



Act. 1.4 & Act. 1.5 National and transnational database(s) & PET

Development and Outcomes

Agenda

01

Why a new database?

Requirements & gaps in the existing landscape

02

First attempt — DHm3c

Achievements, limits & lessons learned

03

Tethys DB & PET

Two tools designed for purpose

04

Future development & application

From pilot to lasting transnational cooperation

01

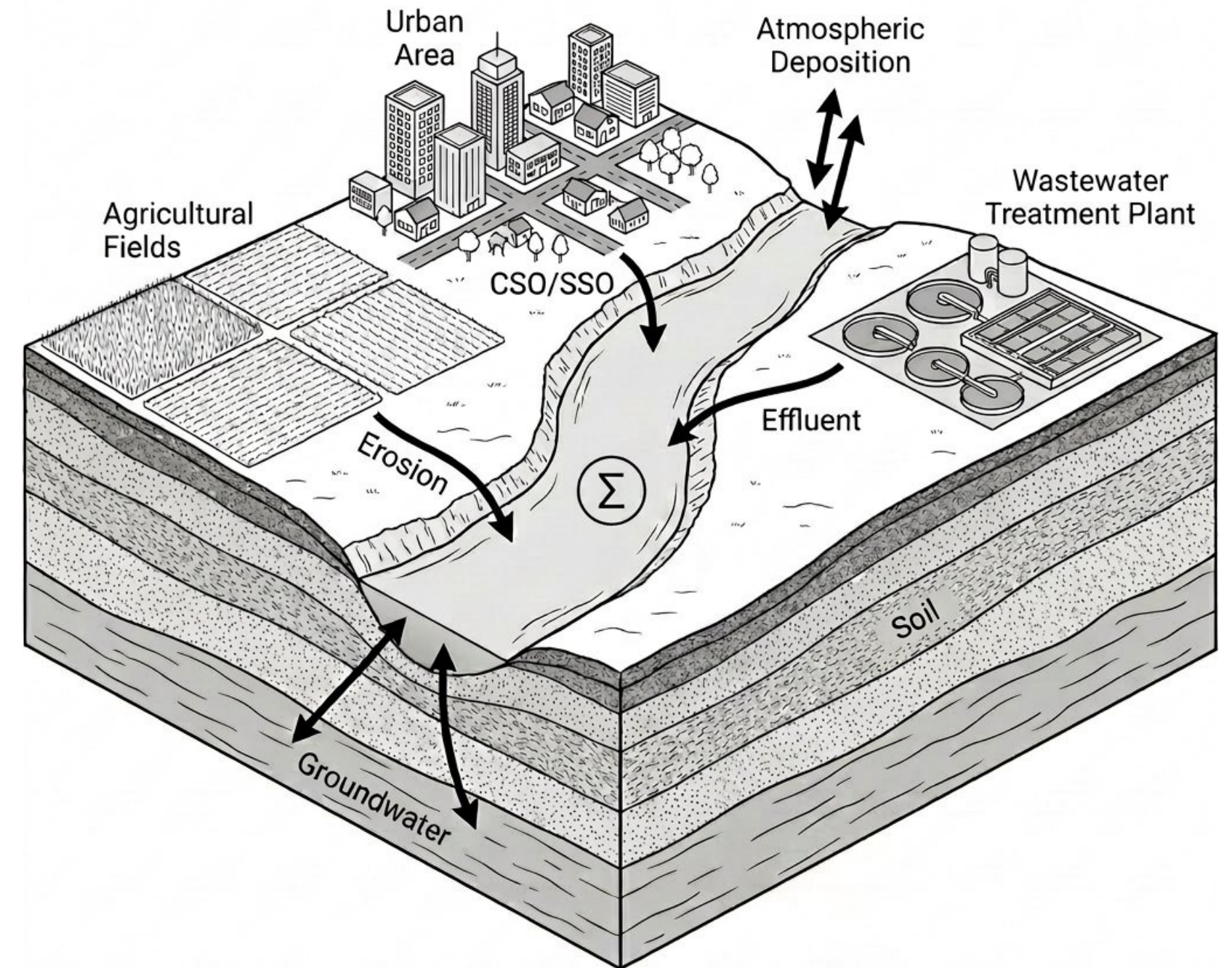
Why a new database?

