FACULTY OF CIVIL AND ENVIRONMENTAL ENGINEERING
INSTITUTE OF WATER QUALITY AND RESOURCE MANAGEMENT

PET – Pollution Evaluation Tool

An Open-Source Shiny Application for Scalable Quality Assurance and Exploration of Transnational River Basin Monitoring Data

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Agenda - PET

01 **Context of development**
Tethys project & MCC database background

02 **Intents of development**
Challenges of MCC-DB & PET goals

03 **Developed Content**
Two modes, features (& live demo)

04 **Future Development goals**
Ongoing refinement & vision

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01

Context of development

Tethys project & MCC database background

Context - The Tethys project

Co-funded by the European Union

2024 - Launched as EU & Interreg project

13 PP
Project Partners

10 SP
Strategic Partners

CAPACITY BUILDING FOR

Monitoring - Chemical analysis - Data storage - Modelling of hazardous substances in the Danube river basin

OUTPUT

Multi-compartment concentration database (MCC-DB) for pathway-oriented modelling

+

Pollution Evaluation Tool

www.fgg-donau.bayern.de/die_donau/flussgebiet_donau

Context - The MCC database

Tailor-made solution to support state-of-the-art emission modelling (e.g. MoRE)

57	35	17	7
Tables	CV registries	Import tables	Compartments

KEY FEATURES

- **Standardized CV metadata**
- **Built-in import constraints**
- **Role-based QA workflow**
- **EU-reporting harmonized**
- **FAIR & open-source**

Visit the MCC-DB poster
by Steffen Kittlaus

02

Intents of development

Challenges of MCC-DB & PET goals

Intents - Challenges of the MCC database

X

Expert tool

Complex database architecture, that need to be understood

!

Technical Skills required

Import, validation, curation, maintenance & exploration are technically demanding

|

Lack of Overview

Information is spread across many tables, hiding the bigger picture

User-friendly Interface is needed!

Intents - Claim & Goals of PET

Standardized and user-friendly processing system for data governance activities

WITH

Less time

Fewer errors

No coding required

03

Developed Content

Two modes, features (& live demo)

Developed Content - Two modes of PET

QA mode

- Measurement-centred evaluation of compartment-specific project data
- Two filter systems linking the subject of evaluation across all import tables - ONE big picture
- Comparison with already imported data

Management mode

- Cross-compartment evaluation by controlled vocabulary and spatial dimension
- Filter incl. EU regulatory geodata (WFD water bodies, NUTS regions)
- Data availability, Statistic, CV management, Export & Transfer

(DEMO TIME)

