



Databank Ondergrond Vlaanderen (DOV)

# PFAS-data in Flanders



Geotechnical engineering

Soil & Geology



**DATABANK  
ONDERGROND  
VLAANDEREN**

**FLANDERS  
ENVIRONMENT AGENCY**

Groundwater



Geotechnical engineering

Soil & Geology



FLANDERS  
ENVIRONMENT AGENCY

Groundwater



Soil contamination & Land movement

1996



FLANDERS  
ENVIRONMENT AGENCY



2023



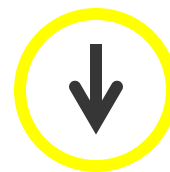
# PFAS Data



Input

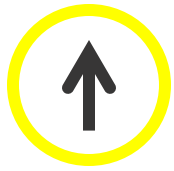


Visualization

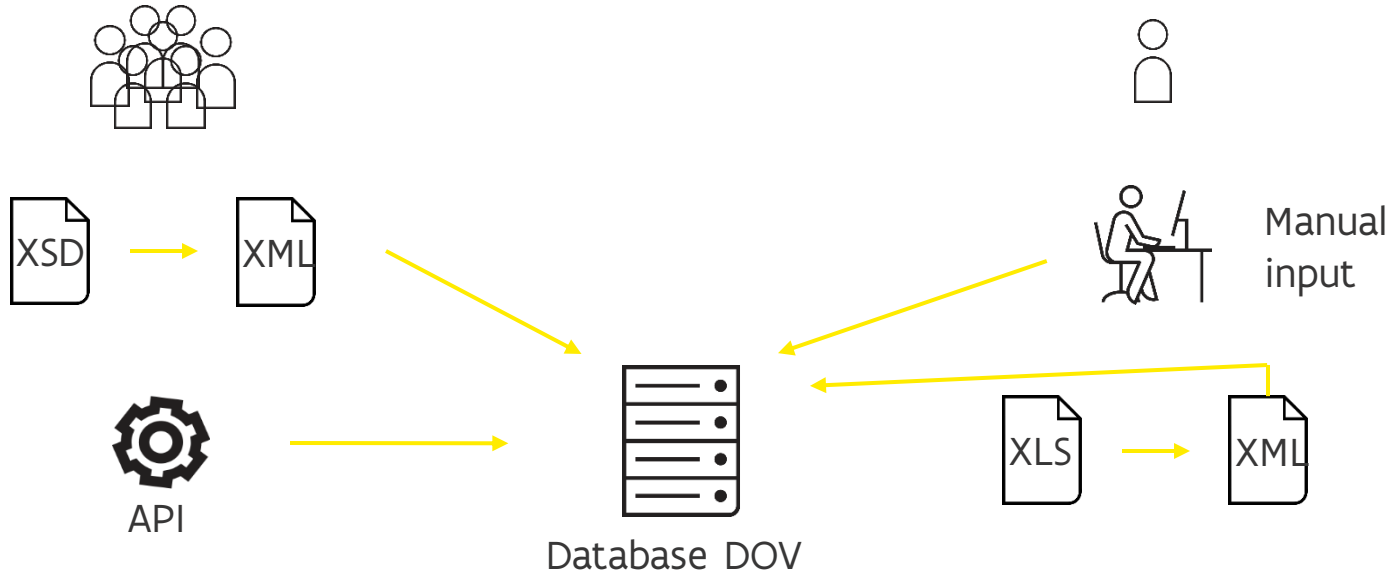


Output





# Data input

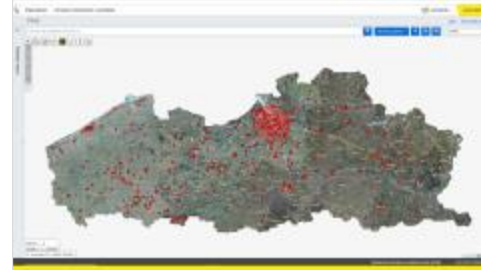


**XML, API, Explorer, Excel**

# Data visualization & availability



- ▶ PFAS no-regret zones
- ▶ Extra PFAS data
  - Soil investigation
  - Research
  - Monitoring
  - ...



**PFAS Explorer**

# PFAS

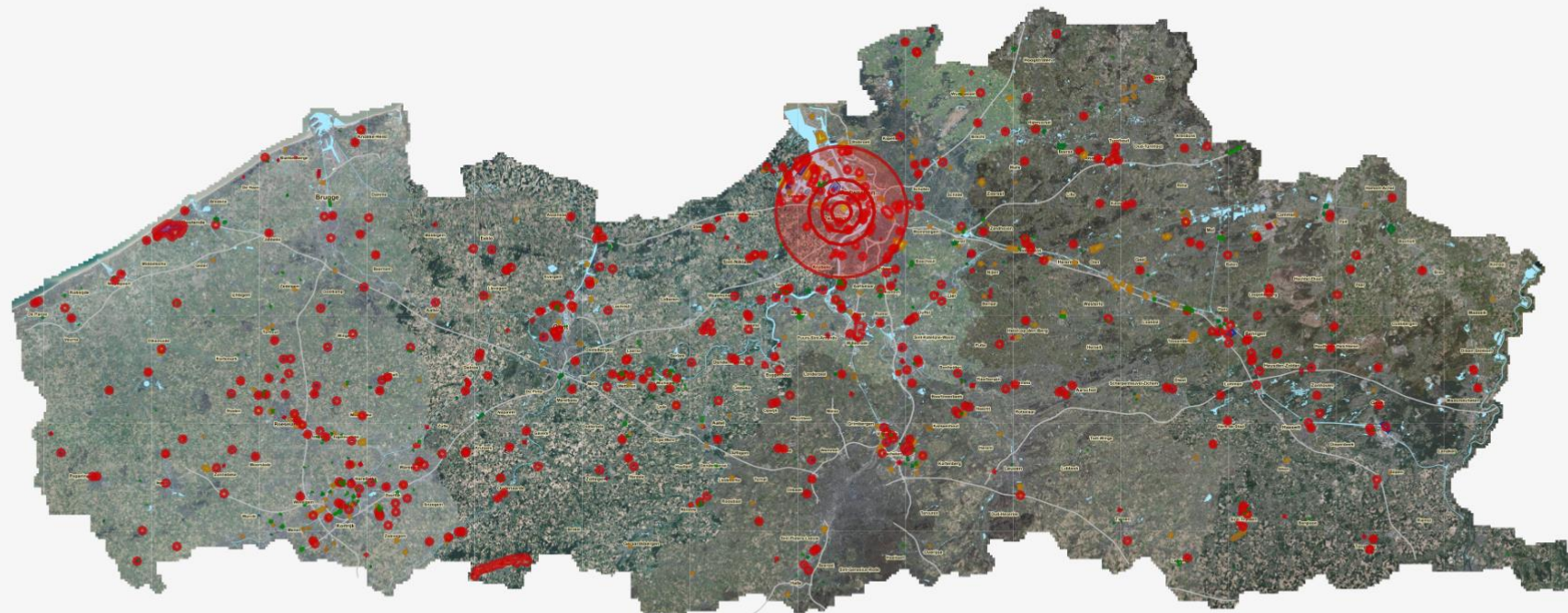
[Help](#) [Terug naar Portaal](#)

Vul hier een zoekterm of adres in...

