German Environment Agency

Umwelt Bundesamt

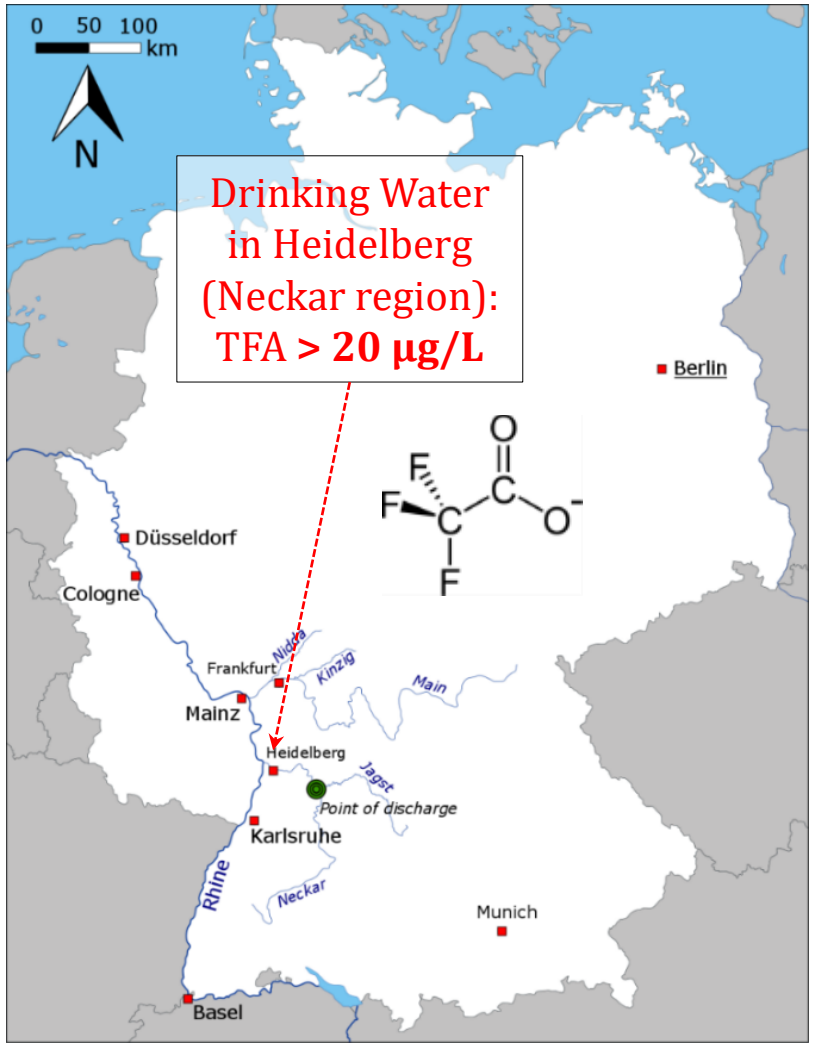
Roundtable on PFAS pesticides and water contamination in the EU

Pesticides as a source of TFA contamination

Dr. Helena Banning
Environmental Risk Assessor
Plant Protection Division

50 Jahre Umweltbundesamt 1974–2024

TFA – how it started in Germany 2016



(source: TZW, 2024)

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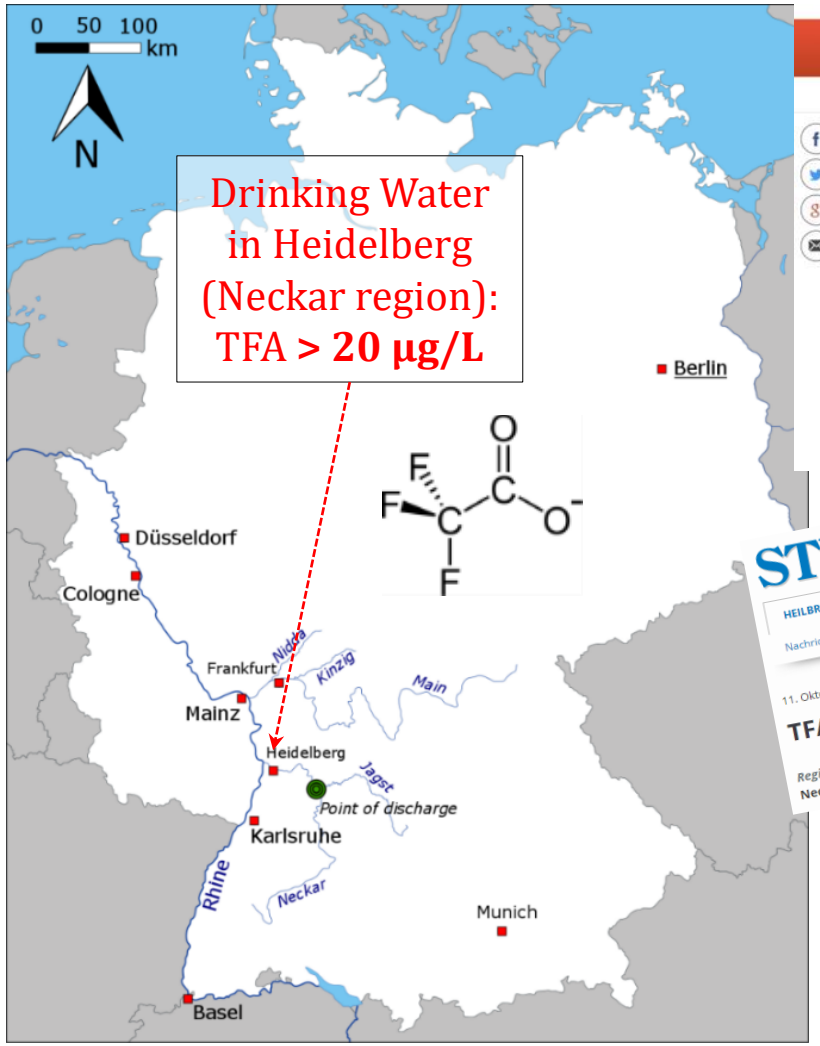