Developed Content - QA: Feature overview

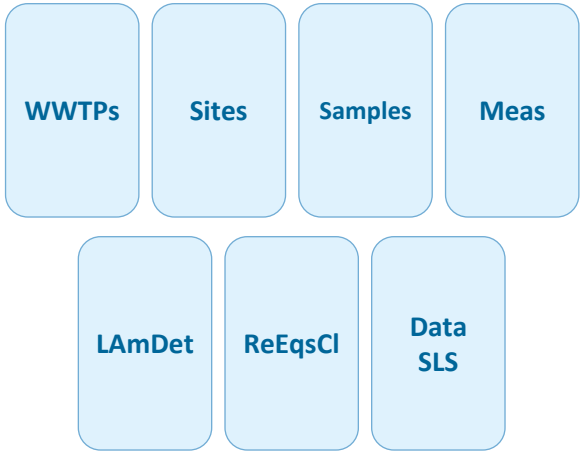
LINKAGE & FILTERING

Fast filter
Quick subject lookup

Advanced filter
Precise filter building

PER-TABLE MODULES

SUMMARY - all tables at a glance

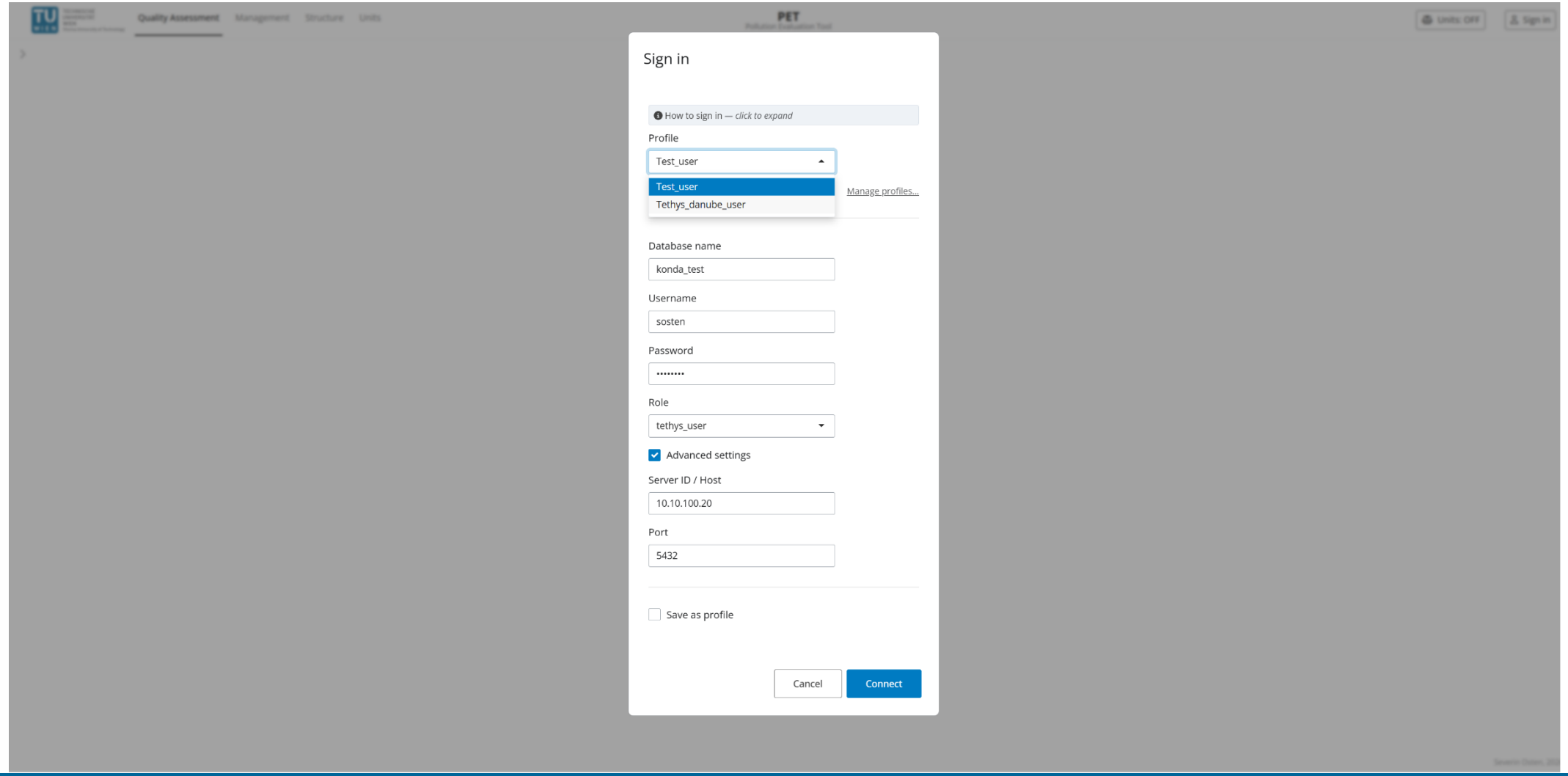


ANALYTICS

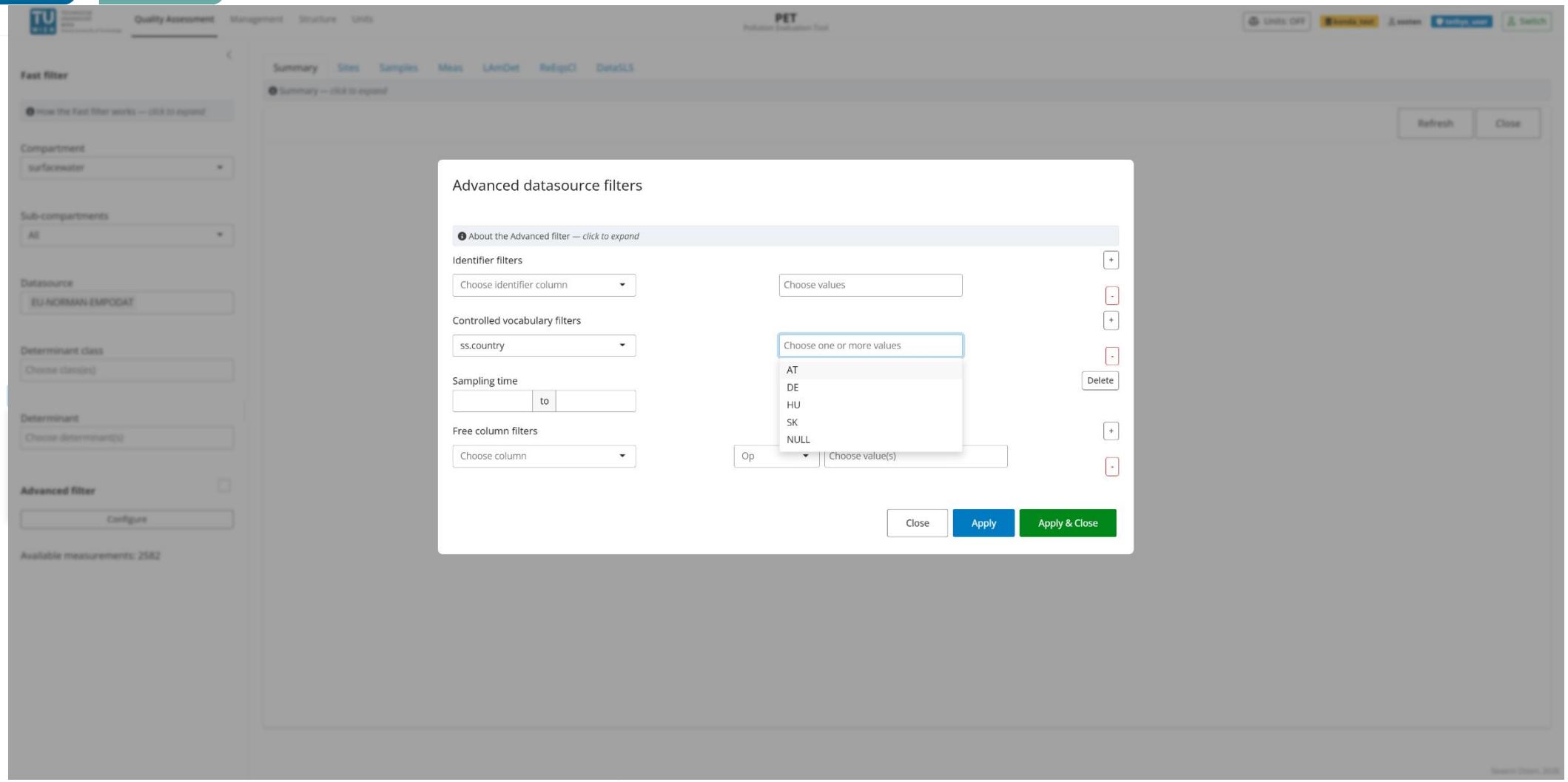
- Key table feature
- Controlled vocabulary
- Cross-table plots
- Grid table plots
- Completeness analysis