Selecteer gebied

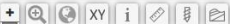
+

Beheer kaart



10 km  
Schaal = 1 : 500000  
XY (Lambert72): 166260 182990

Vul hier een zoekterm of adres in...



Zoekregels

Kaartbeeld instellen

Indien de kaartlaag niet zichtbaar is, zoom in (tot op 120.000 voor sommige kaartlagen).

PFAS in grondwater (ng/l) - max laatste monstername

▼ Legende

- < DL
- DL < Conc. <= 100
- 100 < Conc. <= 250
- 250 < Conc. <= 500
- 500 < Conc. <= 1000
- 1000 < Conc. <= 2000
- 2000 <= Conc.

Actuele no regret zones (PFAS)

► Legende

Middelpunten no regret zones (PFAS)

► Legende

Inventaris brandweer(oefen)terreinen en incidenten (PFAS)

► Legende

GRB-basiskaart selectie

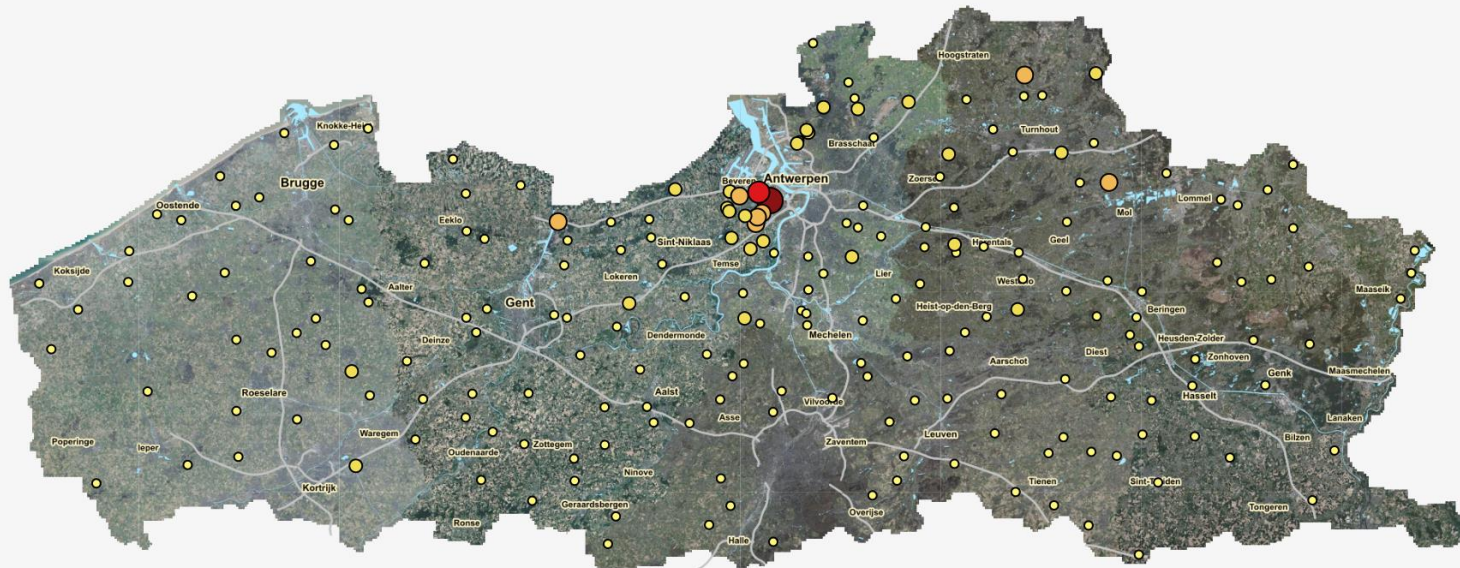
► Legende

GRB-basiskaart - grijswaarden

► Legende

Orthofotomosaïek, middenschalig, winteropnamen, kleur, meest recent, Vlaanderen

► Legende



10 km

Schaal = 1 : 500000

XY (Lambert72):





# Data visualization & availability

## Measurement data (#)

- Air
- Biota (2.627)
- Effluent (93)
- Migration (480)
- Pure product (537)
- Soil (384.986)
- Soilwater (4.945)
- Groundwater (246.015)
- Surface water (96.884)
- Waste water (124.004)
- Rain water (150)

## Risk locations

### Advisory area

- No regret zones

### Permits

- Groundwater
- Discharge



Linked data

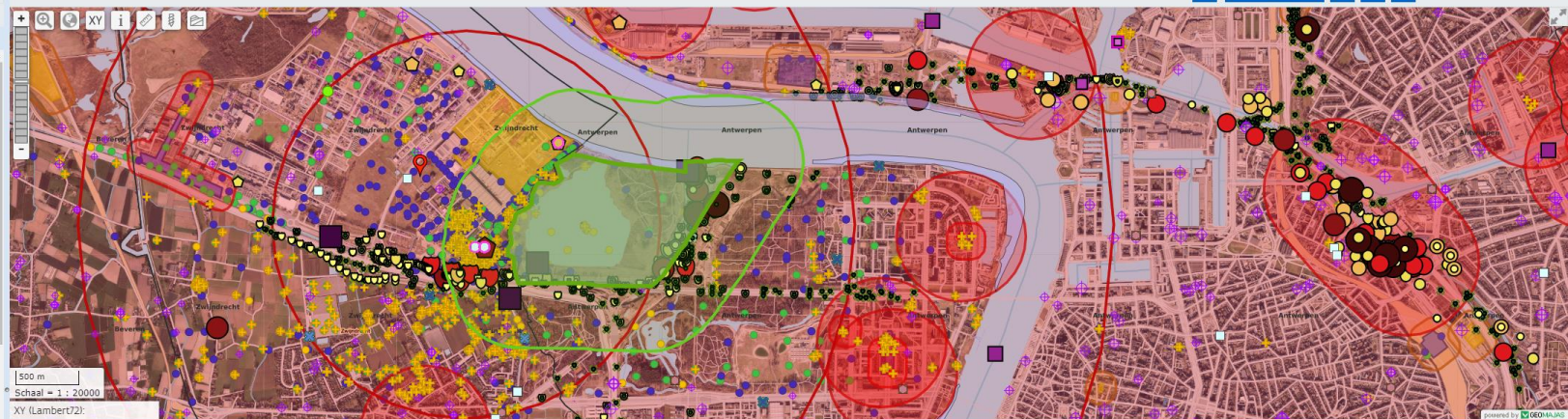
**PFAS Explorer**



## Data search – Case study

- ▶ **3M -> Nature reserve 'Blokbersdijk'**
- ▶ Which data is available within a buffer of 500m?
- ▶ What is the link of 3M to this nature reserve?
- ▶ What is the trend over the years the discharge permit for PFBS (3M)?