Requirements & gaps

Why another database? – Requirements for Modeling

Data Requirements

1. Multi compartment
2. Comprehensively described by meta data
3. Diverse data in terms of meta data
4. Time and space



Why another data base? – Existing DBs

Existing DBs are not designed to store the comprehensive meta data requirements needed for emission modeling

Unsuitable storage will lead to a great loss of information that cost a lot.
(Sampling and chemical analysis)

1. Missing or Incomplete Meta data /Controlled vocabulary
2. Insufficient coverage of time and space
3. Short in environmental compartments or smaller tributaries
4. Limited access or unreliable sources

➤ EU-WFD: Inventory of emissions, discharges and losses is mandatory for every member state

02

First attempt: Danube Hazard m3c

Achievements, limits & lessons

DHm3c – Project aims and limitations

Most resources went into search, collection, harmonization and evaluation of data

10.7M

measurements

383K+

samples

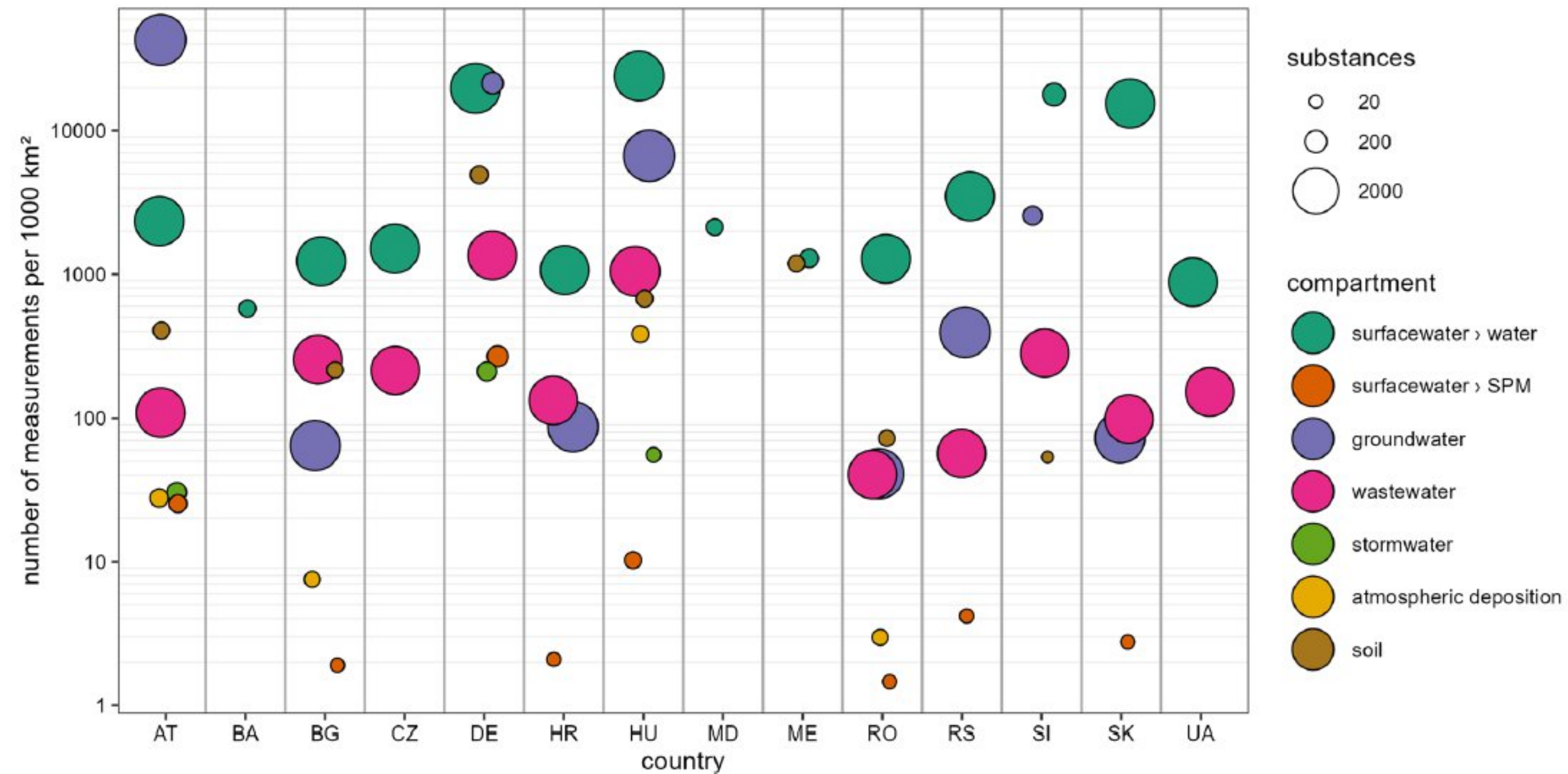
~25K

sampling sites

Suboptimal implementation of data storage, import routines and maintenance tasks led to limitations in efficiency and long-term usability

DHm3c – Insights of Steffen Kittlaus et al. – 2024

Data availability



➤ Balanced sampling-design is crucial

DHm3c – Insights of Steffen Kittlaus et al. – 2024