One big picture of the data - linked across all tables, contextualized for QA

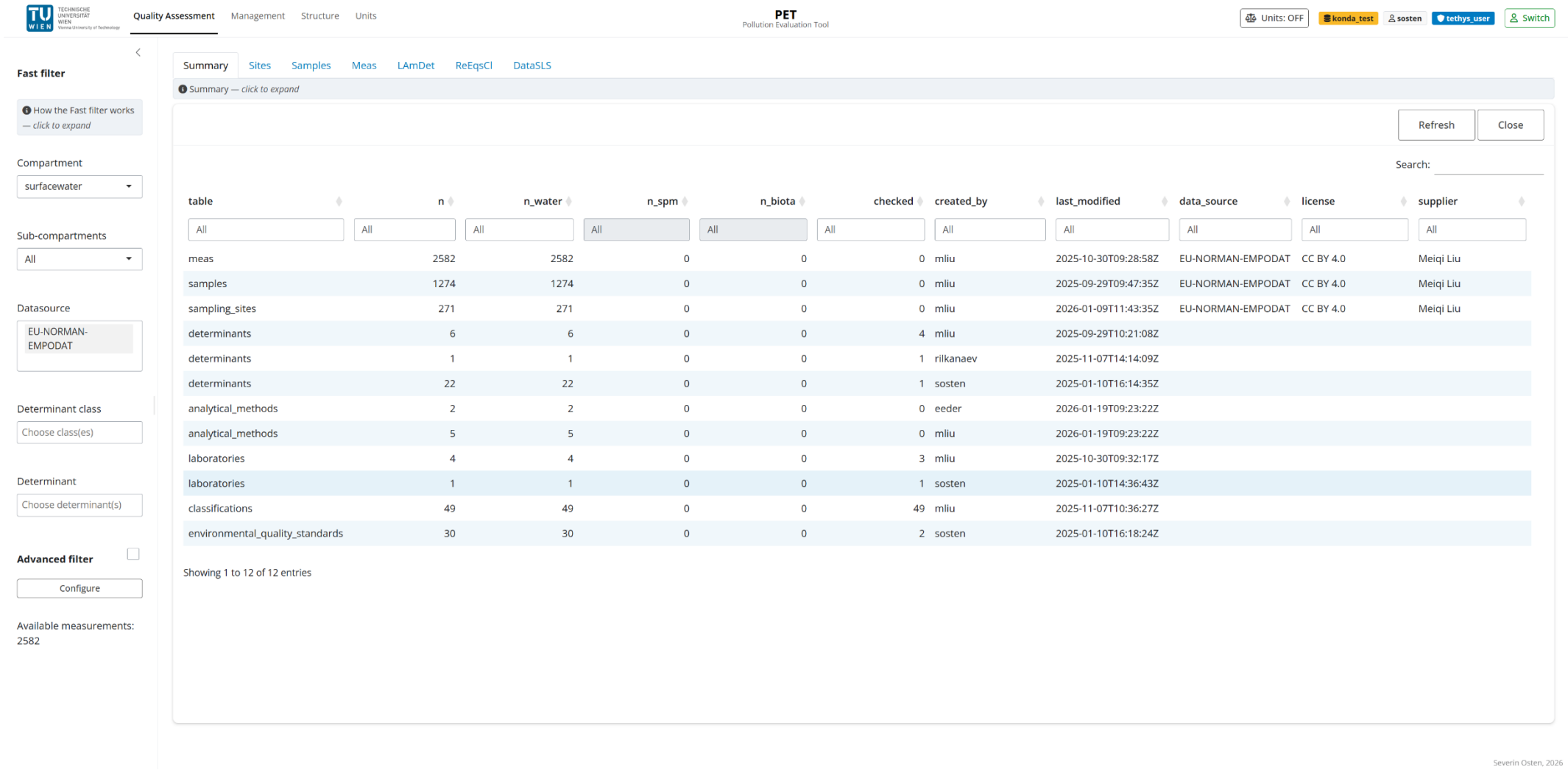
Developed Content - Compatibility & Authentication



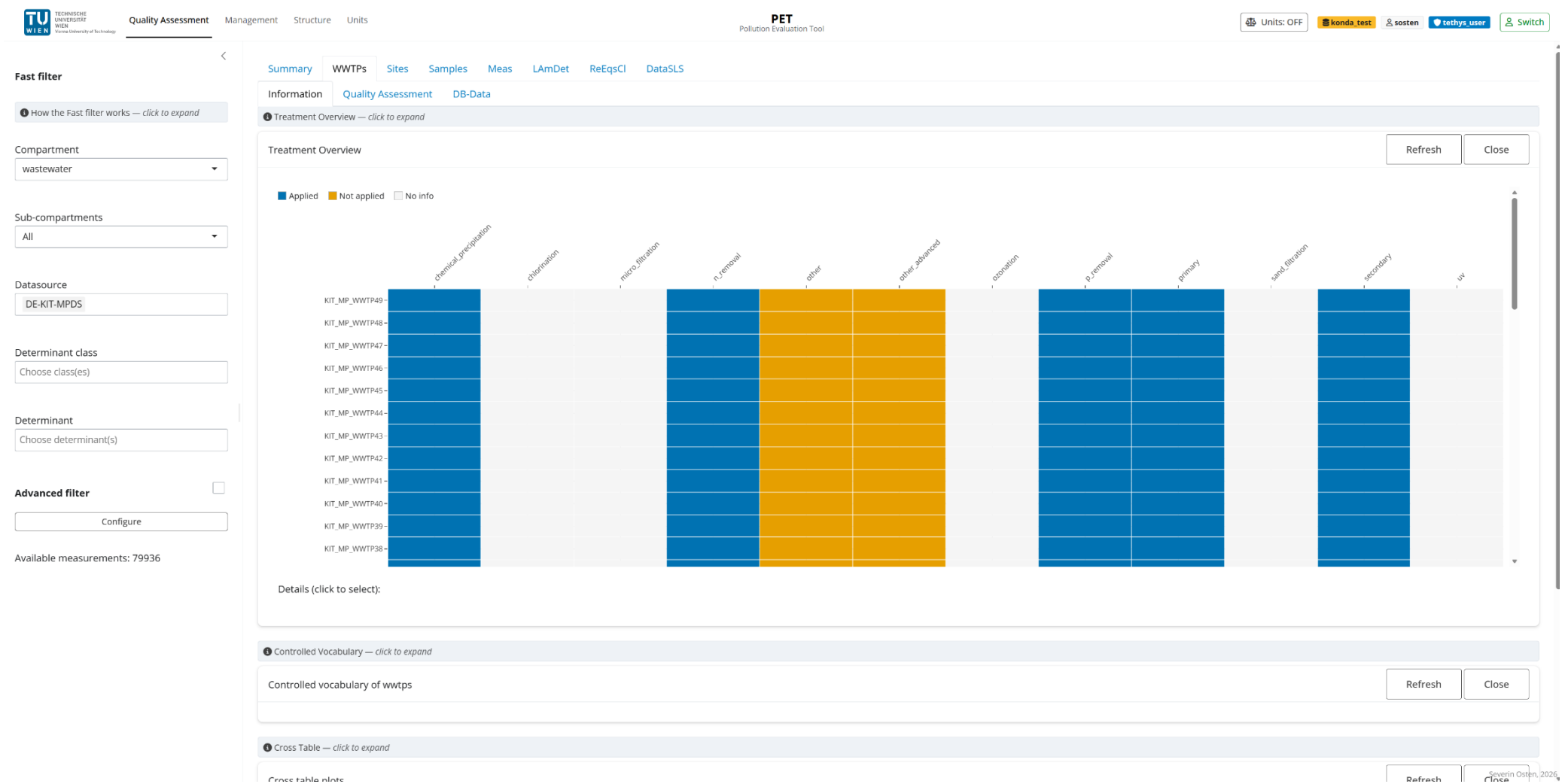
Developed Content - QA: Interface & Filter