- Zoekregels**
- Kaartbeeld instellen**
- Indien de kaartlaag niet zichtbaar is, zoom in (tot op 1:20.000 voor sommige kaartlagen).
  - VEN en IVON gebieden**
    - Legende
  - Lozingsvergunningen PFAS - Huidige situatie**
    - Legende
  - Lozingsvergunningen PFAS - Bedrijven**
    - Legende
  - Lozingsvergunningen PFAS - Historiek**
    - Legende
  - PFAS in afvalwater - vracht (mg/jaar) - Laatste meetjaar**
    - Legende
  - PFAS in afvalwater - Metingen**
    - Legende
  - PFOS in biota (µg/kg ng) - Max laatste meetjaar**
    - Legende
  - PFAS in biota - Metingen**
    - Legende
  - PFOS in oppervlaktewater (ng/l) - Max laatste meetjaar**
    - Legende
  - PFAS in oppervlaktewater (ng/l) - Metingen**
    - Legende
  - PFAS in waterbodembodem (µg/kg ds) - Max laatste meetjaar**
    - Legende
  - PFAS in waterbodembodem (µg/kg ds) - Metingen**
    - Legende
  - PFAS in zwevend stof (ng/m³) - Metingen**
    - Legende
  - PFAS in zwevend stof (ng/m³) - Totalen**
    - Legende
  - PFAS in zwevend stof (ng/m³) -**
    - Legende
- Kaartlagen kiezen**



**Zoekresultaten**

Selectie: Acties Toon resultaten van: PFAS in afvalwater - Metingen (113) Aantal zoekresultaten

Bedrijfsnaam	Meetplaats	X mL72	Y mL72	Jaar	Datum	Parameter	Detectieconditie	Meetwaarde	Meeteenheid	Aanvrager	Alternatief nummer	Motivatie	Geïmpacteerd	Omschrijving	Lozingswijze omschrijving	Lozingstype	Vha segment code
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	26/09/2023	PFBS	<	0,010	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	25/07/2023	PFBS	<	0,010	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	16/05/2023	PFBS	<	0,010	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	26/04/2023	PFBS	<	0,010	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	23/03/2023	PFBS	<	0,020	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852
<input type="checkbox"/>	3M BELGIUM	2070003	147824	213414	2023	16/02/2023	PFBS	<	0,010	µg/l	VMM	emissie meetnet	0	magnetische debietmeter op effluent, staal op effl	Oppervlaktewater direct	Lozend	6033852

# Case study – 3M & Blokkersdijk

# Data visualization & availability



Expansion & optimizing

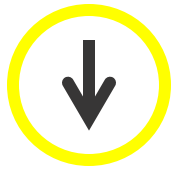
PFAS



Emerging contaminants

**PFAS Explorer**





# Data output

Beginner

PFAS  
Explorer



**Explorer**

PFAS

[Help](#) [Terug naar Portaal](#)

Vul hier een zoekterm of adres in...

Selecteer gebied

Map navigation icons: +, -, XY, i, etc.



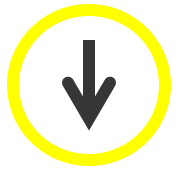
25 km  
Schaal = 1 : 1000000  
XY (Lambert72):

powered by GEOMA/JAS

Zoekresultaten

Selectie  Acties  Toon resultaten van:  Aantal zoekresultaten

Opdracht	Gebruik selectie als zoekgebied	Top in m	Basis in m	Jaar	Datum	Parameter	Detectieconditie	Meetwaarde	Meeteenheid	Medium	Profieltype	Plaatsing profiel	Commentaar	X m/72	Y m/72
<input checked="" type="checkbox"/> 1307706	Gebruik selectie als zoekgebied	0,20	2,20	2021	16/06/2021	PFHpS	<	0,020	µg/l	Grondwater	Peilbuis			237529,00	204908,00
<input checked="" type="checkbox"/> 1307706	Berekeningen op selectie														
<input checked="" type="checkbox"/> 1307706	Zoom naar selectie														
<input checked="" type="checkbox"/> 1307706	Download selectie														
<input checked="" type="checkbox"/> 1307706	Groeperen														
<input checked="" type="checkbox"/> 1307706	Download selectie als Excel														
<input checked="" type="checkbox"/> 1307706	Download selectie als Csv														
<input checked="" type="checkbox"/> 1307706	Download selectie als Html														
<input checked="" type="checkbox"/> 1307706	Download selectie als Shape														
<input checked="" type="checkbox"/> 1307706	Download selectie als Word														



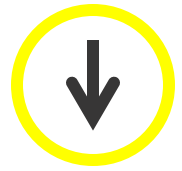
# Data output

Beginner

PFAS  
Explorer



**Explorer**



# Data output

Beginner

PFAS  
Explorer



GIS-specialist



Automatisation & Integration

**Explorer, Webservices**



# Handleiding Webservices gebruiken

Gemaakt door Marleen Van Damme, laatste wijziging door Bart Pannemans op jun 22, 2023

## Gebruik maken van DOV services in QGIS

QGIS of Quantum GIS is een Open Source desktop GIS product. Deze handleiding is gebaseerd op versie 3.16.3.