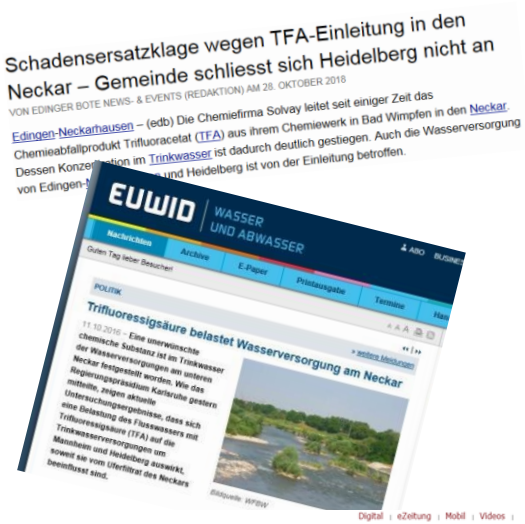

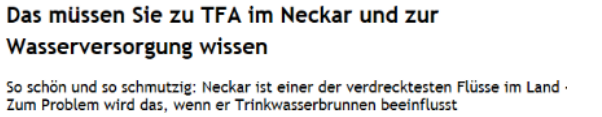

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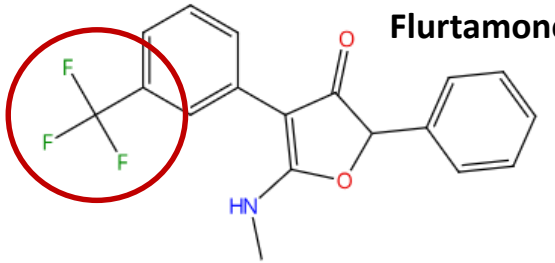
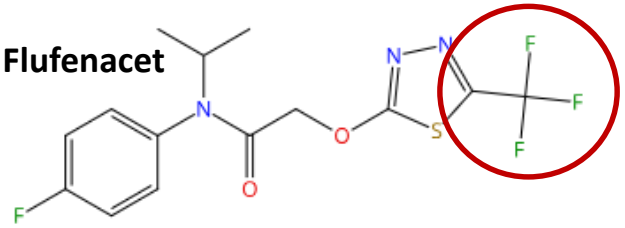
TFA at UBA – an emerging issue

Flurtamone



Flufenacet



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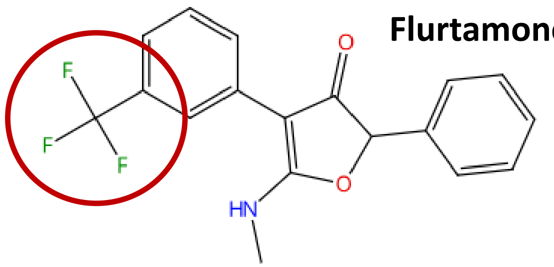

