

Review of monitoring data and critical evaluation of proposed P/vP and M/vM criteria

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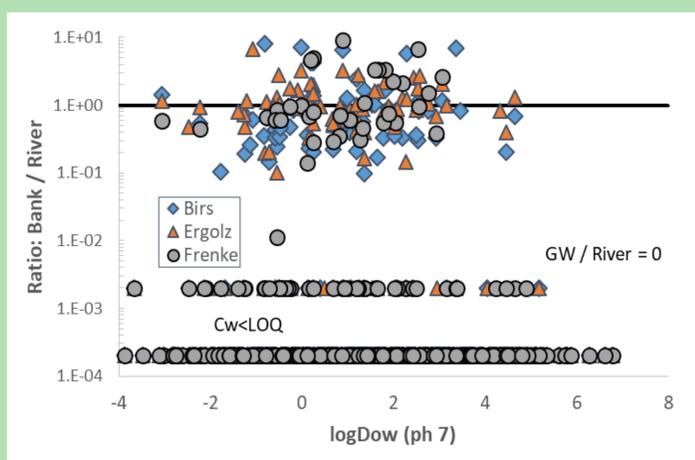
BACKGROUND

- The current PMT/vPvM* concept (UBA, 2019) is built on the assumption that substances fulfilling both P and M criteria all have the potential to reach sources of drinking water while those not fulfilling these criteria do not.
- This evaluation challenges this assumption through the analysis of available monitoring data from surface water and groundwater for chemicals with different degradation rates and $\log K_{oc}$ (organic carbon-water partition coefficient) values.

RESULTS

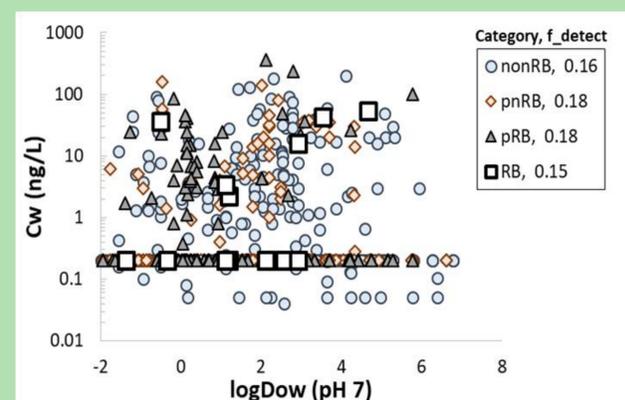
- Approach: Compile available monitoring data from UBA 2019 and other sources (ECETOC, 2020)
- Physicochemical properties were estimated with EPI Suite™ ($\log K_{oc}$) or JChem ($\log D_{ow}$, pH 7 (Octanol-water distribution coefficient)). Ready biodegradation test (RBT) results were estimated with VEGA model, or measured data were obtained from online databases.
- $\log D_{ow}$ scales with $\log K_{oc}$ (ECETOC, 2013) and is a reasonable basis for preliminary evaluation, similar to the approach taken by UBA 2019.
- **Figure 1.** Comparing the ratio of concentrations in Swiss surface water (river) to nearby groundwater (river bank) vs $\log D_{ow}$

- Many chemicals were not measurable (<LOQ, limit of quantification)
- Quantifiable ratios all near 1 (± 3 -fold)
- No observable trends with $\log D_{ow}$



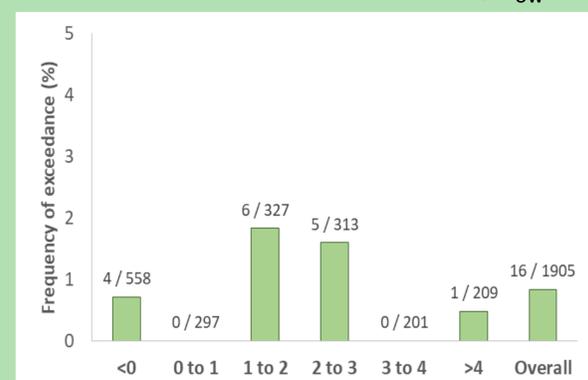
RESULTS

- **Figure 2.** Plot of median concentrations in European surface water and groundwater (C_w) for different analytes vs $\log D_{ow}$
- No relationship between concentration and $\log D_{ow}$ or RBT status



Predicted RBT: nonRB, probably not RB (pnRB), probably RB (pRB), readily biodegradable (RB). Number of quantifiable data vs total data provided (f_{detect})

- **Figure 3.** Frequency plot of numbers of chemicals (median concentrations >100 ng/L) that fall within $\log D_{ow}$ bins
- Low overall exceedance frequency (<1%) and no correlation with $\log D_{ow}$



CONCLUSIONS/NEXT STEPS

- It is concluded that P and M criteria are not good predictors of surface water or groundwater contamination. Emission profiles (tonnages, routes of exposure, etc.) are probably the major explanatory factors.
- The PM/vPvM approach would result in an ineffective and inaccurate screening method. Conservative exposure modelling and risk assessment would probably be more appropriate to quantitatively predict environmental contamination.

* PMT = Persistent, Mobile and Toxic; vP/vM = very Persistent and very Mobile

References

Umweltbundesamt (UBA). 2019. Protecting the sources of our drinking water - The criteria for identifying Persistent, Mobile, and Toxic (PMT) substances and very Persistent, and very Mobile (vPvM) substances under EU REACH Regulation (EC) No 1907/2006.
ECETOC. 2020. Technical Report 'Persistent chemicals and water resources protection' Chapter 5. For Publication 2020.
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