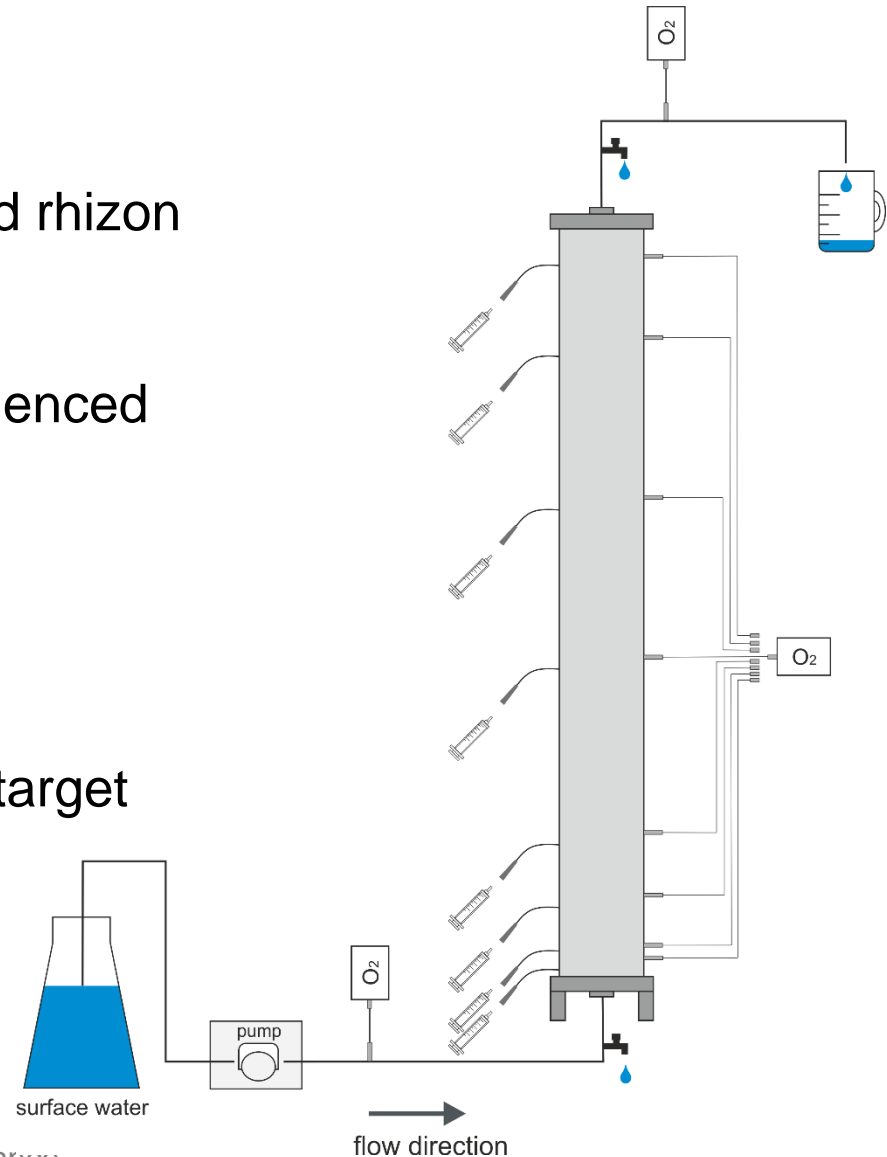
## Sampling sites



- Waste water influenced
- Differences with regard to surface water quality

## Experimental setup

- Installation of oxygen probes and rhizon samplers
- Inflow solution: waste water influenced surface water
- Depth dependent sampling (3x)
  - Hydrochemical conditions
  - Degradation behavior of the target compounds