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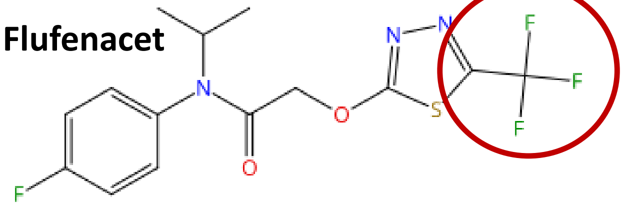
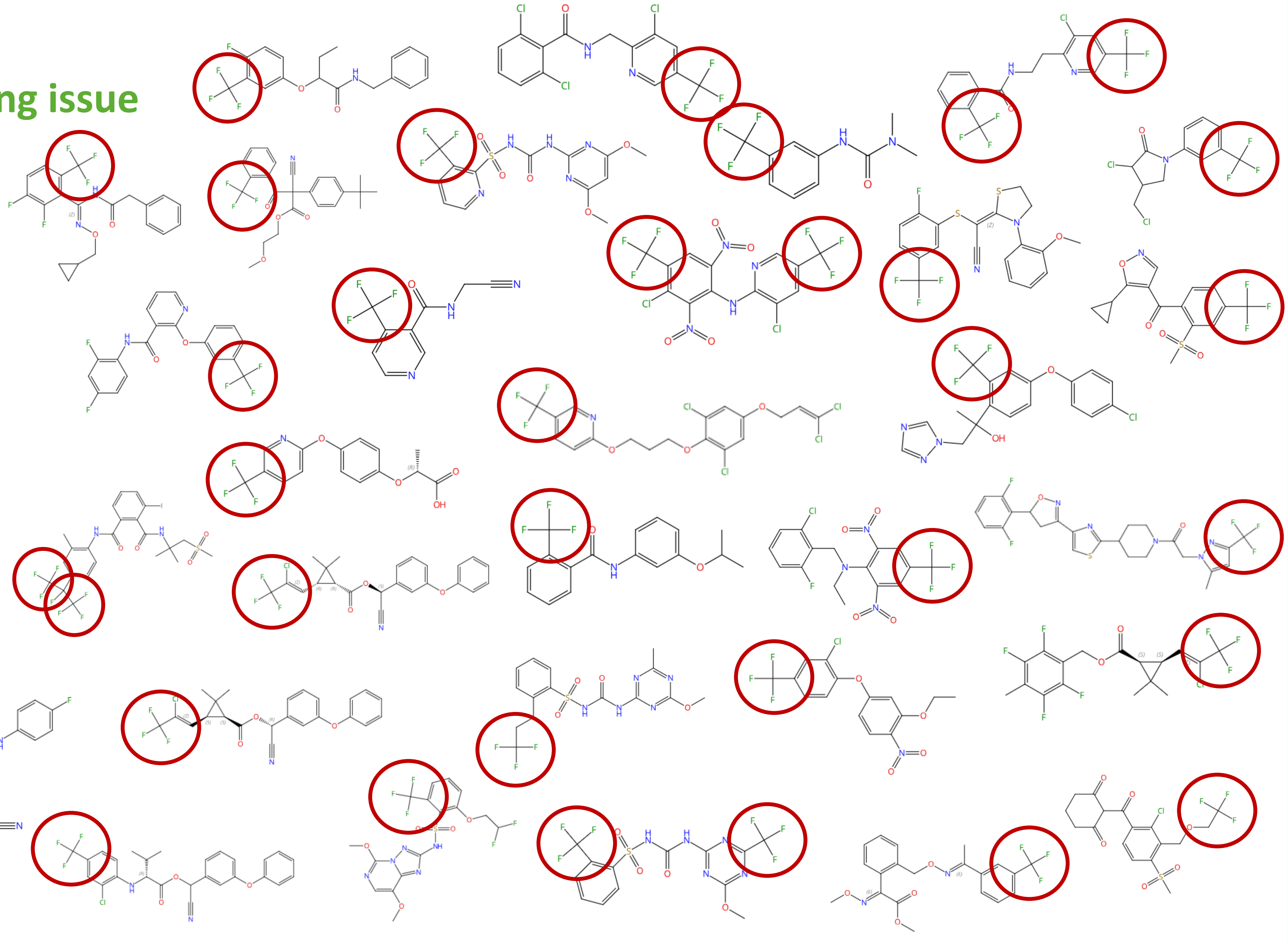
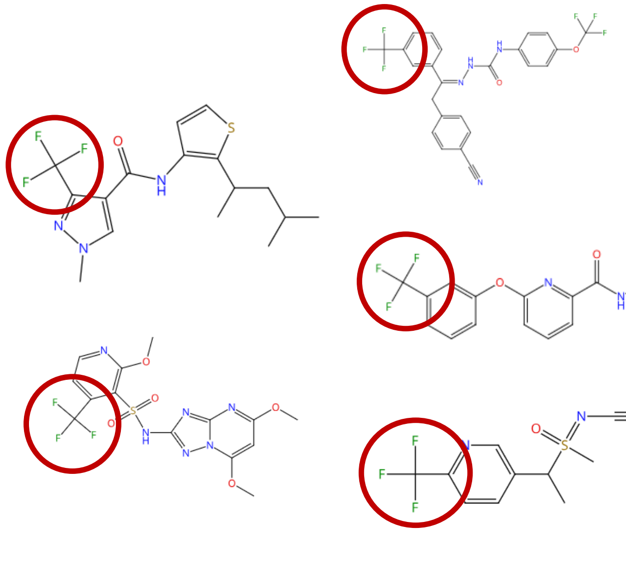