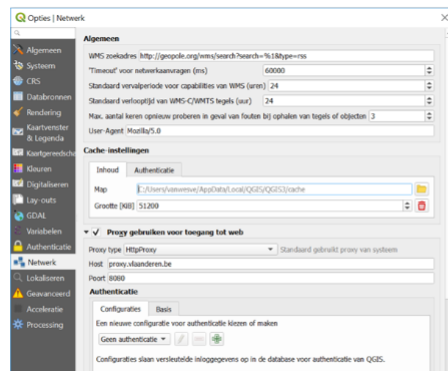
- 1. Gebruik WMS in QGIS
  - 1.1. Gebruik van een Proxyserver in QGIS
  - 1.2. WMS inladen
  - 1.3. GetFeatureInfo request
- 2. Gebruik WFS in QGIS
  - 2.1. Gebruik van een Proxyserver in QGIS
  - 2.2. WFS inladen
  - 2.3. Enkel features van een bepaalde extent inladen
  - 2.4. Selectie en opslaan van data
- 3. Slechts 1 laag (WMS of WFS) tegelijk inladen in QGIS
  - 3.1. Maak gebruik van een filter
  - 3.2. Maak gebruik van de rechtstreekse url

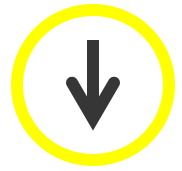
## 1. Gebruik WMS in QGIS

### 1.1. Gebruik van een Proxyserver in QGIS

Als uw bedrijf gebruik maakt van een proxyserver om het netwerk te beveiligen, moet je dit ook eerst aangeven in QGIS. Doe je dit niet, dan heb je niet de mogelijkheid om een WMS service in te laden.

1. Klik op Extra en daarna op Opties.
2. Ga naar het tabblad Netwerk en geef de gegevens van je proxyserver in. Klik op OK.

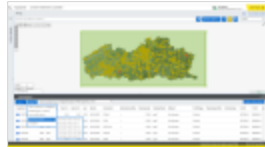




# Data output

Beginner

PFAS  
Explorer

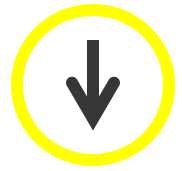


GIS-specialist



Automatisation & Integration

**Explorer, Webservices**



# Data output

Beginner

PFAS  
Explorer



GIS-specialist



Python-specialist



Automatisation & integration

**Explorer, Webservices & Pydov**



stable

Search docs

#### GETTING STARTED

Installation  
Quick start  
Tutorials

#### USER GUIDE

Select datasets  
Query on attribute properties  
Query on location  
Customizing data output  
Sorting and using limit  
Performance  
Caching  
Hooks  
Repeatable pydov sessions  
Network via proxy server

#### DEVELOPER GUIDE

Contributing to pydov

## Welcome to pydov's documentation!

CI failing docs passing DOI: [10.5281/zenodo.2788680](https://doi.org/10.5281/zenodo.2788680) pyopencsi approval

A Python package to query and download data from Databank Ondergrond Vlaanderen (DOV).

- Free software: MIT license
- Documentation: <https://pydov.readthedocs.io>

### Introduction

The pydov package is a community effort and everyone is welcome to contribute. It is hosted on [GitHub](#) and development is coordinated by [Databank Ondergrond Vlaanderen \(DOV\)](#). DOV aggregates data about soil, subsoil and groundwater of Flanders and makes them publicly available. Interactive and human-readable extraction and querying of the data is provided by a [web application](#), whereas the focus of this package is to support **machine-based** extraction and conversion of the data. The package aims to support a set of complementary use cases, for example:

- integrate DOV data in larger data processing pipelines
- support the reproducibility and/or repeatability of research studies
- integrate the data in third-party applications

The machine-based availability of the data can potentially serve a diverse community of researchers, consultants, modelers, and students. As efficient and proper functioning of DOV data processing is of interest to the variety of users, we believe that a community-based effort to develop and maintain these functionalities as an open source package provides the optimal development trajectory.

Please note that downloading DOV data with pydov is governed by the same [disclaimer](#) that applies to the other DOV services. Be sure to consult it when using DOV data with pydov.

### Getting started

After [Installation](#), check the [Quick start](#) instructions for a first introduction of the pydov functionalities. For a more in-depth overview of the capabilities, the [Tutorials](#) illustrate different capabilities of the pydov package for each of the object types.

[Select datasets](#) of your interest, and check the [Query on attribute properties](#) and [Query on location](#) pages to find the information you're looking for. While the search objects are different, the workflow is the same for each dataset.

All functionalities are built on top of the existing webservices provided by DOV. For more details about these services and endpoints, check the [Accessing DOV data](#) page.



master 7 Branches 16 Tags Go to file Code

Table of repository files and folders including .github, binder, contrib, docs, orig, pydov, tests, .editorconfig, .gitignore, .readthedocs.yml, AUTHORS.rst, HISTORY.rst, LICENSE, MANIFEST.in, README.md, requirements.txt, requirements\_dev.txt, requirements\_doc.txt.

About

Python package to retrieve data from Databank Ondergrond Vlaanderen (DOV)

pydov.readthedocs.io/en/latest/

- python package water data-access lifewatch oscibio

- Readme MIT license Activity Custom properties 30 stars 20 watching 16 forks

Report repository

Releases 15

v3.1.0 Latest on Oct 10, 2023

+ 14 releases

Packages

No packages published

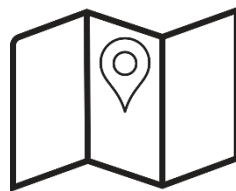
Contributors 12



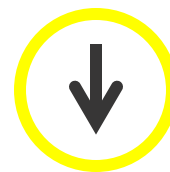
# PFAS Data



Input

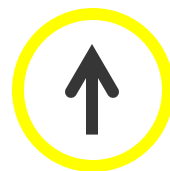


Visualization



Output

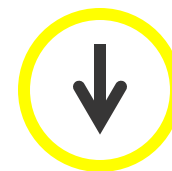
# PFAS Data



Input



Data Analysis

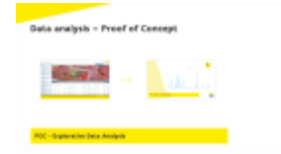


Output



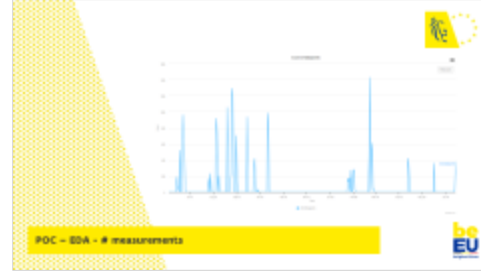
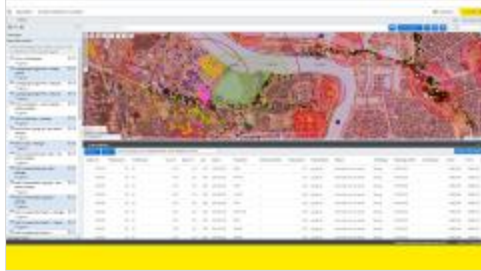
# Data analysis – Proof of Concept

- ▶ What is the PFAS situation within an area?
- ▶ How does these PFAS data relate to the framework of standards?
- ▶ What are the trends related to PFAS-data?