Comparison across Compartments

- Identification of emission patterns
- Identification of predominant pathways of substances
- Identification of legacy contamination
- Identification of indicator substances
- Helps prioritize resource allocation regarding further investigation and the development of most efficient mitigation measures

DHm3c – Insights of Steffen Kittlaus et al. – 2024

Extrapolation potential of harmonized data

- Standardized meta data (Controlled vocabulary) is of utmost importance as it makes heterogeneous data evaluable as one
 - Identification of statistically significant patterns
 - Extrapolation of un-monitored regions improve model results
 - Creation of CV is a highly complex task
- Transnational cooperation enriches the statistical analysis and helps deriving a more differentiated picture of reality

03.1

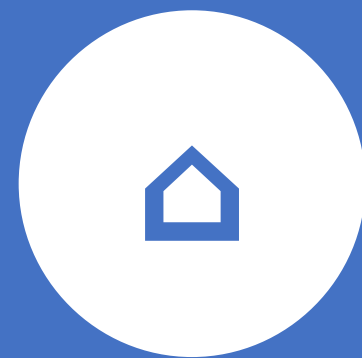
Tethys DB

Design, build, deploy

Two purposes — One structure

10 institutions tested feasibility and added value of an implementation

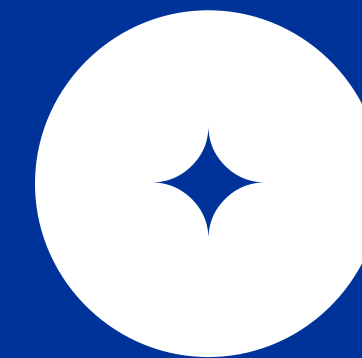
Even if adoption strategies vary due to different national systems, resources, and institutional roles, know how was created



NATIONAL

Feedback:

- Rigorous meta data and extrapolation potential
- Quality assurance strengthen long-term usability
- EU-compatible