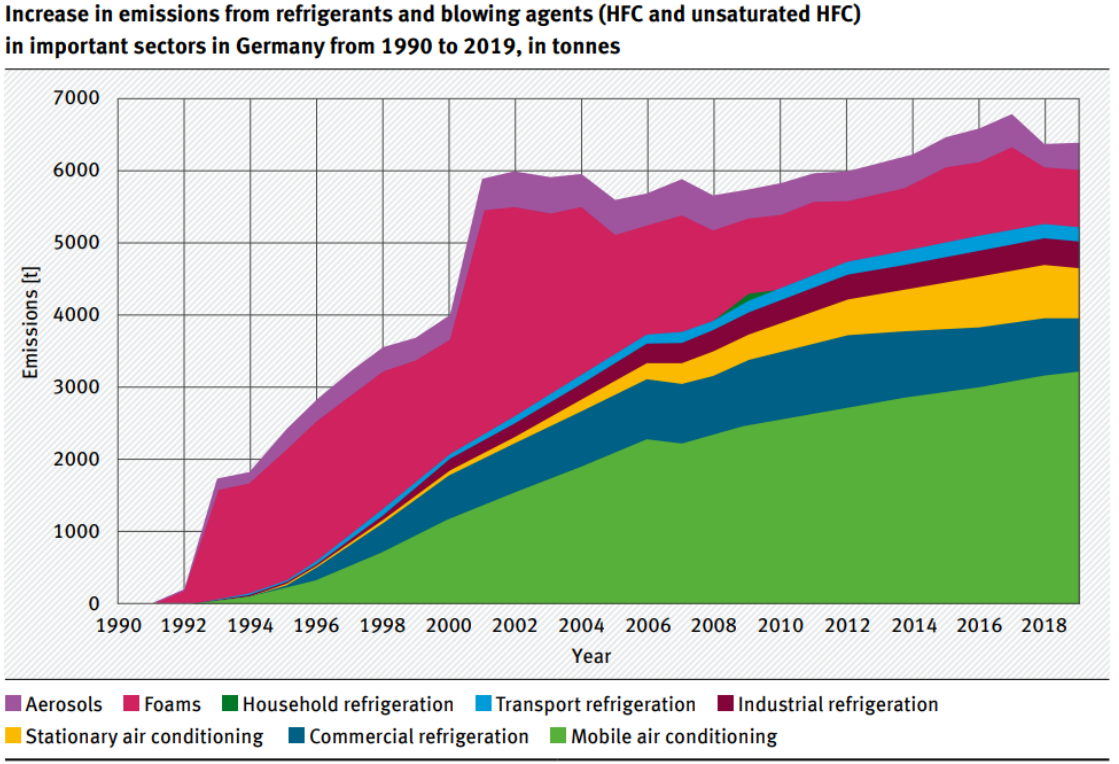


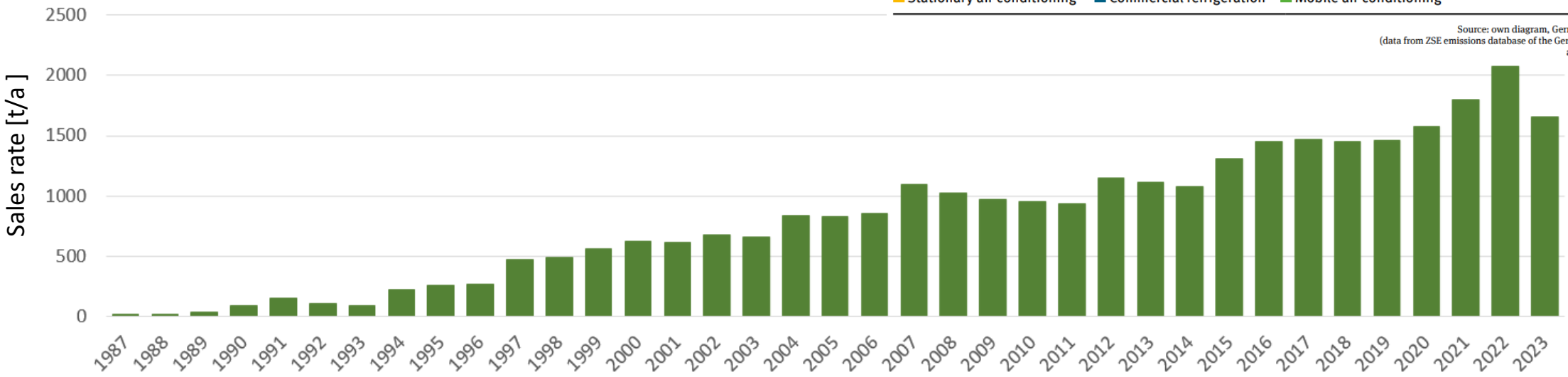
TFA at UBA – an emerging issue

TFA as an **emerging contaminant** in Germany

Potential sources are industrial emissions, refrigerants, pesticides, organic fertilizer, pharmaceuticals?

Which ones are most important for the existing TFA contamination in groundwater and surface water?