**POC - Data Analysis**

# Data analysis – Proof of Concept



POC - Explorative Data Analysis

PFAS

Hulp Terug naar Portaal

Star  Commentaar

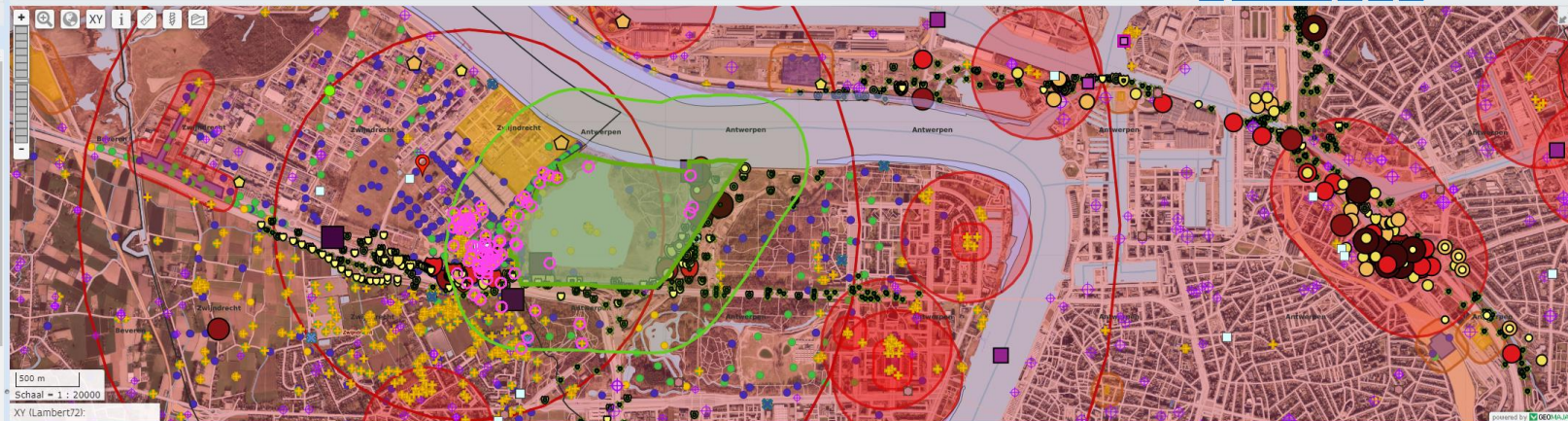
Vul hier een zoekterm of adres in...

Zoekregels

Kaartbeeld instellen

Indien de kaartlaag niet zichtbaar is, zoom in tot op 1:20.000 voor sommige kaartlagen!

- VEN en IVON gebieden** 
  - Legende
- Lozingsvergunningen PFAS - Huidige situatie** 
  - Legende
- Lozingsvergunningen PFAS - Bedrijven** 
  - Legende
- Lozingsvergunningen PFAS - Historiek** 
  - Legende
- PFAS in afvalwater - vracht (mg/jaar) - Laatste meetjaar** 
  - Legende
- PFAS in afvalwater - Metingen** 
  - Legende
- PFOS in biota (µg/kg ng) - Max laatste meetjaar** 
  - Legende
- PFAS in biota - Metingen** 
  - Legende
- PFOS in oppervlaktewater (ng/l) - Max laatste meetjaar** 
  - Legende
- PFAS in oppervlaktewater (ng/l) - Metingen** 
  - Legende
- PFAS in waterbodem (µg/kg ds) - Max laatste meetjaar** 
  - Legende
- PFAS in waterbodem (µg/kg ds) - Metingen** 
  - Legende
- PFAS in zwevend stof (ng/m<sup>3</sup>) - Metingen** 
  - Legende
- PFAS in zwevend stof (ng/m<sup>3</sup>) - Totalen** 
  - Legende
- PFAS in zwevend stof (ng/m<sup>3</sup>) - Kaartlagen kiezen**



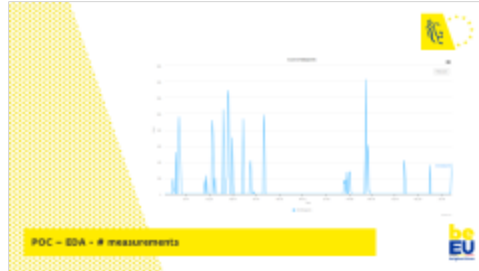
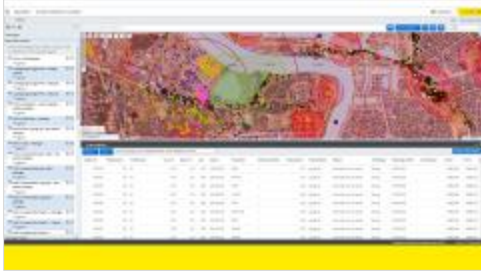
Zoekresultaten

Toon resultaten van:

Opricht	Pfasdoosnr	Profielnaam	Top in m	Basis in m	Jaar	Datum	Parameter	Detectieconditie	Meetwaarde	Meeteenheid	Medium	Profieltype	Plaatsing profiel	Commentaar	X m172	Y m172
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFBA	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFTrDA	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFDA	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	4-2 FT5	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFBS	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFOStotal	=	4,90	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFDS	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFODA	<	0,50	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42
<input type="checkbox"/>	13151258	732 B1	0,00	0,15	2021	23/06/2021	PFTeDA	<	0,20	µg/kg ds	Vaste deel van de aarde	Boring	18/06/2021		148535,86	212833,42

