PM(T) Substances

Detected in Groundwater Sources

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25th March 2021

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Vitens

Vitens – some key figures

- Largest drinking water company in the Netherlands
- 5 provinces
- 5,6 million people and companies
- Production 375 Mm3/y
- 110 well fields

Interest in PMT

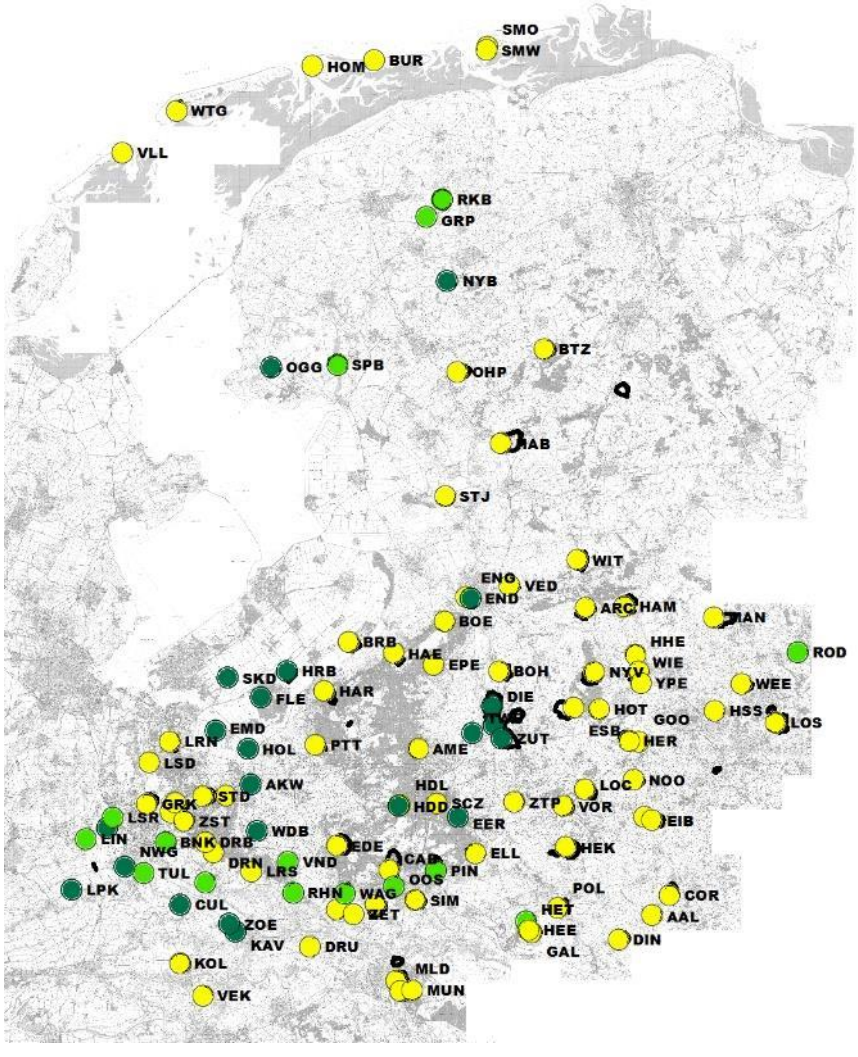
A Drinking Water Company using Groundwater

1. Prevent Organic Micropollutants (OMP) penetrating in groundwater
2. Predict mobility of detected substances in aquifers
3. Make monitoring programs tailor-made for relevant substances

Vitens

Vitens data

- 110 well fields
- 90% groundwater
- 10% infiltrated surface water
- 85% vulnerable for pollution
- Traveltimes > 2 years
- Data 2020
- Analysis program of 778 OMP



