

# Updating input data and expanding the range of substances – A harmonized approach for modelling emissions from Urban Systems and Municipal Wastewater Treatment Plants in MoRE

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## Motivation

- Pollutants from urban areas including discharges from municipal wastewater treatment plants (WWTP), combined sewer systems (CSO) and stormwater sewers (SSO) pose a significant emission to surface waters
- Due to different sampling strategies and analytical methods, data is often limited and difficult to combine
- Monitoring results with a standardized sampling strategy are used and a harmonized calculation approach for Germany is developed in MoRE

## Methods

- The input data based on a monitoring from 49 WWTPs, 12 CSO, three SSO with small LOQs
- Only substances whose number of samples are above 50% of the LOQ are modelled
- For values smaller than the LOQ, half of the LOQ is used for the calculation of medians

## Results

- Annual emission loads for a broad spectrum of relevant substances in urbanized areas are estimated
- Depending on the origin, use and substance characteristics, the primary pathway varies

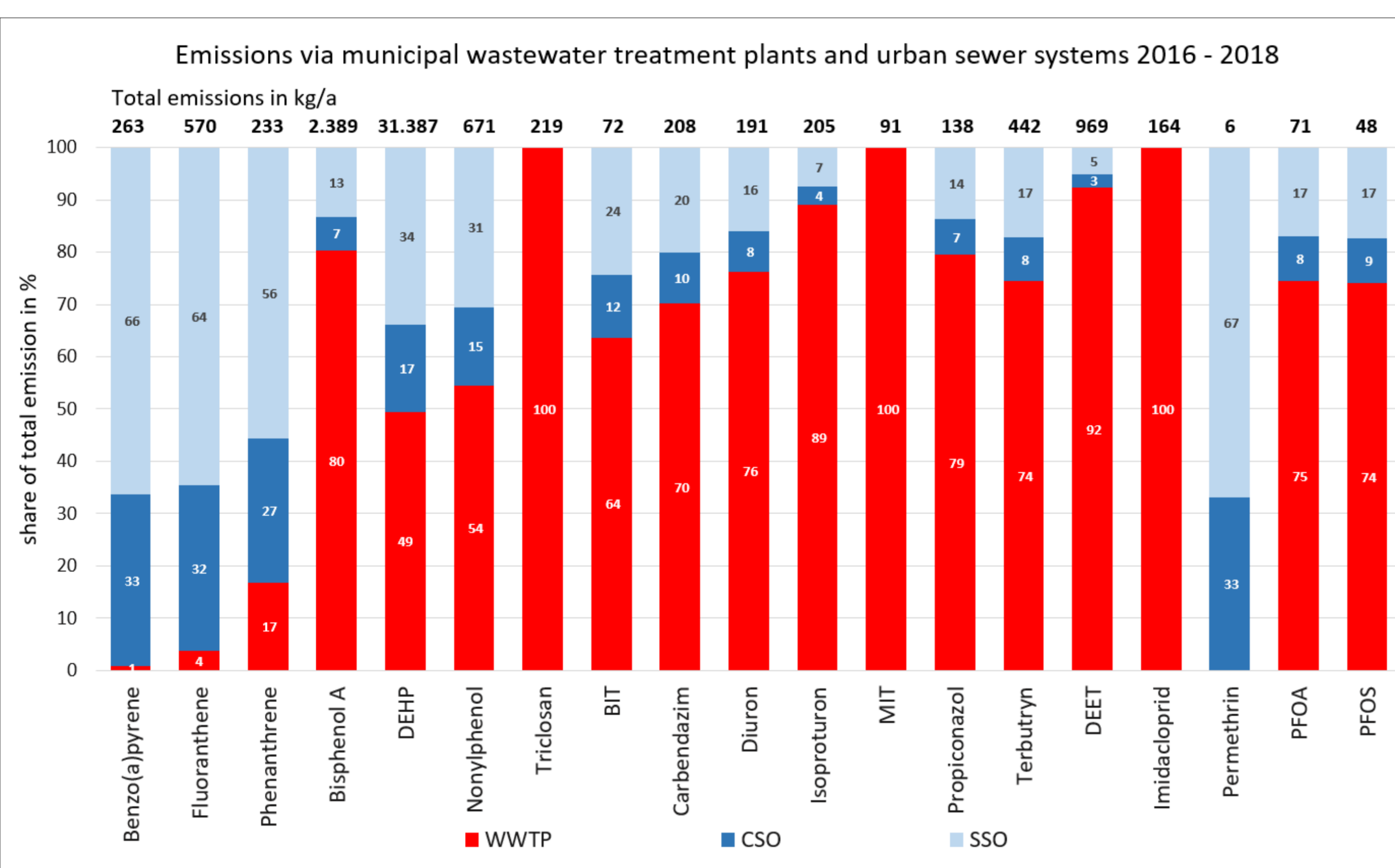


Fig. 1: Emissions via municipal WWTP and urban sewer systems from 2016 to 2018

## Results

- Regionalised results give an overview of the largest emission hotspots

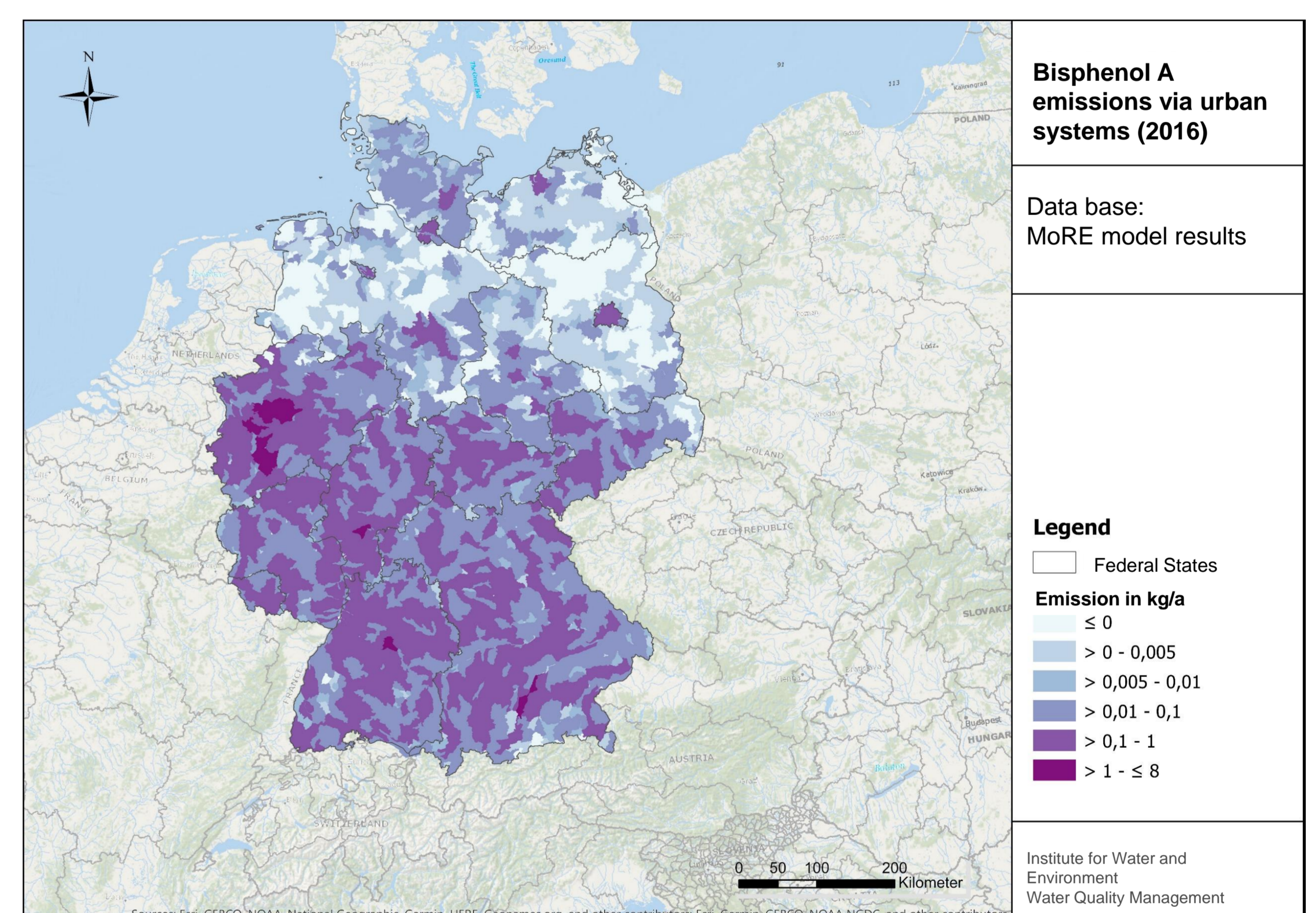


Fig. 2: Regionalized Bisphenol A emissions via urban systems in Germany

## Conclusion

- New monitoring results can be used as representative input data and enable the estimation of emissions of new substances
- For a number of substances, the highest median does not reflect the primary pathway, as LOQs are highest for WWTP influent due to analytical methods
- Even lower LOQs should be used to capture substance specific behaviour and improve the quantification

## References

Nickel, Jan Philip; Sacher, Frank; Fuchs, Stephan (2021): Up-to-date monitoring data of wastewater and stormwater quality in Germany. In: *Water research* 202, S. 117452. DOI: 10.1016/j.watres.2021.117452.

Kopp, Lukas: Spurenstoffe aus Misch- und Regenwassereinleitungen (FKZ 3719 21 202 0), unpublished

Kopp, Lukas: Einträge von Bioziden in Gewässer über Mischwasserentlastungen (FKZ 3721 63 4020), unpublished

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