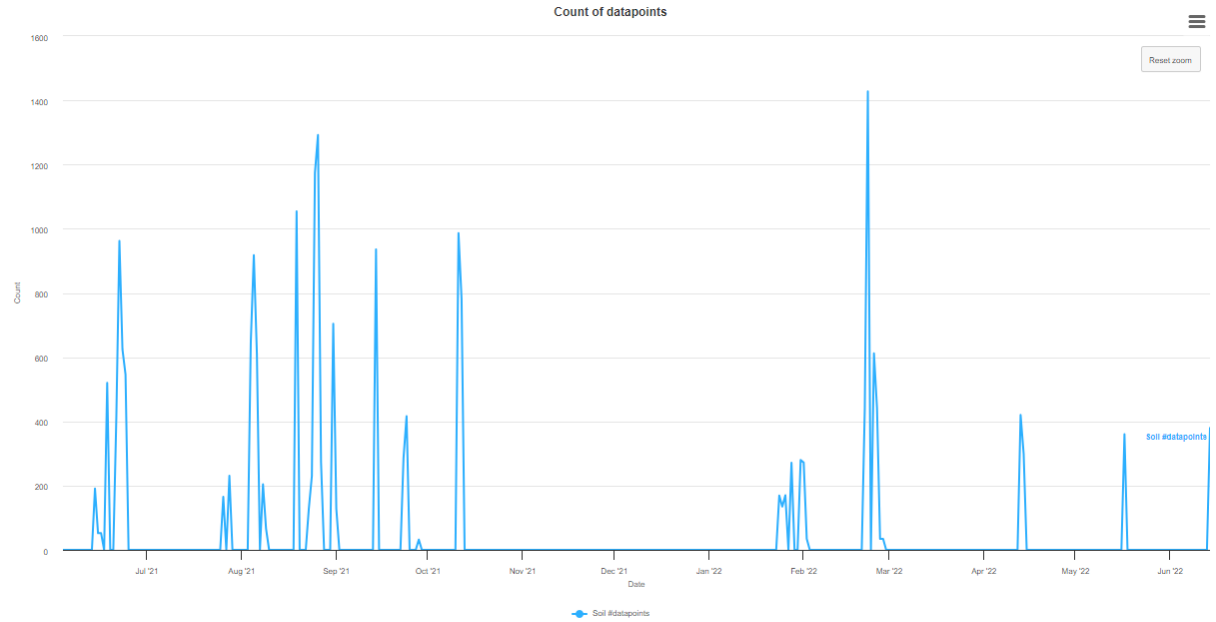


# Data analysis – Proof of Concept

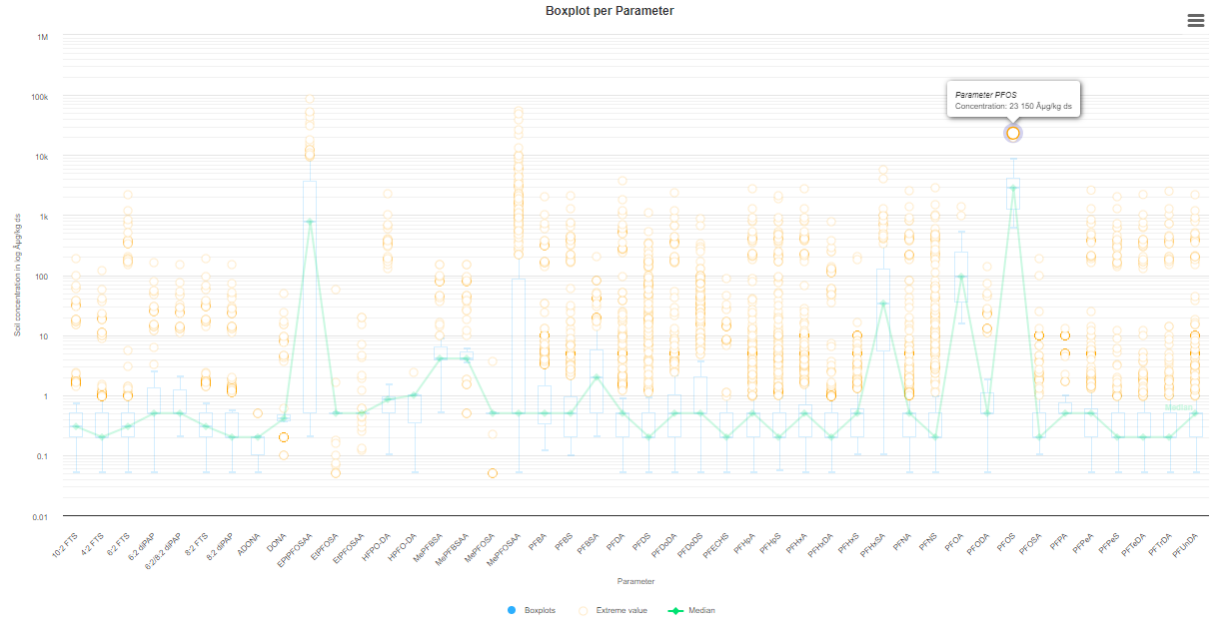


- ▶ # measurements
- ▶ Median
- ▶ Boxplot per parameter
- ▶ Boxplot per parameter per depth interval
- ▶ Correlation matrix

**POC - Explorative Data Analysis**



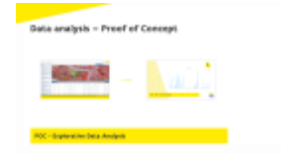
POC – EDA - # measurements



POC – EDA – Boxplot per parameter

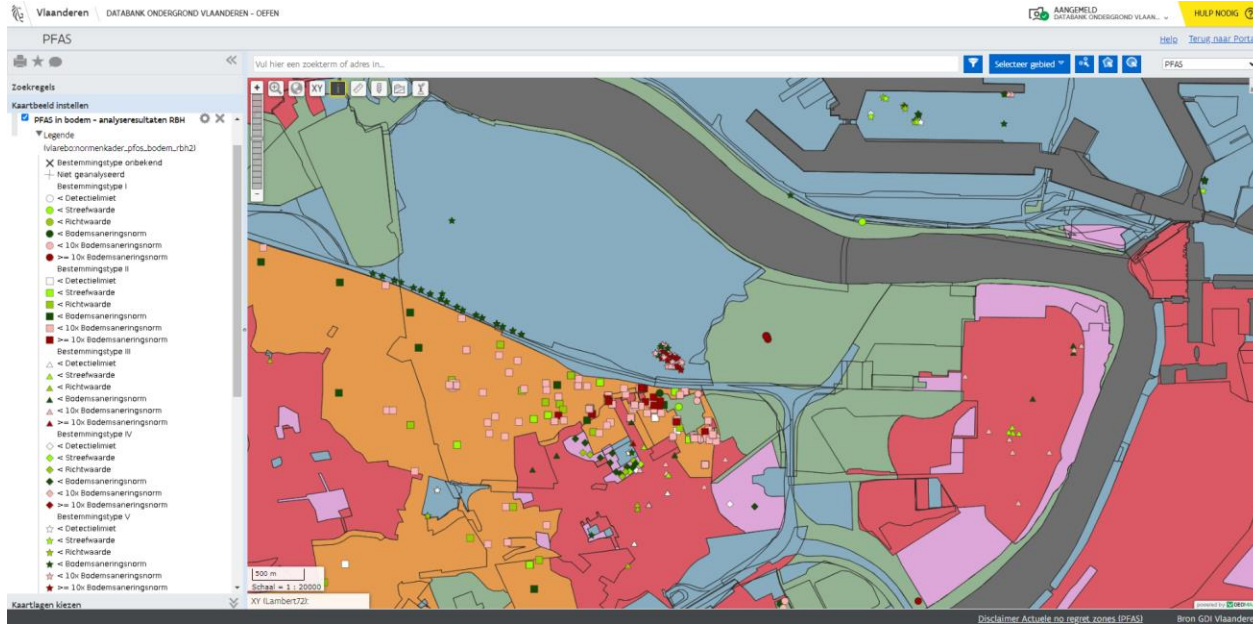
# Data analysis – Proof of Concept

- ▶ What is the PFAS situation within an area?
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- ▶ What are the trends related to PFAS-data?