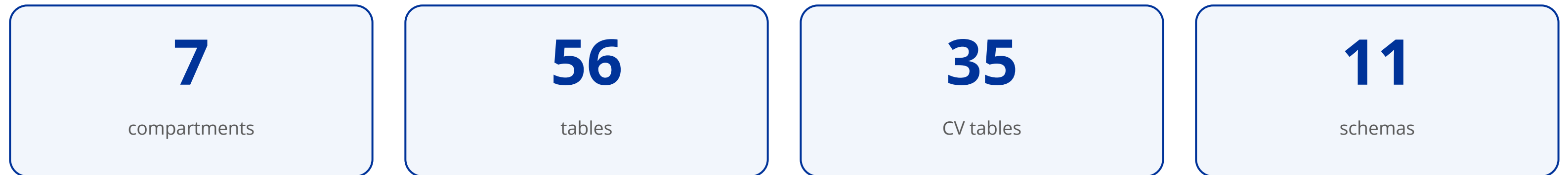


TRANSNATIONAL

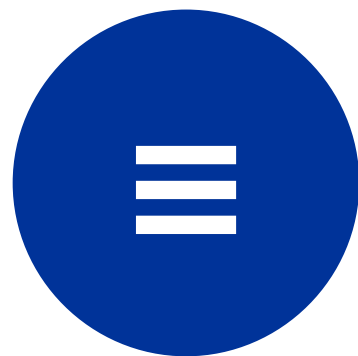
Future role & use:

- MoRE-Model parametrization and Validation
- Reporting, Management and scientific purposes as well as public information

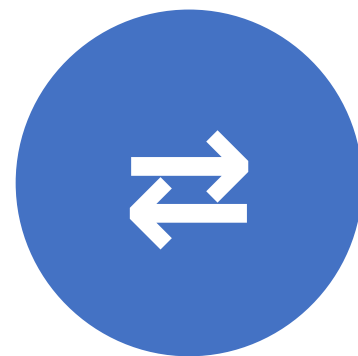
Tethys DB — Architecture



Tethys DB — What sets it apart



Controlled vocabulary
Standardized and well-established



EU-reporting harmonized



Built-in role-based QA workflow and Import constraint



FAIR & open-source

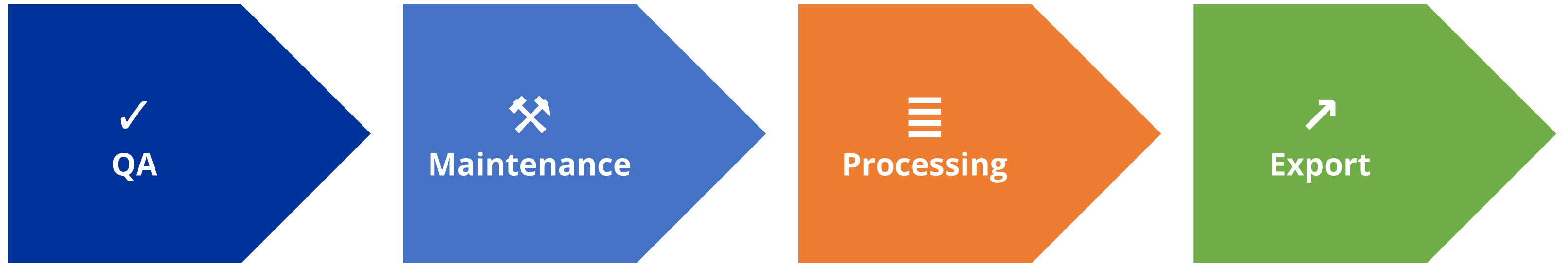
03.2

Tethys PET – Pollution Evaluation Tool

Design, build, deploy

PET – Pollution Evaluation Tool

Standardized and user-friendly processing system for data governance activities



 **Less time**  **Fewer errors**  **No coding required**

PET — Two Modes

QA mode

- Measurement centered evaluation of compartment specific project data
- Two filter systems linking the subject of evaluation across all import tables delivering ONE big picture of the data
- Contextualized analysis of all QA table content

Management mode

- Measurement centered evaluation across all compartments by controlled vocabulary and a spatial dimension
- Comprehensive Filter featuring among others EU regulatory geodata (WFD water bodies, NUTS regions)
- Comprehensive analysis of data availability, general visualizations, statistics, CV management and Export/transfer functions

04

Future & application

From pilot to lasting cooperation

We've come a long way, ...



... but we still have a long way to go.



Thank you for your attention