## Investigated compounds

### Anti-epileptic drugs

**carbamazepine**

10,11-dihydro-10,11-hydroxy-  
carbamazepine

**pregabalin**

**gabapentin**

gabapentin lactam



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### Anti-hypertensive drugs

**candesartan**

**olmesartan**

valsartan acid

**acesulfame**

oxypurinol

FAA

**primidone**

PEMA

**metoprolol**

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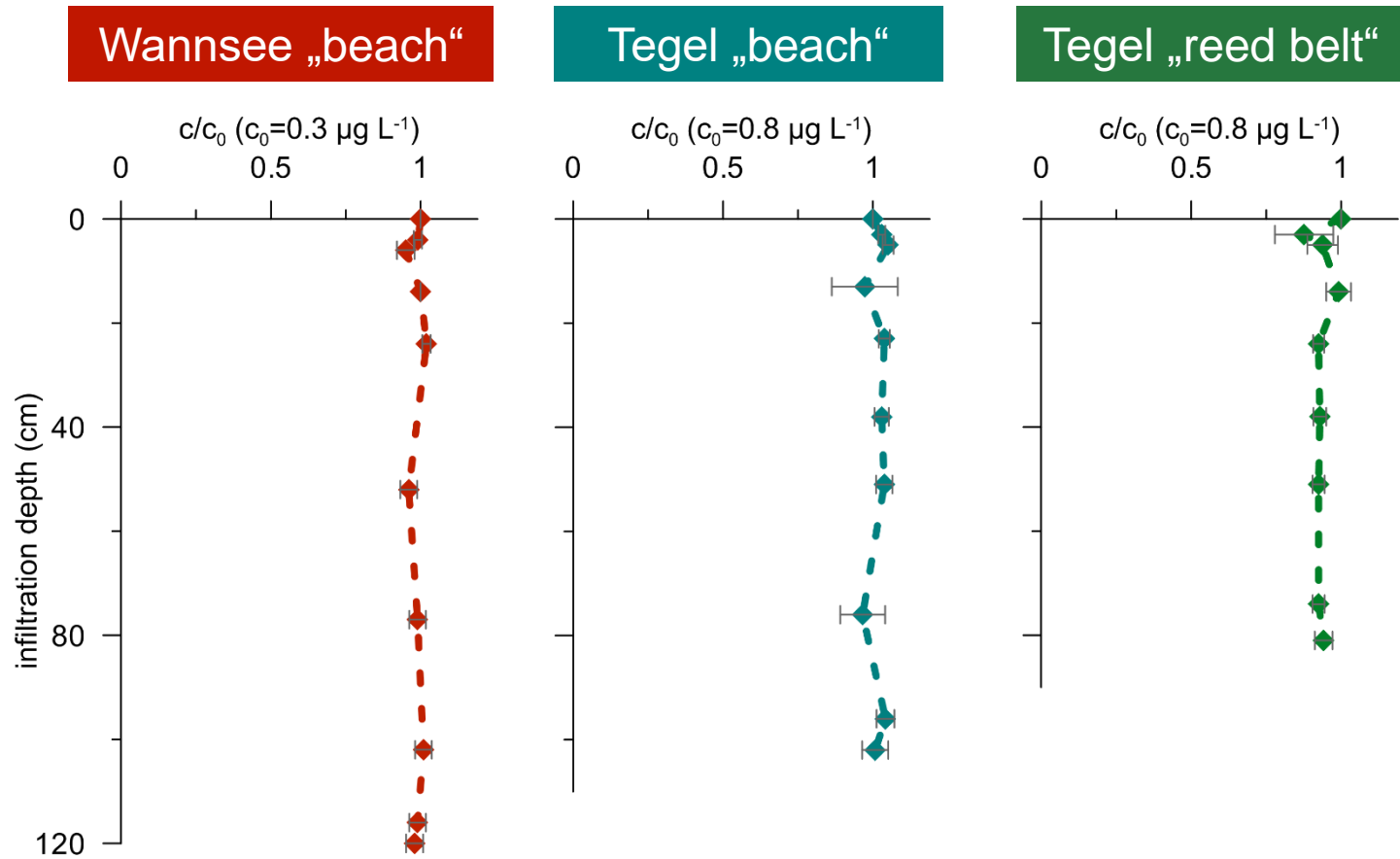
**primidone**