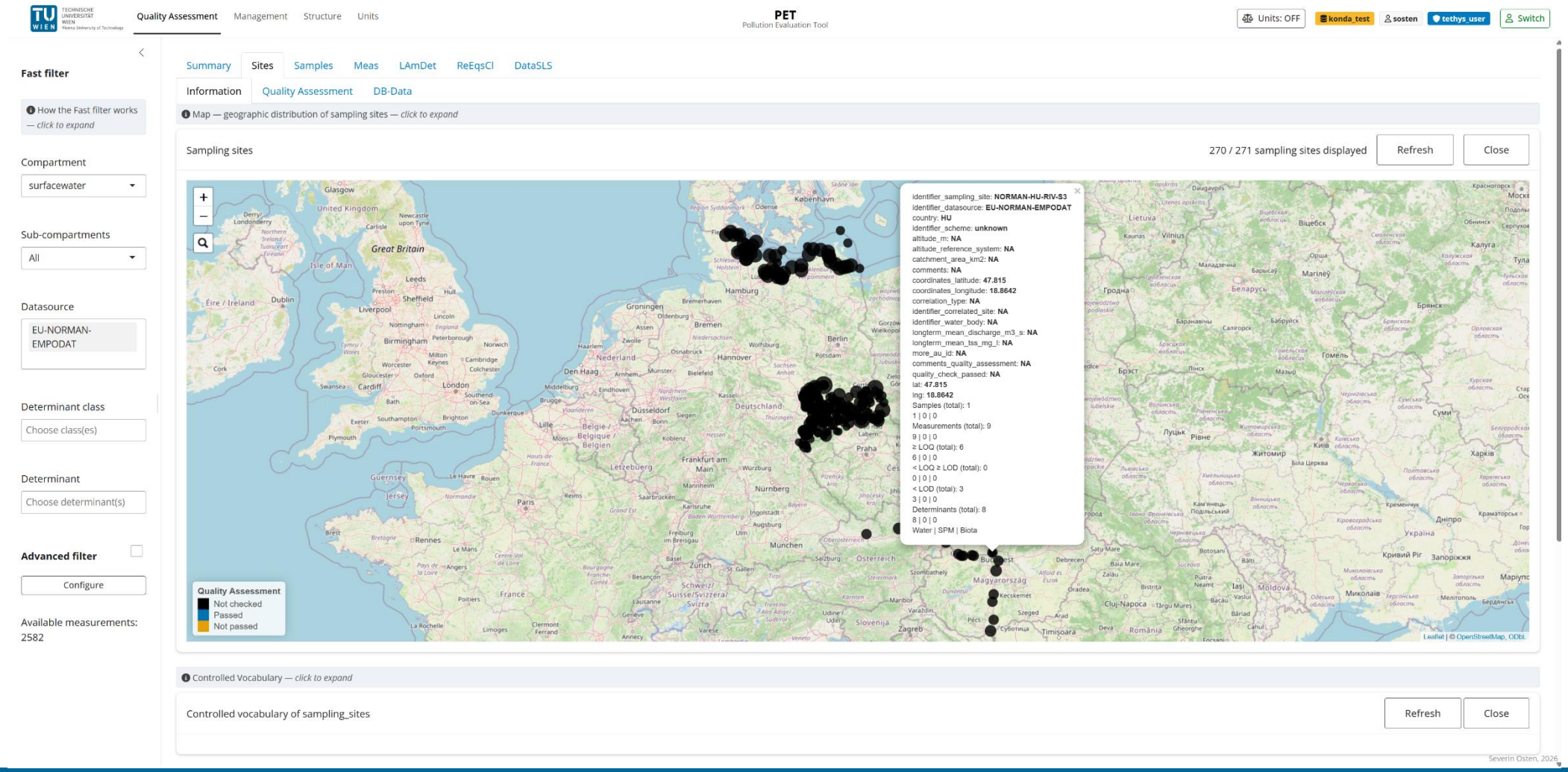
Developed Content - QA: Summary



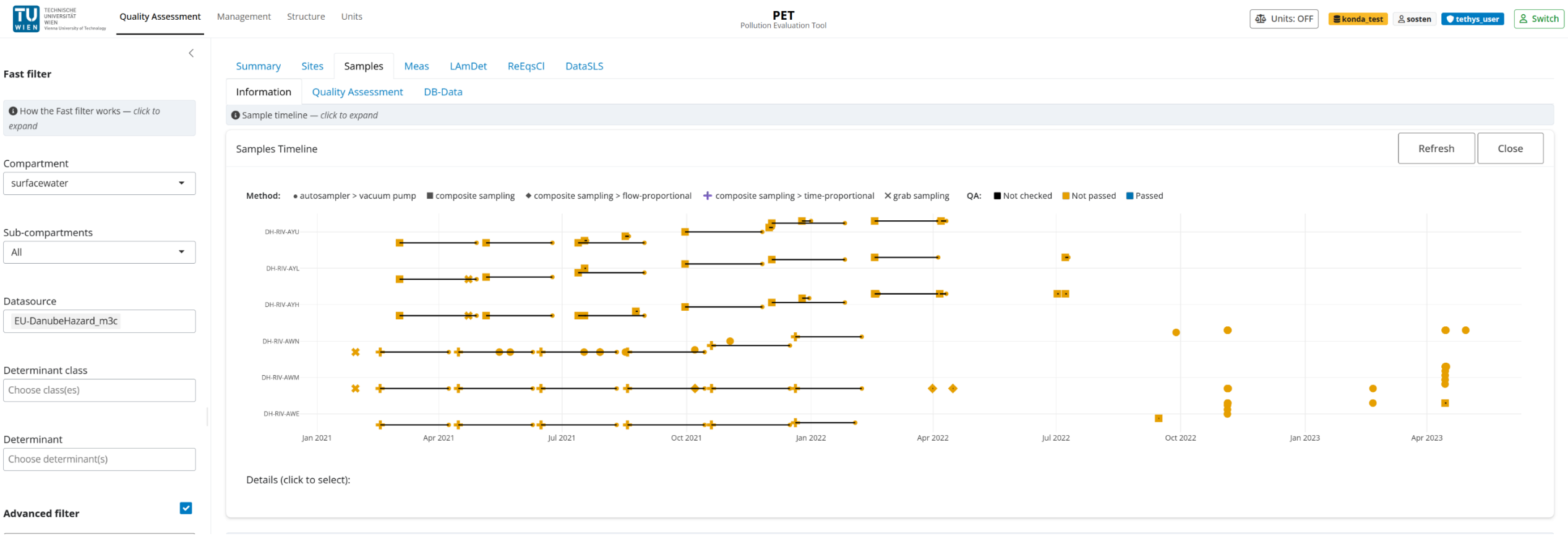
Developed Content - QA: WWTPs



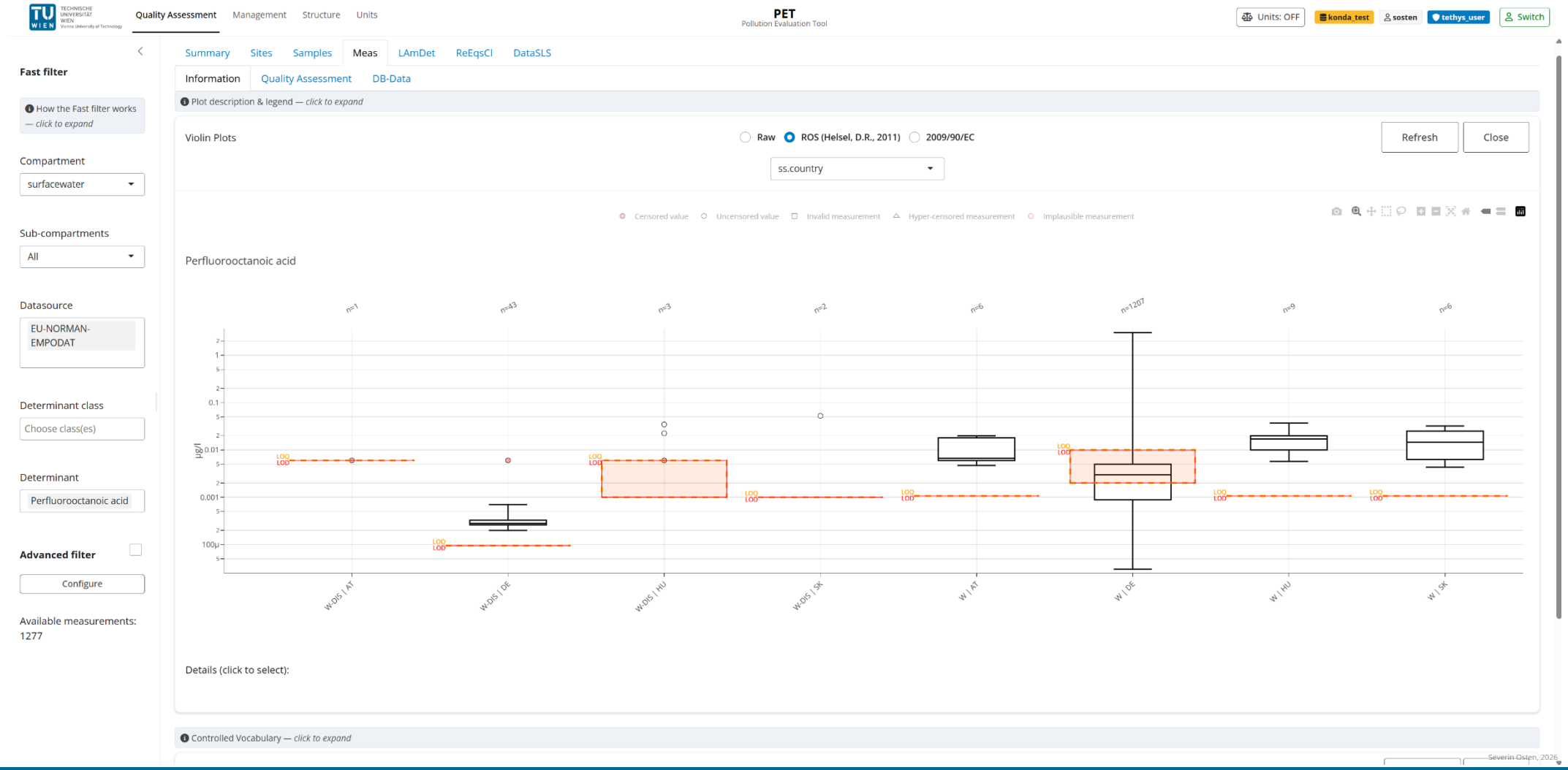
Developed Content - QA: Sites



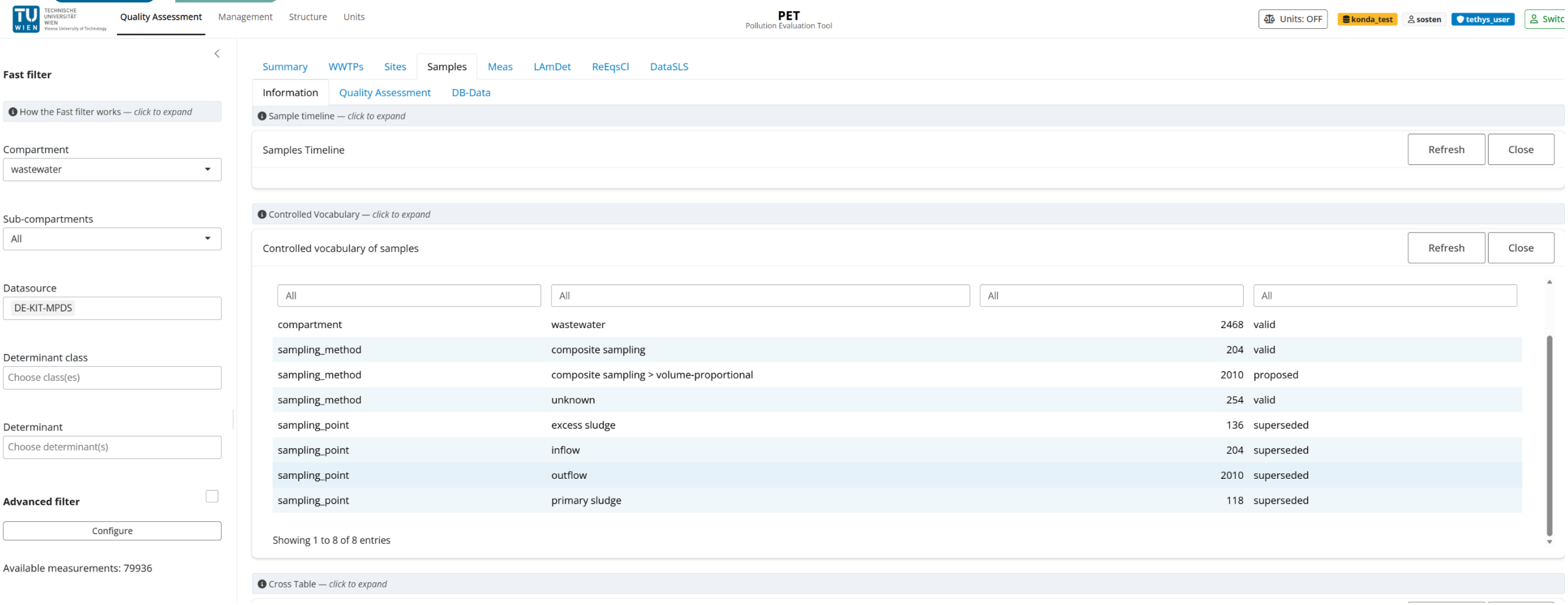
Developed Content - QA: Samples



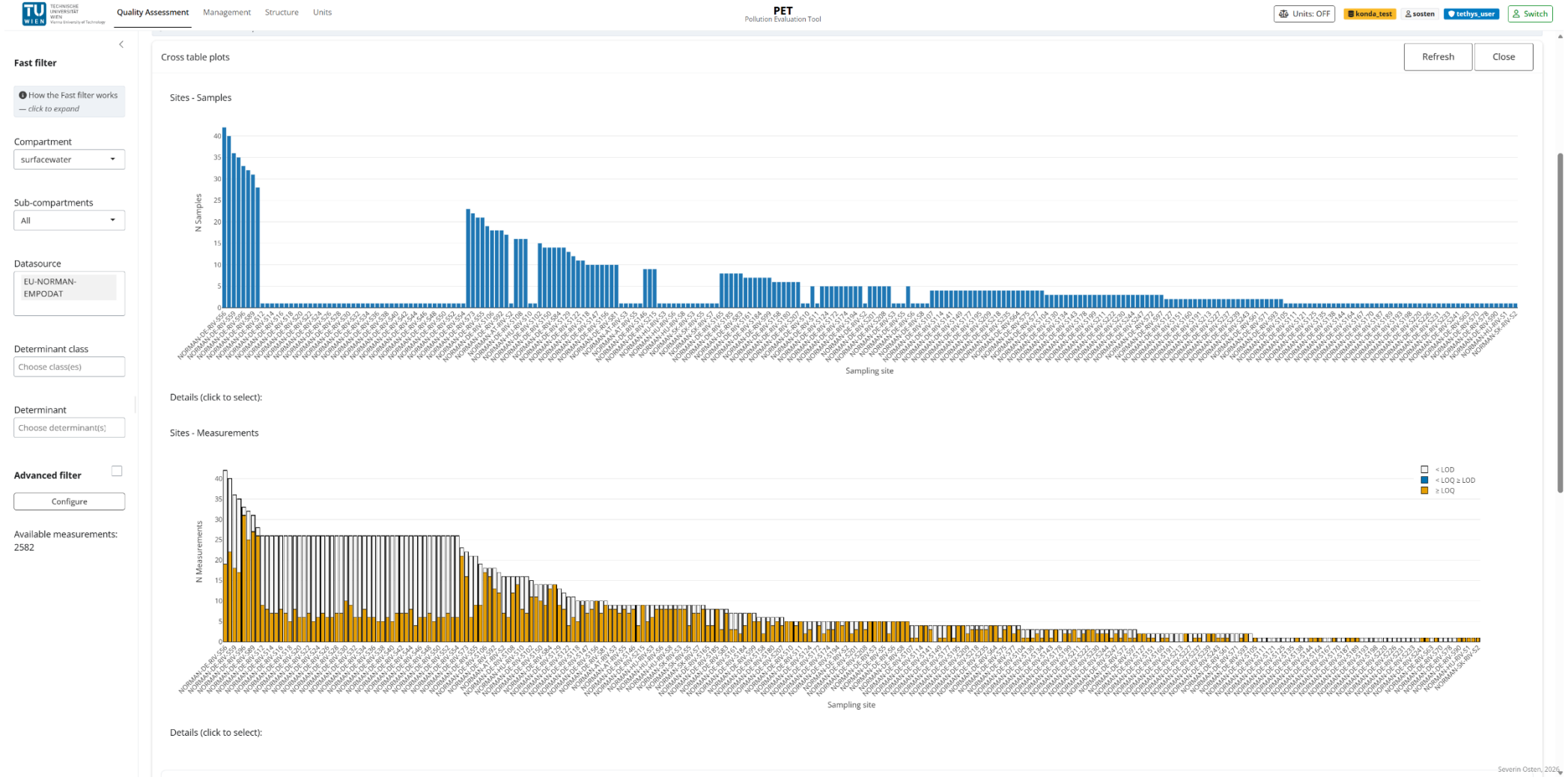