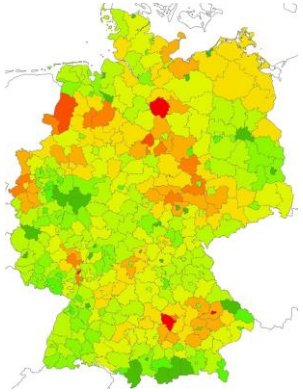




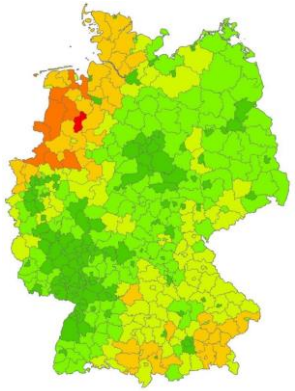
Sales rate for potentially TFA forming pesticides in Germany (data: BVL, 2024)

Spatial analysis of TFA emissions and contamination in Germany

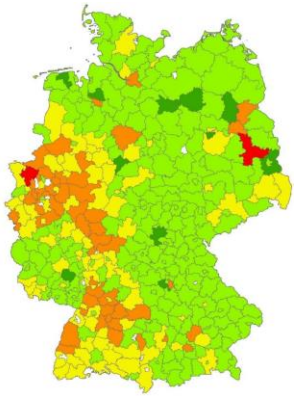
Fluorochemical production



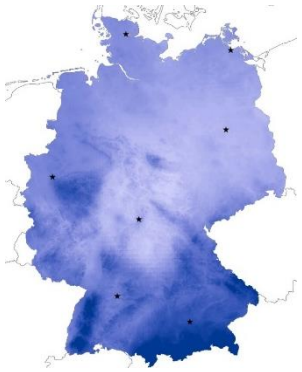
Agricultural pesticides



Organic fertiliser



Wastewater (pharmaceuticals)



Precipitation (refrigerants)

(source: TZW, 2023)

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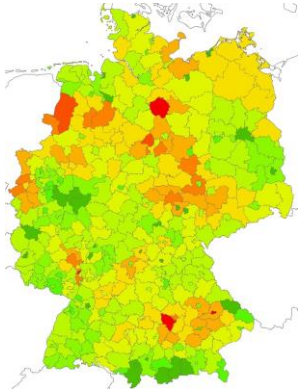

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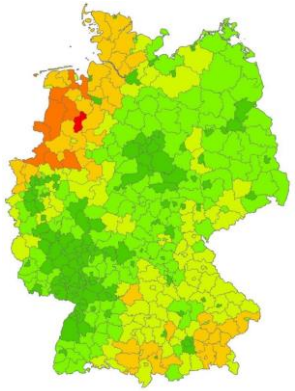

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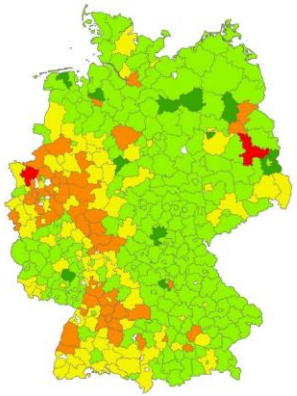

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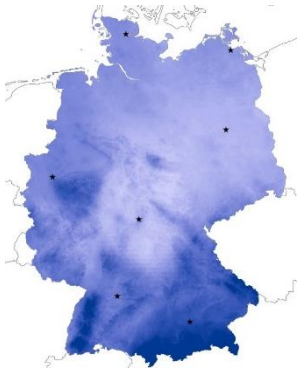

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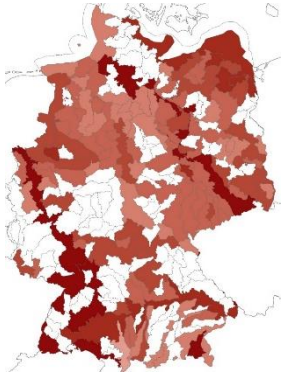
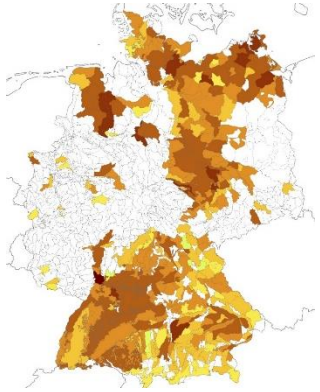


TFA monitoring in surface water



TFA monitoring in groundwater

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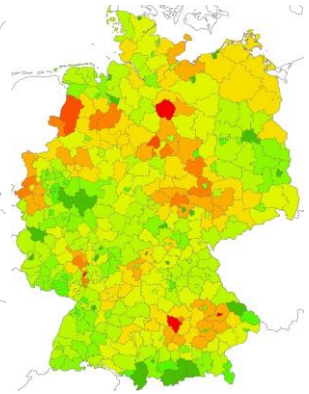

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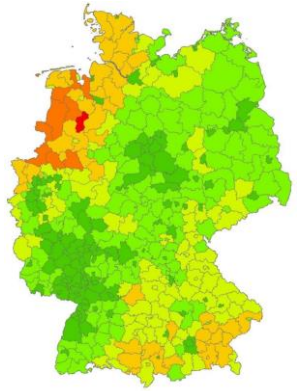