PEMA

**metoprolol**

# Contaminant removal

**carbamazepine**

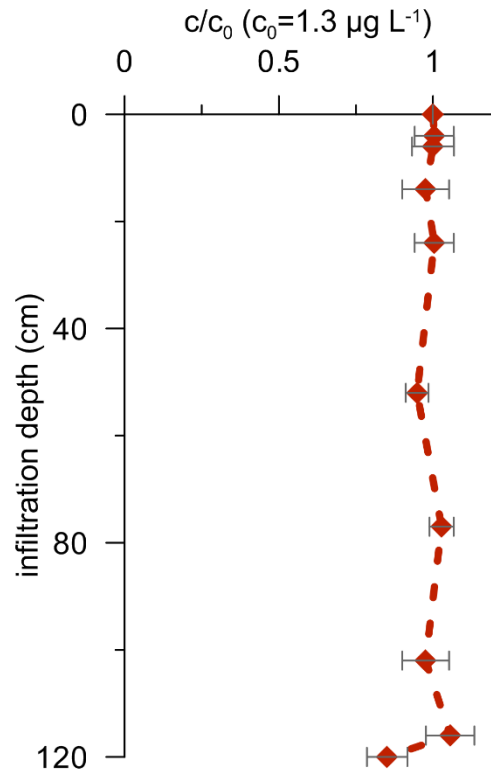




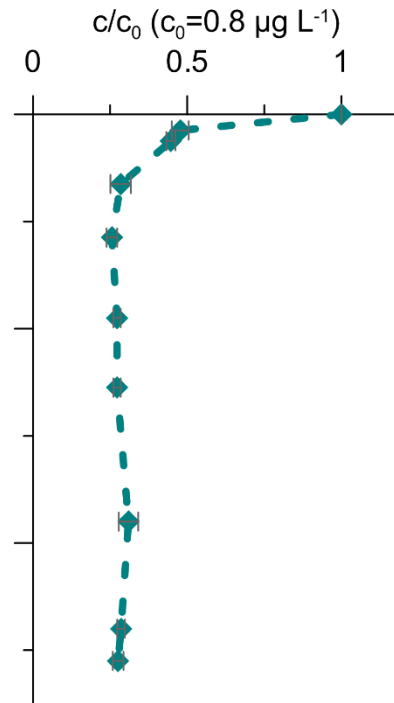
# Contaminant removal

**acesulfame**

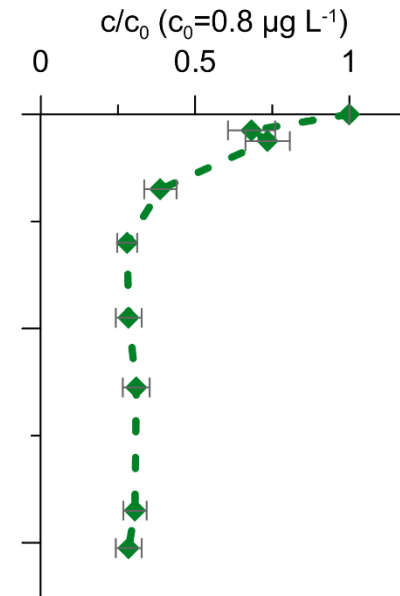
Wannsee „beach“



Tegel „beach“



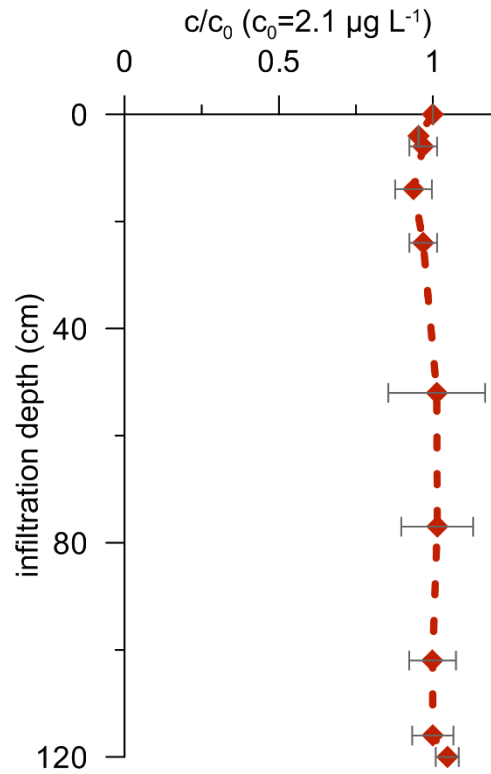