Developed Content - QA: Measurements



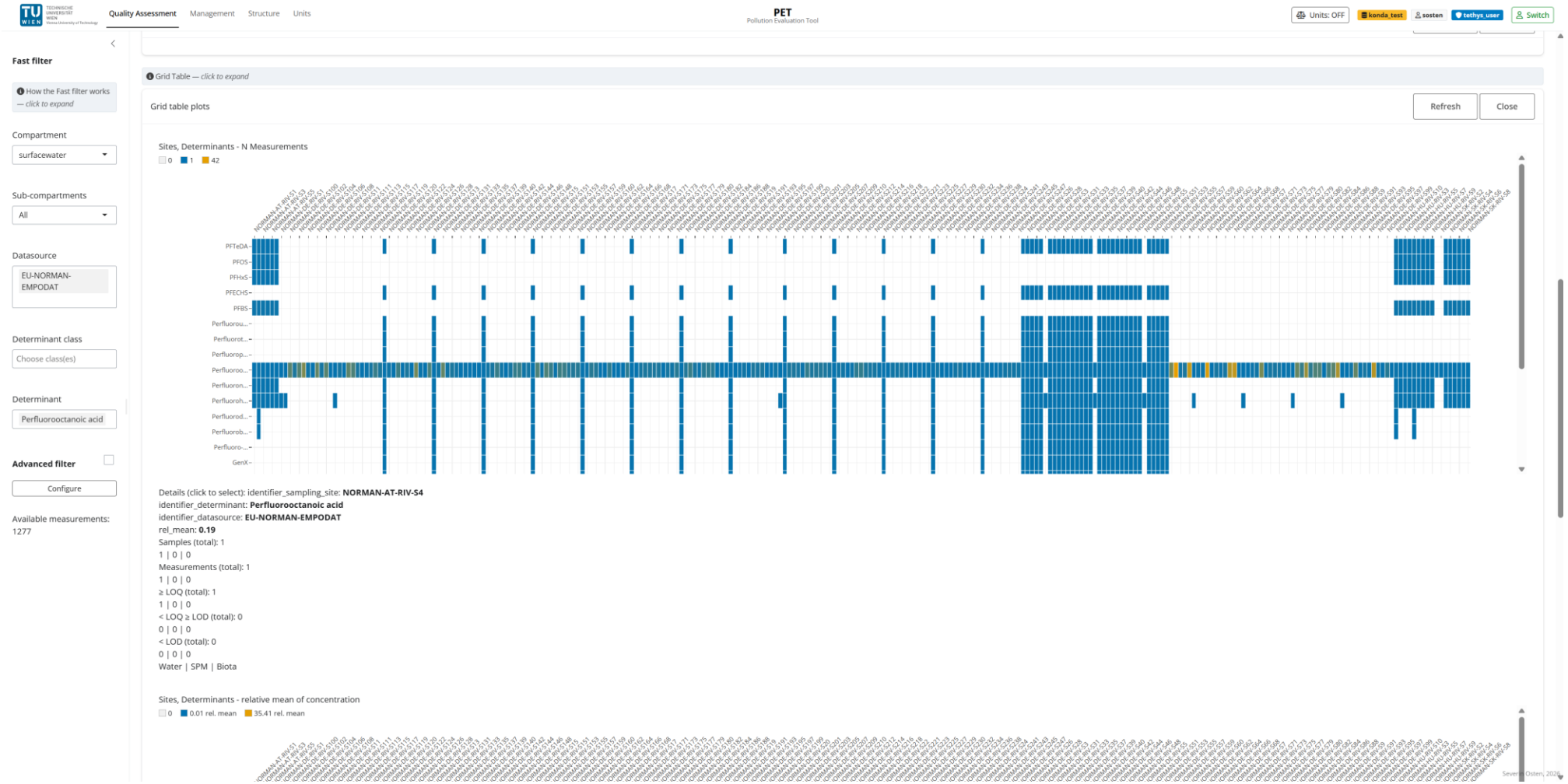
Developed Content - QA: Controlled Vocabulary



Developed Content - QA: Cross table plots



Developed Content - QA: Grid table plots



Developed Content - QA: Completeness analysis

Completeness — *click to expand*

Completeness overview of samples

Refresh | Close

Vertical completeness