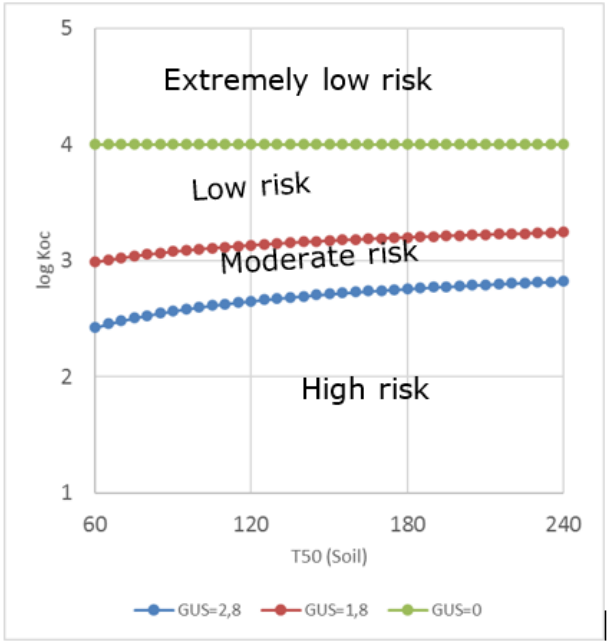
PM(T) criteria and GUS-Index

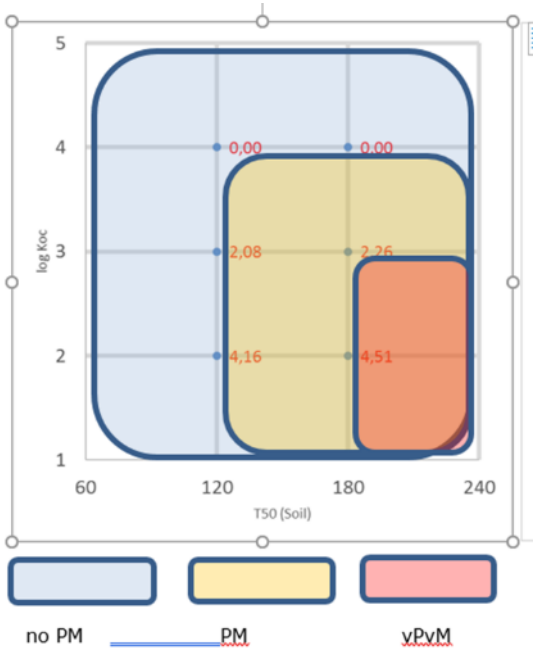
	T50 (Soil)	T50 (Water)	log Koc	GUS
UBA PM	120	40	4	0,00
UBA vPvM	180	60	3	2,26

- Focus on groundwater: no T
- GUS-Index for prediction of leakage of pesticides (Gustafson, 1989):

$$GUS = \log_{10}(t_{1/2}^{soil}) \times (4 - \log_{10}(K_{oc}))$$

- UBA M-criterion stricter than GUS
- UBA P-criterion wider than GUS
- Range of environmental conditions (redox, pH, etc)