Tegel „reed belt“



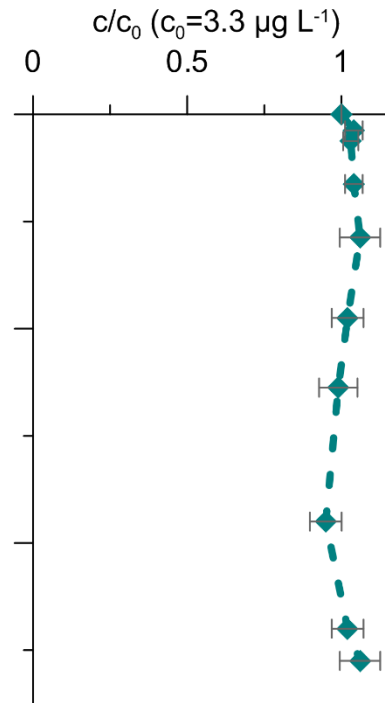
# Contaminant removal

**oxypurinol**

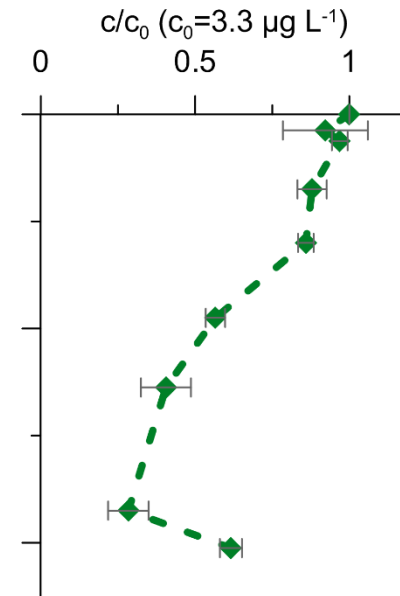
Wannsee „beach“



Tegel „beach“

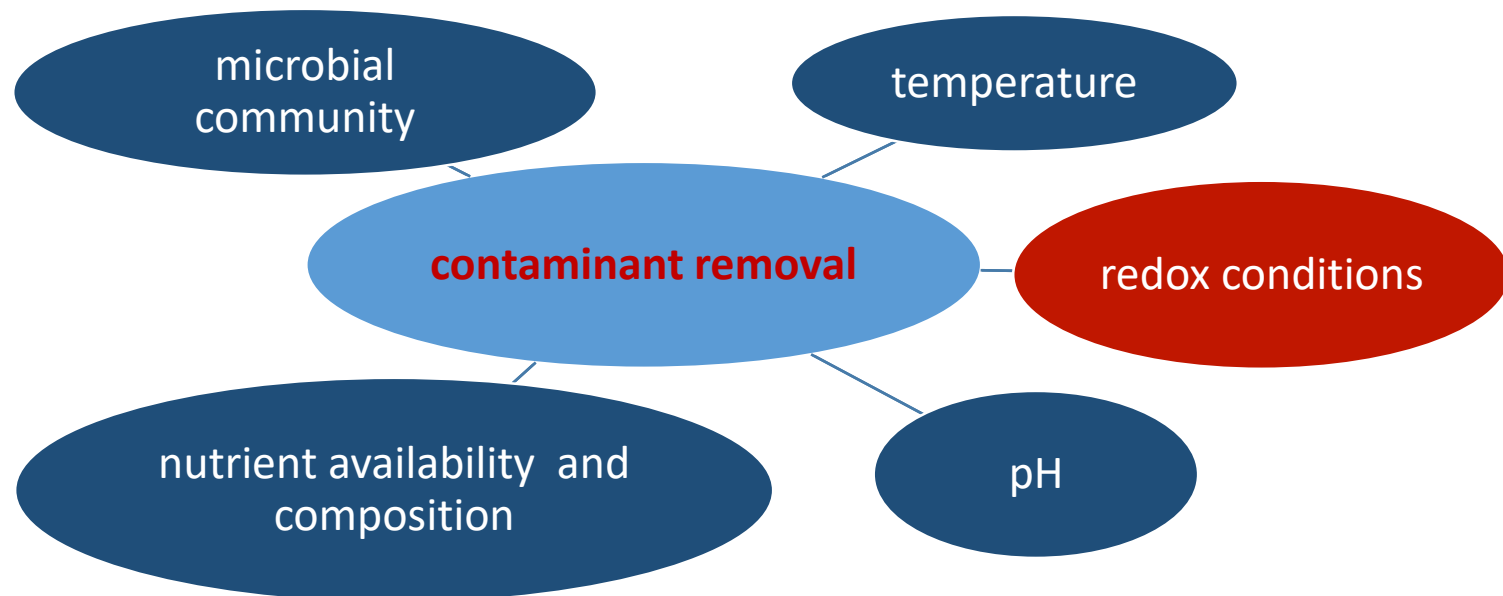


Tegel „reed belt“

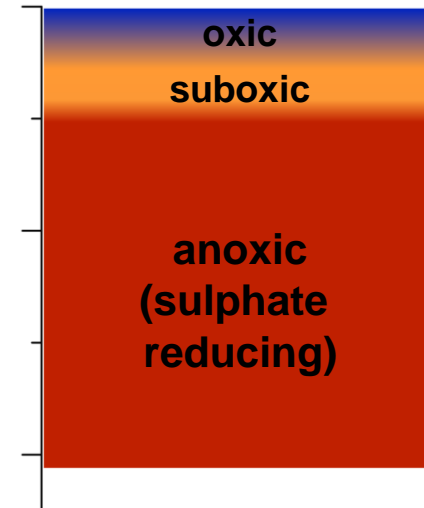