Column name	Completeness
discharge_during_sampling_m3_s	88.57
dry_content_weight_percent	0
igsn_pid	0
organic_content_mgc_per_kg_dry	0
sample_volume_ml	84.44
sampling_method_accredited	100
sampling_method_reported	100
sampling_point_reported	81.44
discharge_during_sampling_m3_s	88.57
igsn_pid	0
sample_volume_ml	84.44
sampling_method_accredited	100
sampling_method_reported	100
sampling_point_reported	81.44

Showing 1 to 14 of 14 entries

Lateral completeness

N ids	Completeness
133	28.57
17	42.86
129	57.14
955	71.43

Showing 1 to 4 of 4 entries

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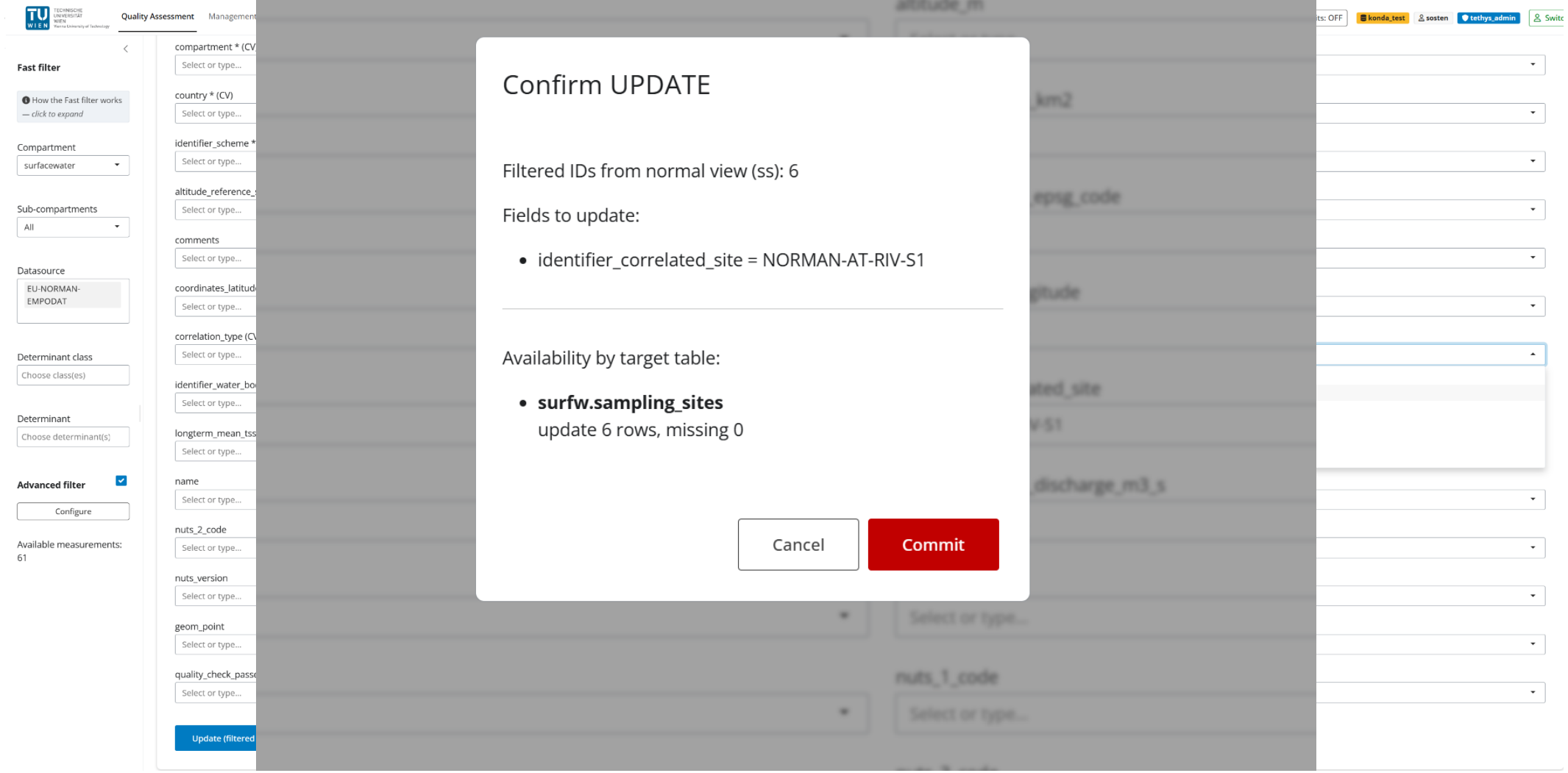
Developed Content - QA: Quality Assessment Workflow