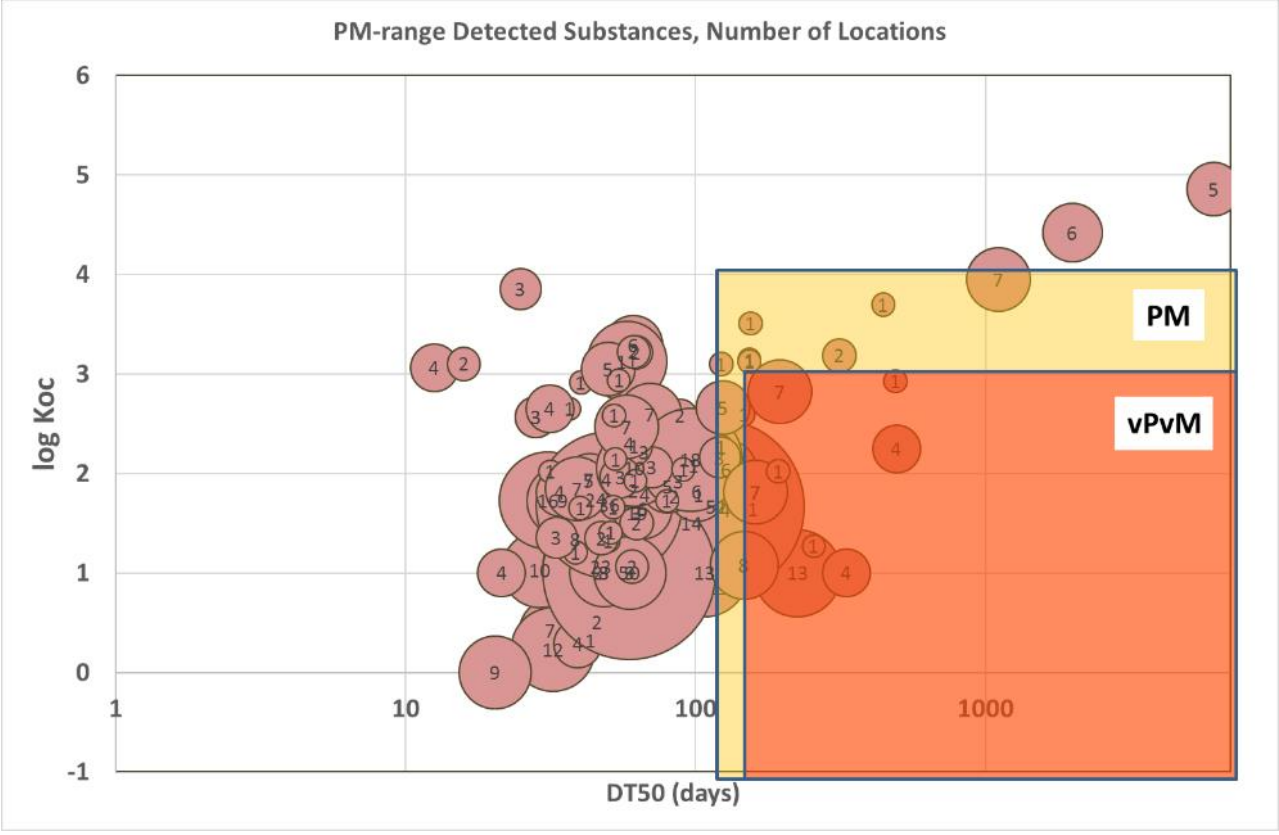




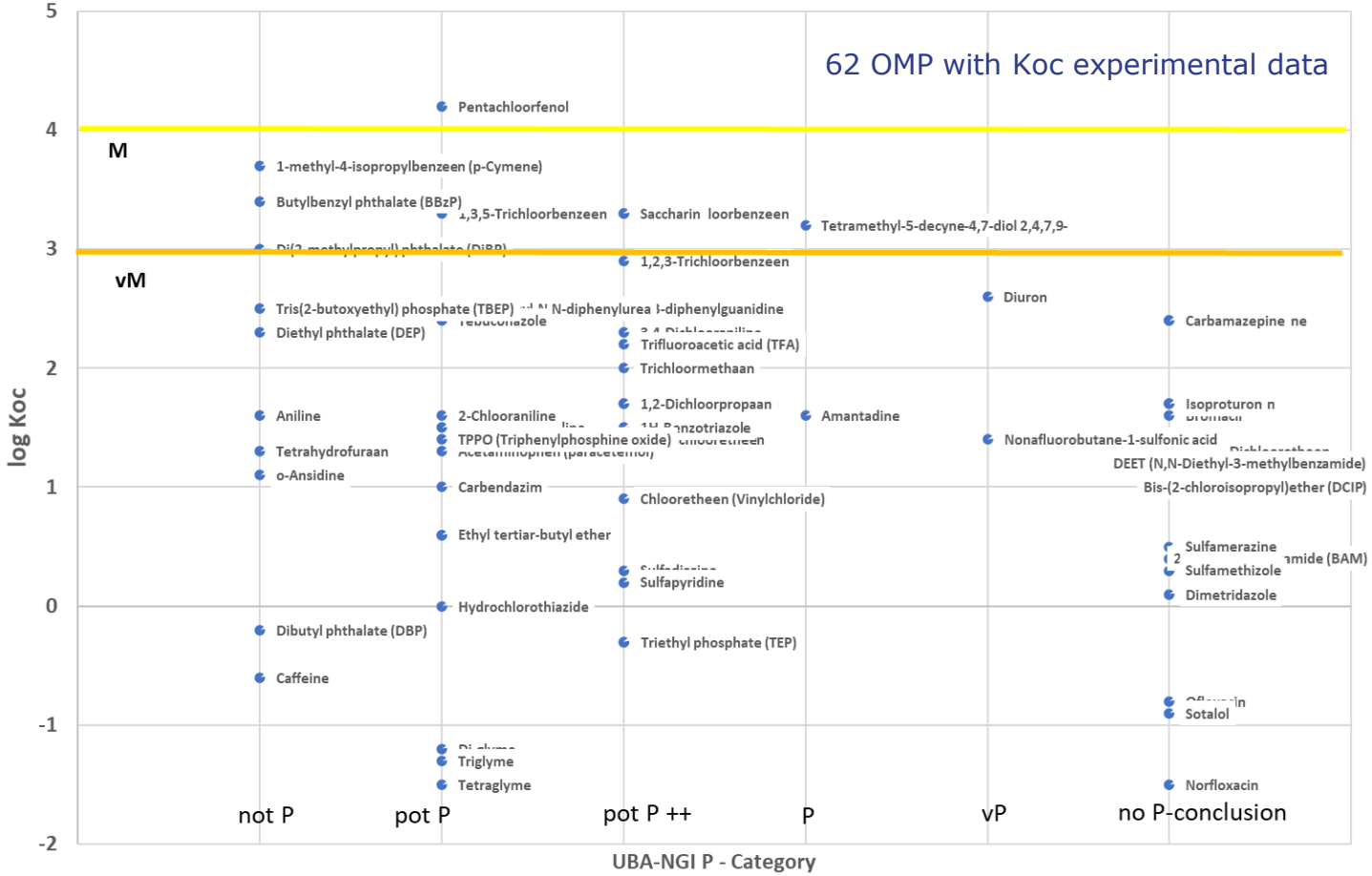
Vitens-data on P and M-axis

DT50 and Koc from RIVM-database: 124 of 134 OMP matched

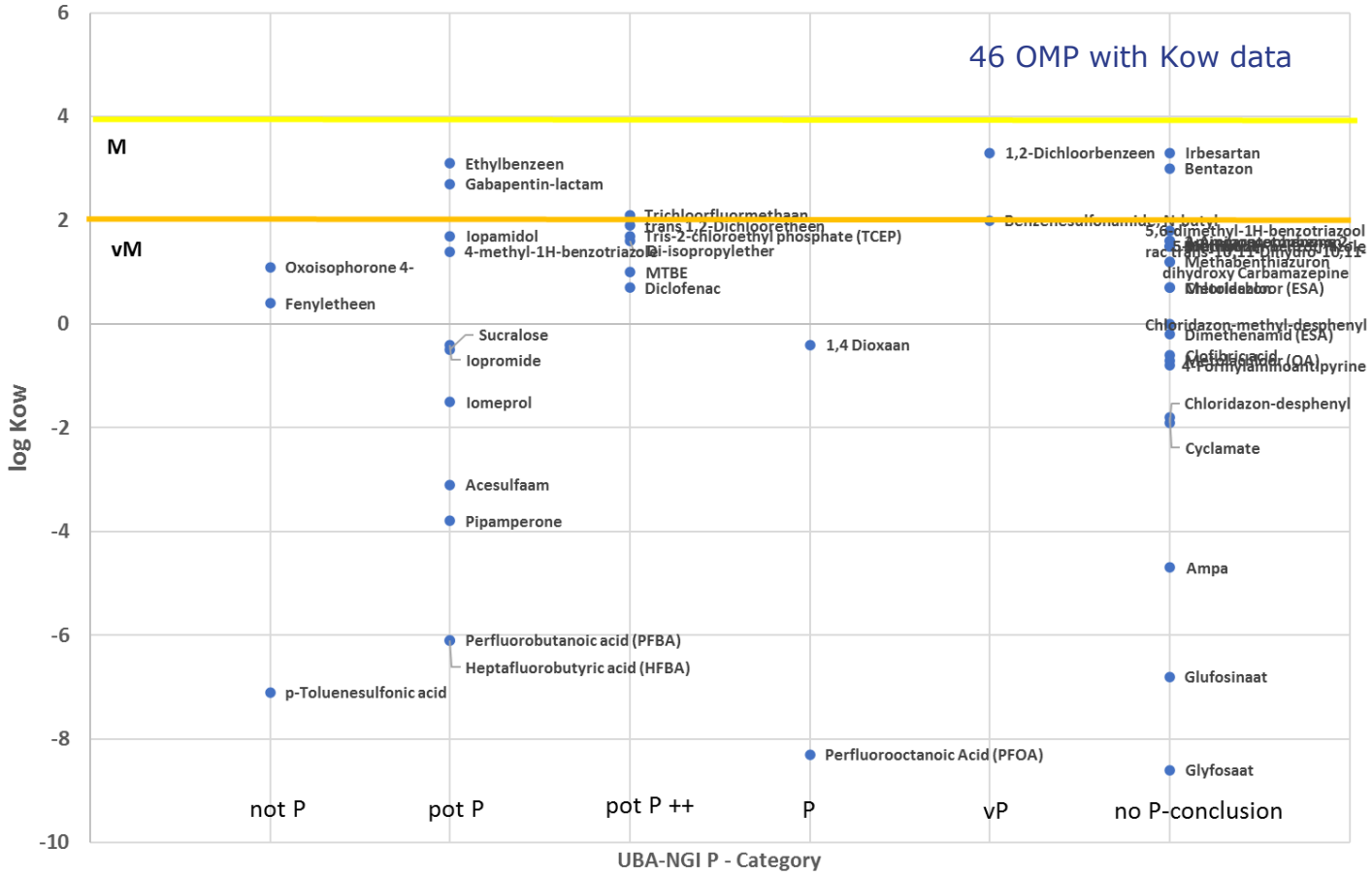
- Most detected substances fullfill vM-criterion of log Koc < 3
- Most outside P-criterion of DT50 > 120d
- Many substances found on several locations



Vitens data: 108 of 134 OMP matched with NGI-UBA



Vitens data (2)



Summarizing

Match with NGI-UBA

- 108 detected OMP matched
- 65 REACH-registered
- Others:
  - pesticides
  - Pharmaceuticals
  - Not registered

	Matched	REACH-reg	Example	Locations
vPvM	21	20	MTBE	23
PM	9	8	PFOA	6
Pot P	28	18	Tetraglyme	9
Not P	13	13	Aniline	7
No conclusion	37	6	5-Methyl_1H-Benzotriazole	5

Findings

1. 134 OMP detected in Vitens well fields
2. Vitens data match with vM-criterion
3. Many detected OMP lack reliable P-data for application in groundwater
4. About 60% of detected OMP are REACH-registered

Recommendations

1. Develop methods for determination of Persistency under several aquifer conditions
2. Priority for determination of P for commonly detected REACH-registered OMP

Thanks to Andre Bannink and Merijn Schriks

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www.vitens.nl

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