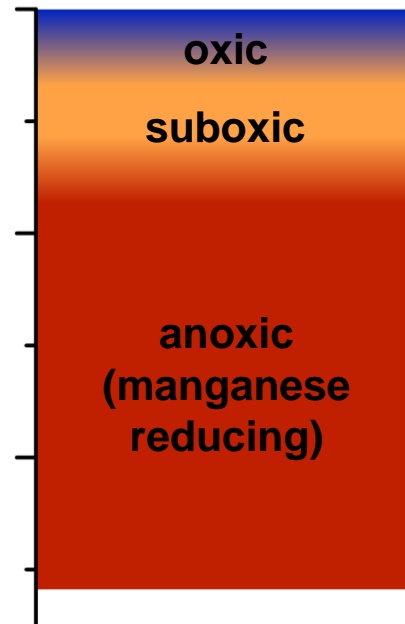
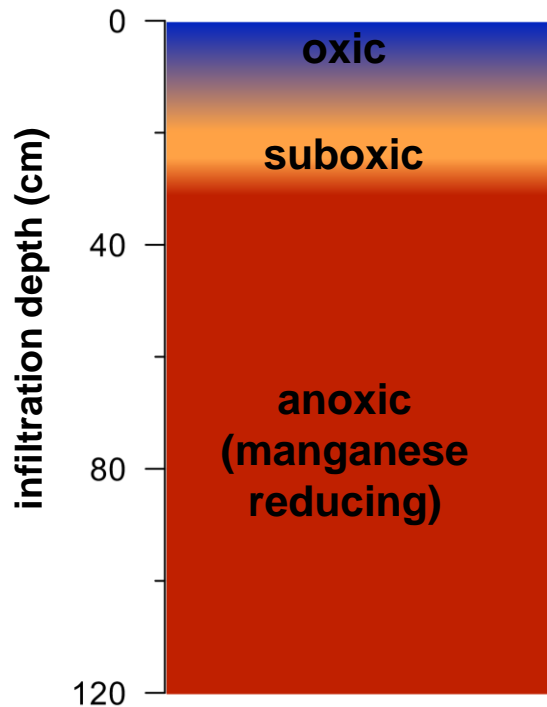
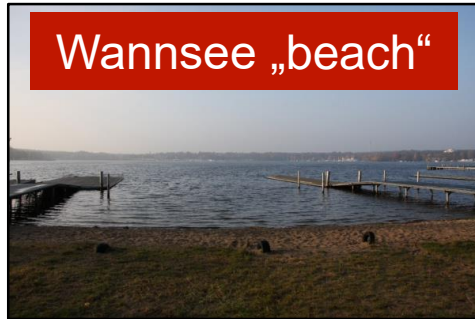


## Interim conclusion

- **Significant removal within the hyporheic zone observed for 8 out of 14 compounds**
- **BUT: Differences between the sampling sites as well as small-scaled**