**POC - Data Analysis**

# Data analysis – Proof of Concept



POC - Framework of standards - Soil

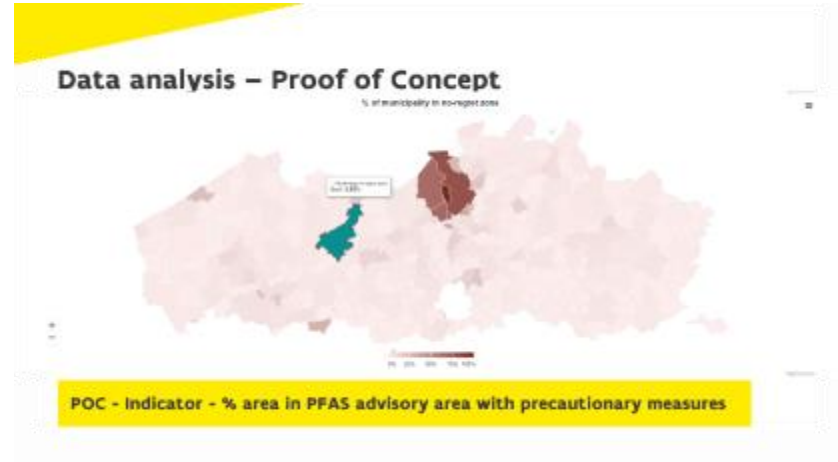
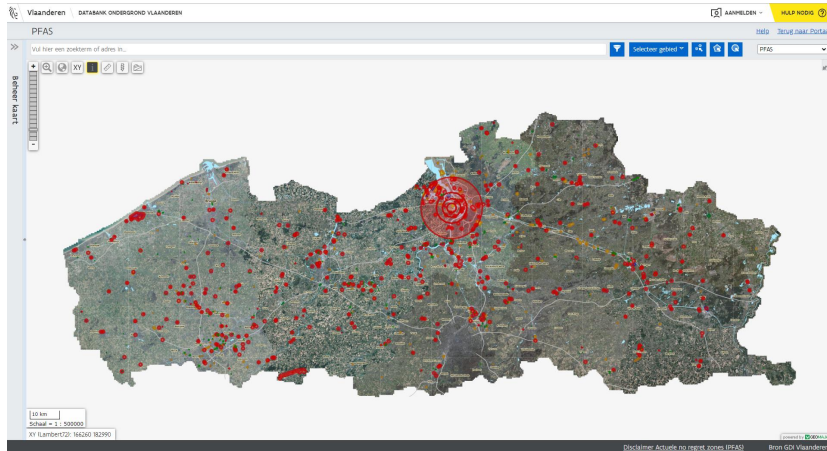
# Data analysis – Proof of Concept

- ▶ What is the PFAS situation within an area?
- ▶ How does these PFAS data relate to the framework of standards?
- ▶ What are the trends related to PFAS-data?