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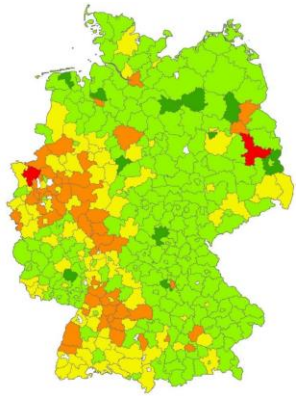

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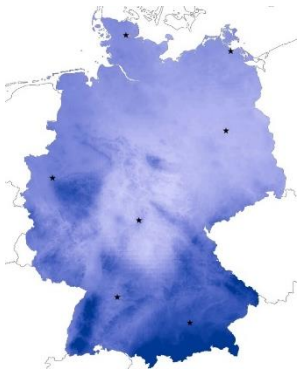

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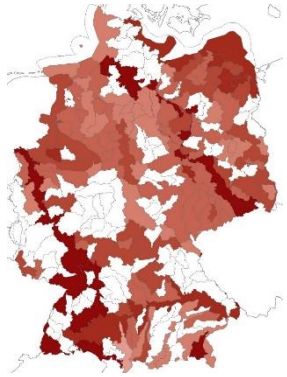

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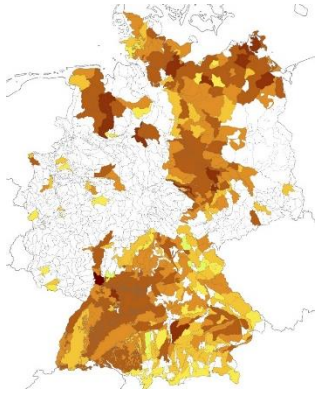

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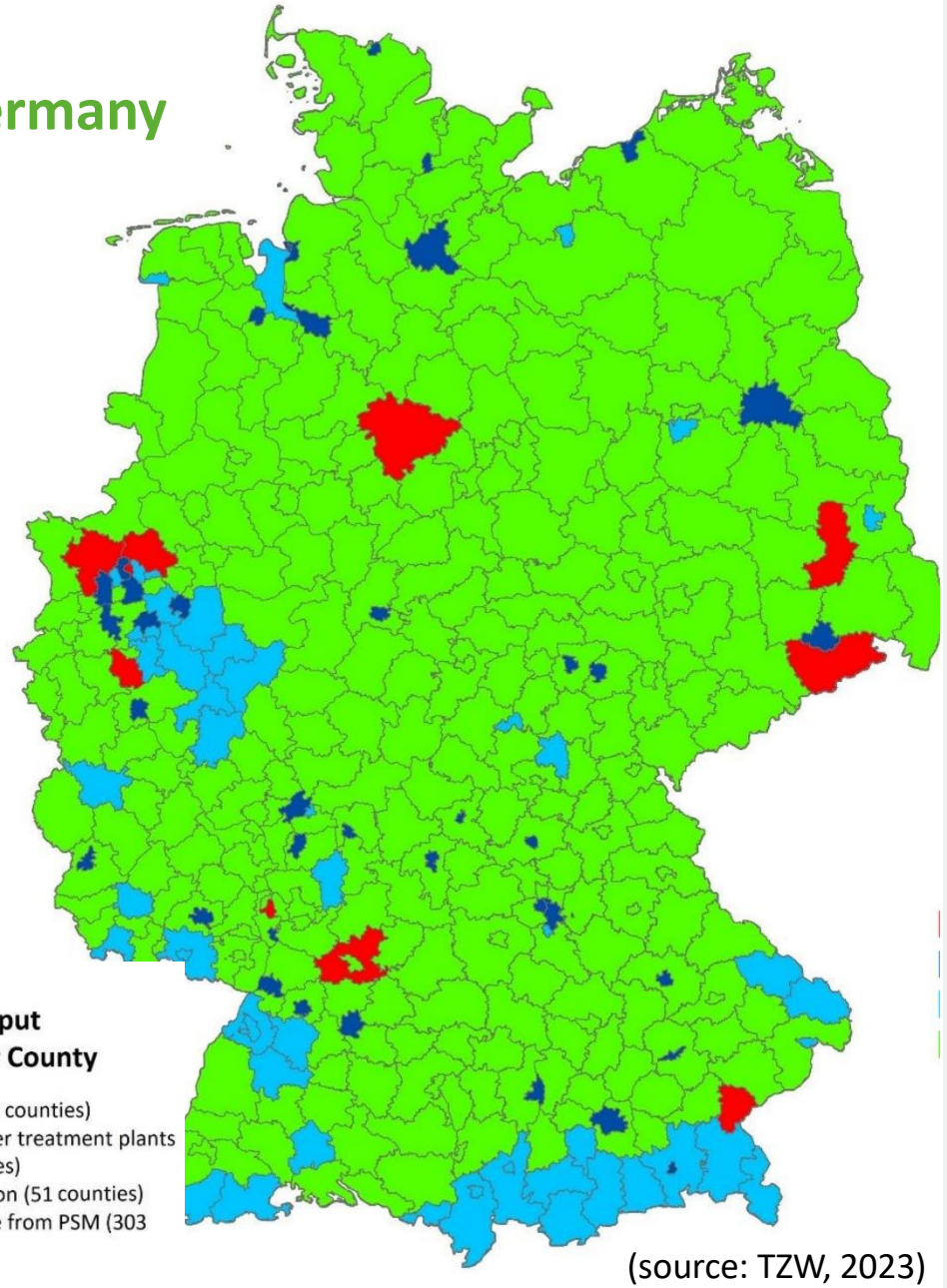