Developed Content - Management: Feature overview

Cross-compartment evaluation with spatial intelligence

Advanced spatial & data filter

WFD water bodies, NUTS regions, full CV-driven slicing

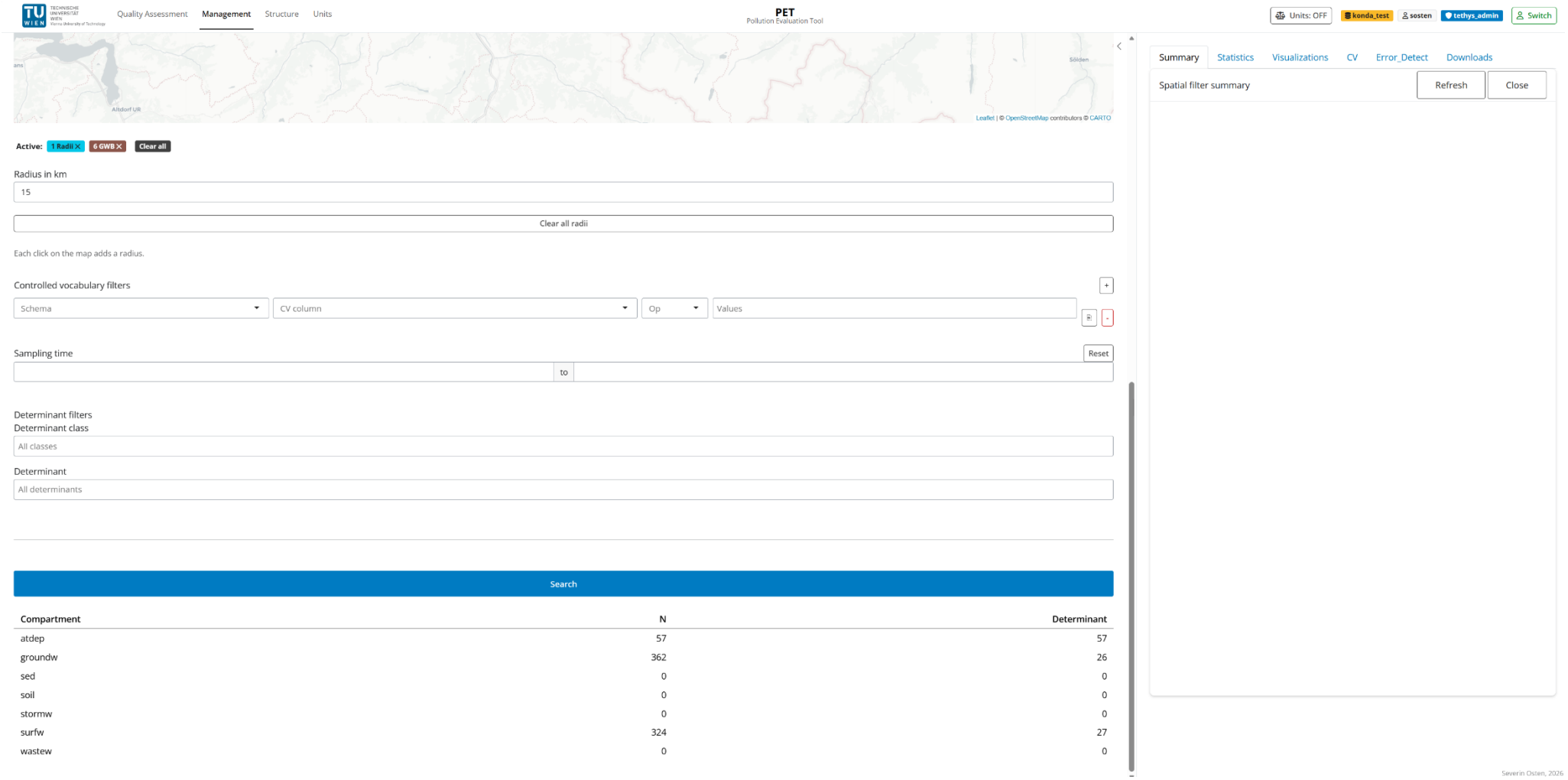
Summary module

Data availability, Source, License and QA-Status

Compartment comparison plot

Side-by-side measurements across all compartments

Developed Content - Management: Filter system



Developed Content - Management: Compartment comparison

04

Future Development goals

Ongoing refinement & vision

Future Development

From pilot to a lasting transnational governance tool

1

Refinement

Bug fixing, usability, feature requests

2

Task support

Modelling & management workflows

3

Insights

Availability, quality, statistics, CV mgmt

4

Data exchange

Export & transfer across databases

VISION

PET as the user-friendly gateway to transnational hazardous-substance data

Thank you for your attention

PET - Pollution Evaluation Tool

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Questions & discussion welcome