**POC - Data Analysis**

# Data analysis – Proof of Concept

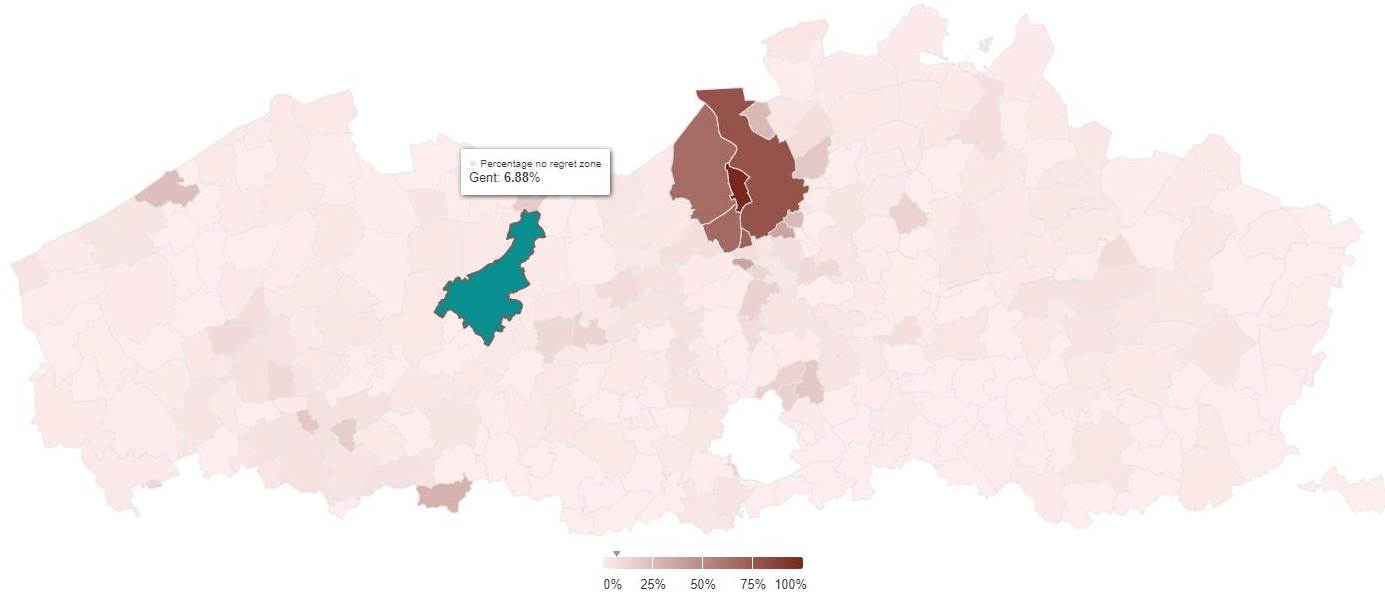


**POC - Indicator - % area in PFAS advisory area with precautionary measures**



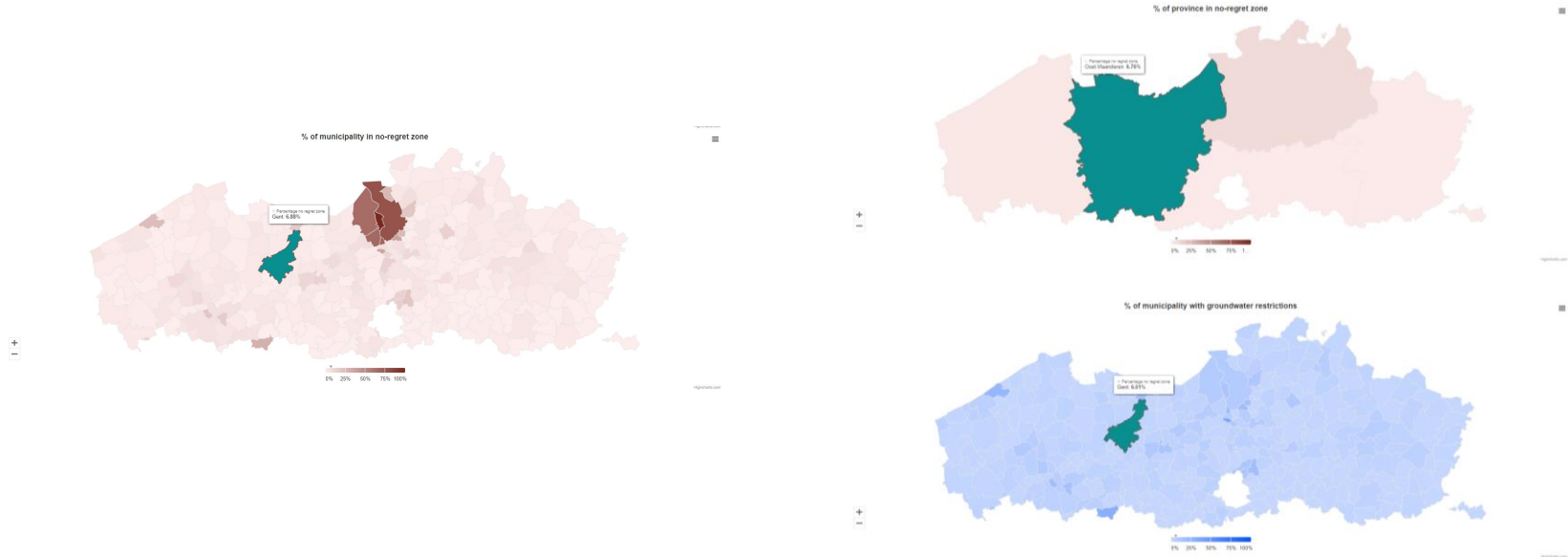
# Data analysis – Proof of Concept

% of municipality in no-regret zone



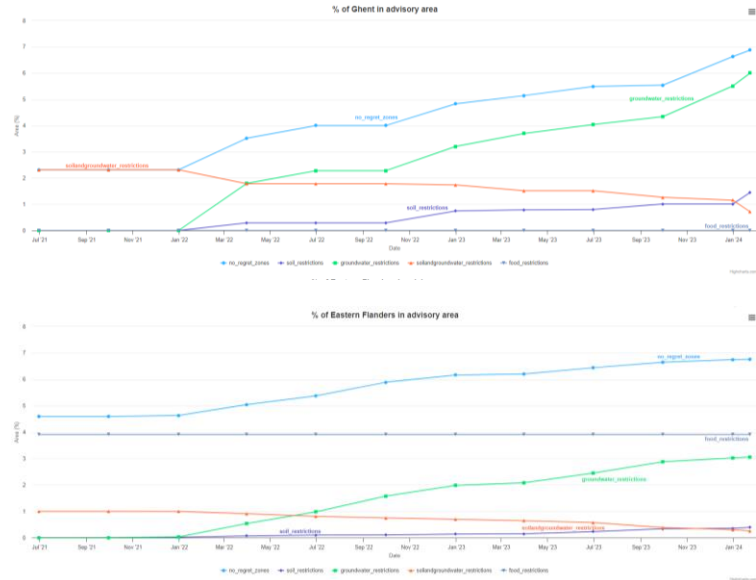
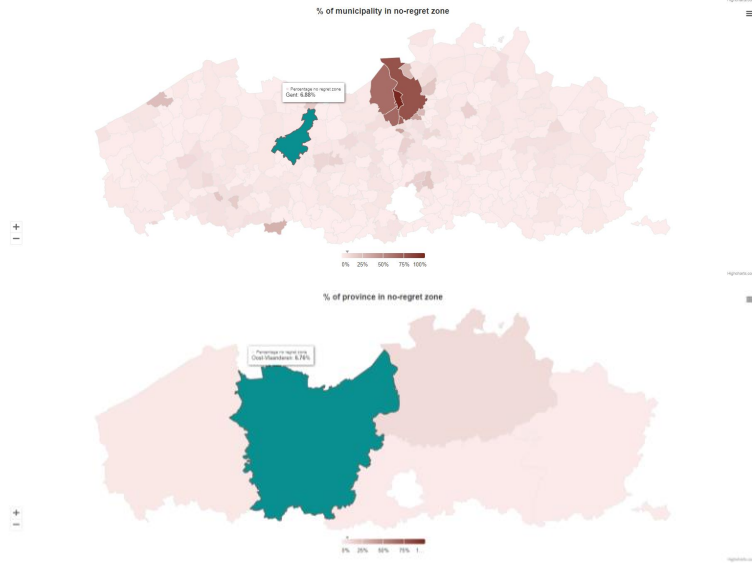
**POC - Indicator - % area in PFAS advisory area with precautionary measures**

# Data analysis – Proof of Concept



**POC - Indicator - % area in PFAS advisory area with precautionary measures**

# Data analysis – Proof of Concept



**POC - Indicator - % area in PFAS advisory area with precautionary measures**



be  
EU  
belgium24.eu

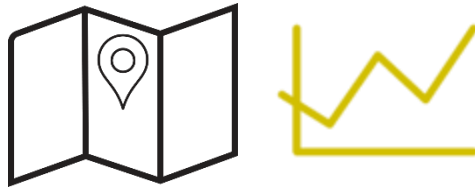
Input



Data accumulation



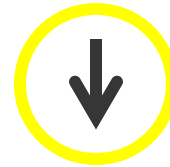
Visualization



PFAS-explorer



Output



Integration

Recap

## Contact

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## PFAS Flanders links

[General PFAS site](#)

[PFAS-explorer](#)