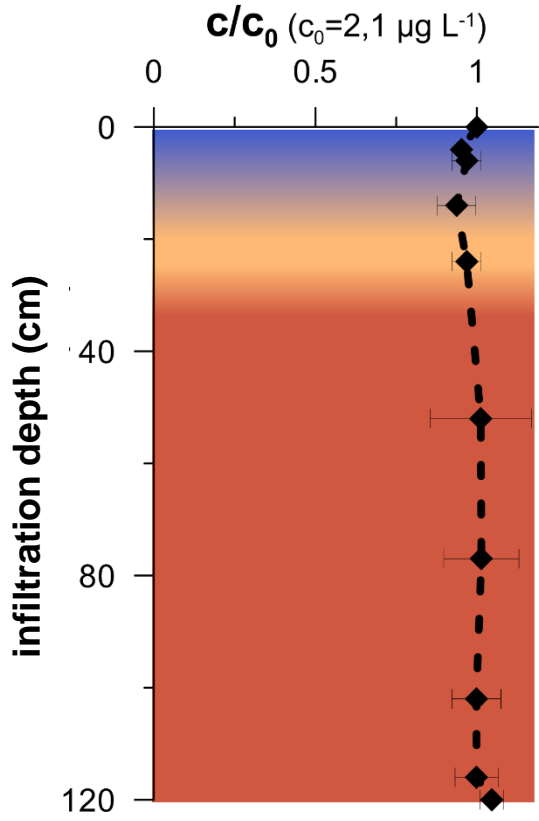
## Redox conditions



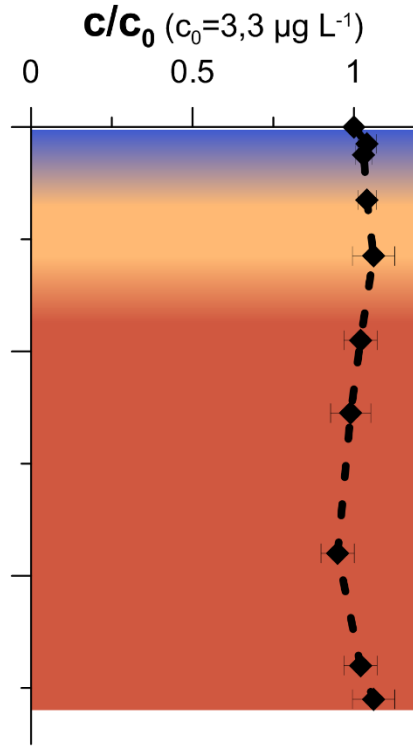
# Redox dependent contaminant removal

**oxypurinol**

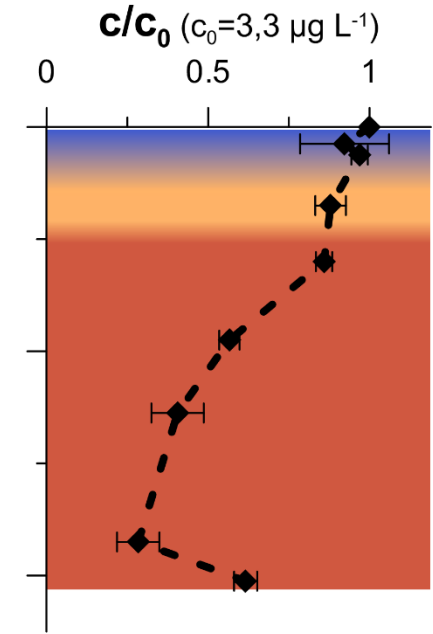
Wannsee „beach“



Tegel „beach“



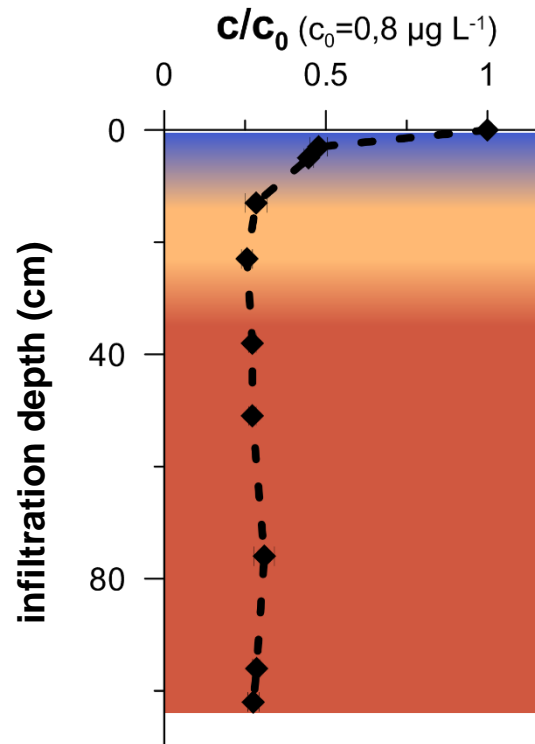
Tegel „reed belt“



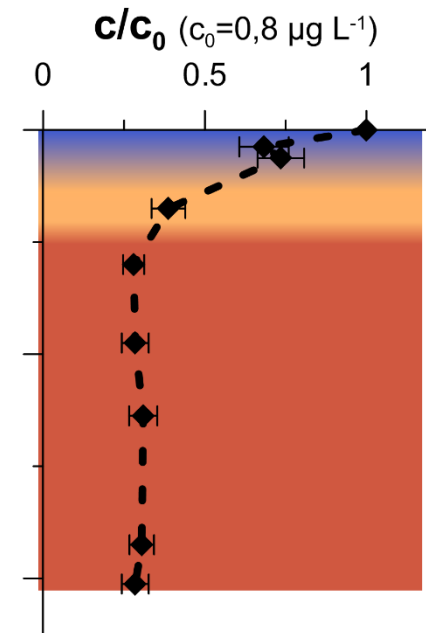
# Redox dependent contaminant removal

**acesulfame**

Tegel „beach“



Tegel „reed belt“



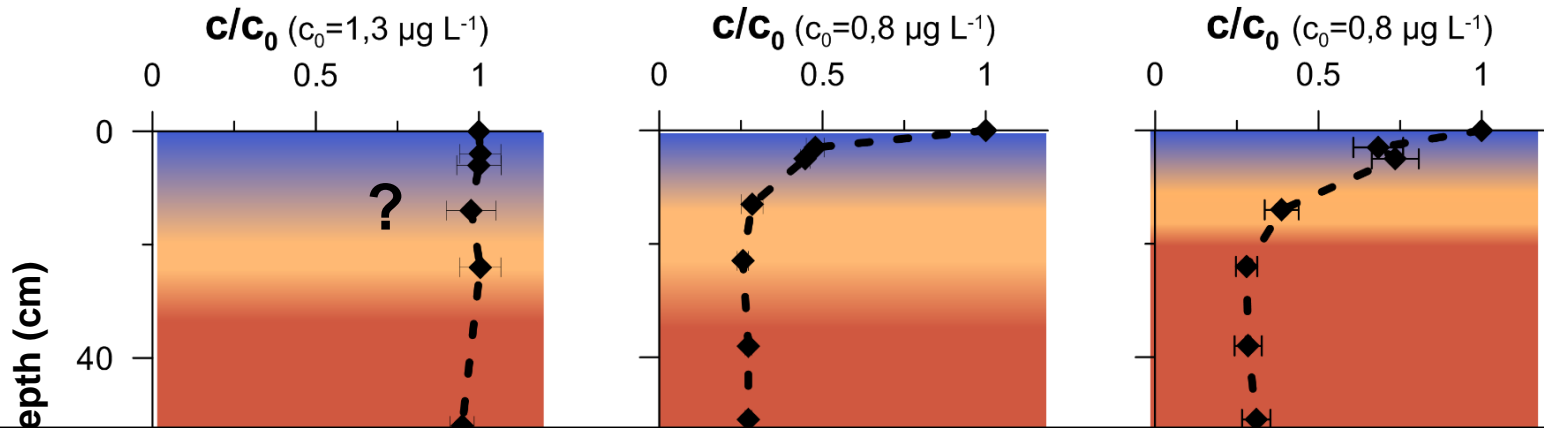
# Redox dependent contaminant removal

**acesulfame**

**Wannsee „beach“**

**Tegel „beach“**

**Tegel „reed belt“**



**Influencing parameters...**

**nutrient availability?  
 microbial community?**



## Identification of similarities and differences in the attenuation potential of different field sites

- **Clear differences – between the sampling sites as well as at small scale**
- **If degradation occurs, it generally happens within the upper 20 cm**
- **Identification and quantitative assessment of isolated parameters remains challenging**



Thank you for your attention !