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Regulation of TFA from pesticides

2016-2024:

- TFA considered a **“non-relevant metabolite“** for groundwater in PPP regulation
- No legal limit, **non-harmonised guide value of 10 µg/L** for pesticide authorisation
- UBA tried to implement **risk mitigation measures** for groundwater for **flufenacet**, but failed

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2024:

- Germany proposed new **CLH classification** for TFA: vPvM (UBA) and **Repr. 1B** (BfR)
- “TFA task force“ by fluorochemistry companies: self-classification as **Repr. 2**
- Proposals Repr. 1B and Repr. 2 ➔ TFA =**“relevant metabolite“** for groundwater for pesticide regulation (EU guidance **SANCO 221/2000 – hazard based approach for relevance assessment**)

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TFA = “relevant metabolite“ for groundwater – what does it mean for TFA forming pesticides?

- Groundwater leaching (prospective modelling): **limit value of 0.1 µg/L** for approval/authorisation
- Requires more attention – and data that show TFA is **(not)** formed in significant amounts

Data basis on TFA formation from approved PFAS pesticides (our state of knowledge)

EU approved active substance	OECD 307 soil metabolism study	plant residue, crop rotational, dietary studies	Danish soil study
Beflubutamid			
Cyflufenamid			
Cyflumetofen			
Diflufenican			
Flazasulfuron			
Flonicamid	✓		
Fluazifop-P			
Fluazinam			
Flufenacet	✓		
Fluometuron			
Fluopicolide			
Fluopyram	✓		
Flurochloridone			
Flutianil			
Flutolanil			
gamma-Cyhalothrin			

EU approved active substance	OECD 307 soil metabolism study	plant residue, crop rotational, dietary studies	Danish soil study
Isoxaflutole			
lambda-Cyhalothrin			
Mefentriflu-conazole			
Oxathiapiprolin			
Oxyfluorfen			
Penoxsulam			
Penthiopyrad			
Picolinafen			
Prosulfuron			
Pyroxsulam			
Sulfoxaflor			
tau-Fluvalinat			
Tefluthrin			
Tembotrione			
Trifloxystrobin			

TFA formation shown in soil acc. to data req. for groundwater

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Cyflumetofen			✓
Diflufenican			
Flazasulfuron			
Flonicamid	✓		
Fluazifop-P			✓
Fluazinam		✓	✓
Flufenacet	✓		
Fluometuron			
Fluopicolide			
Fluopyram	✓		
Flurochloridone			
Flutianil			
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TFA formation shown in other studies/compartments

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Fluazifop-P			✓
Fluazinam		✓	✓
Flufenacet	✓		
Fluometuron			
Fluopicolide			
Fluopyram	✓		
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tau-Fluvalinat			✓
Tefluthrin			
Tembotrione			
Trifloxystrobin		✓	

TFA formation shown in soil acc. to data req. for groundwater

TFA formation shown in other studies/compartments

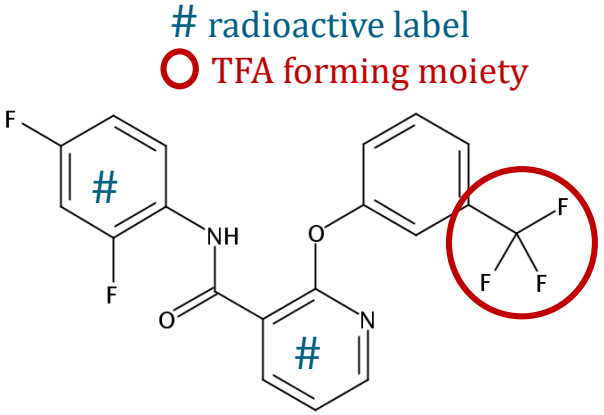
no data on TFA formation known

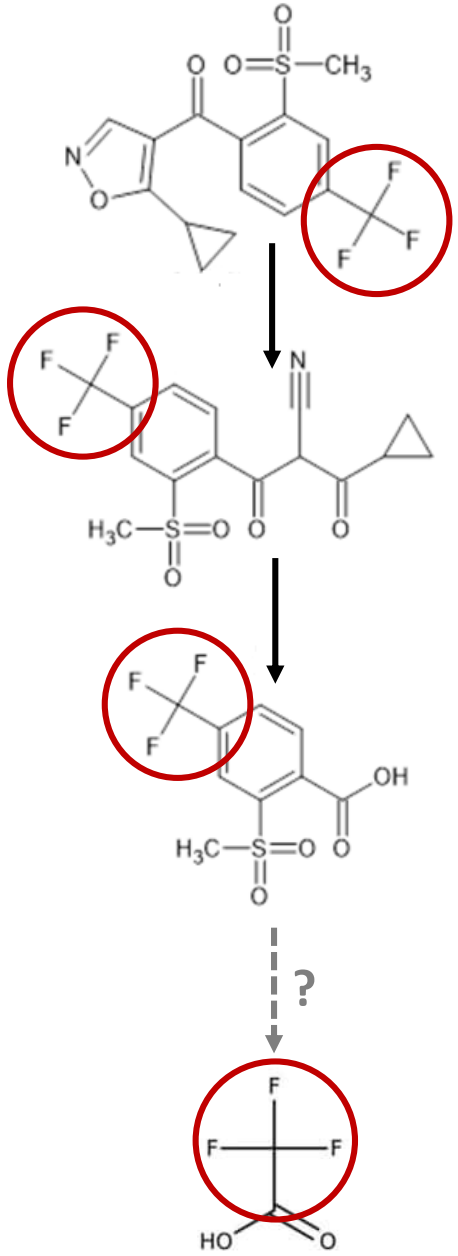
Studies to (dis)prove TFA formation from PFAS pesticides for regulation

Standard data requirement for soil metabolism: **OECD 307 studies**

- Study duration usually 120 d: often **too short** for dead end product TFA
- Radioactive labelling often **in other parts** of the molecule
- Chromatographic methods (HPLC, TLC): **TFA difficult to detect**

TFA not found ≠ TFA not formed





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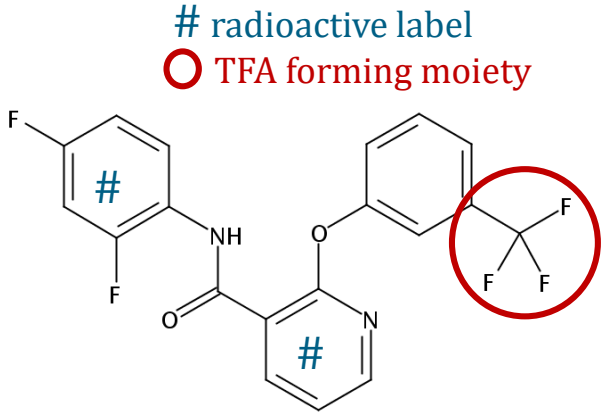

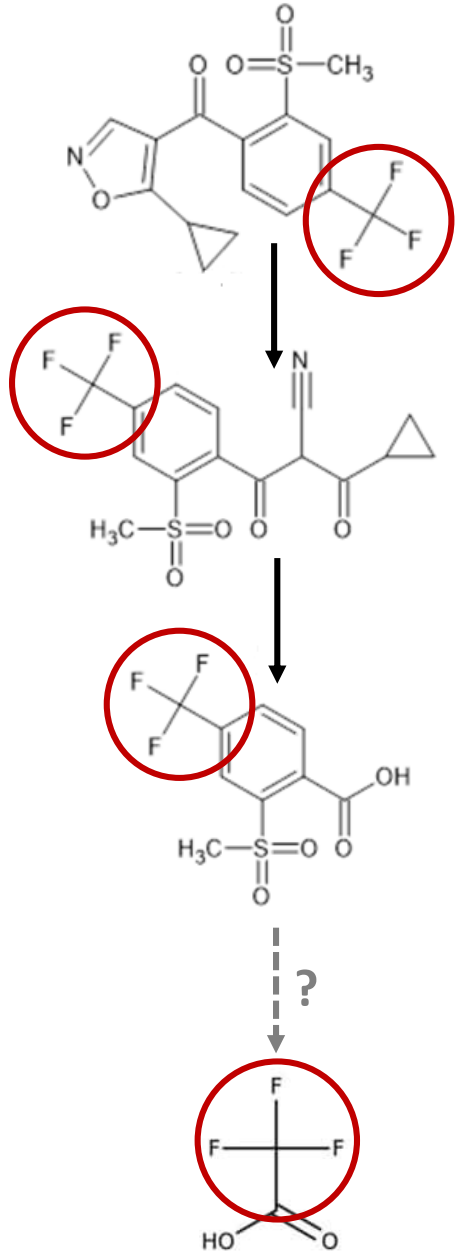

Approaches:

- Worst case **modelling**, assuming 100 % TFA formation (work by UBA)
- **Adapted OECD 307 studies** dedicated to TFA (in discussions)

Thank you for your attention

Dr. Helena Banning
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+49-340-2103-2728

New website section on pesticides:
https://www.umweltbundesamt.de/themen/chemikalien/pflanzenschutzmittel

UBA publications on TFA
https://www.umweltbundesamt.de/publikationen/reducing-the-input-of-chemicals-into-waters
https://www.umweltbundesamt.de/publikationen/trifluoroacetate-tfa-laying-the-foundations-for

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