

FPCUP USER WORKSHOP

ACTION „DOWNSTREAM SERVICE / APPLICATION
DEVELOPMENT FOR NATIONAL STATISTICS AND REPORTING”

Background and Concept

Ursula Gessner (DLR), Eva-Christina Katz (BKG), Andreas Hirner (DLR)

23.11.2022



Agenda



1. Welcome and introduction of the organisers (9:00 - 9:15)
2. Project background and concept (U. Gessner, E.-C. Katz, 9:15 – 10:00)
10 min break
3. Demonstration of the training area generation tool (A. Hirner, 10:10 - 12:00)
(including breaks)
4. Discussion and feedback (12:00 - 13:00)

The Project FPCUP

Framework Partnership Agreement on Copernicus User Uptake

<https://www.copernicus-user-uptake.eu/>



- **Funding:** European Commission (DG DEFIS) since 2018
- **Consortium:** 50 partners from 23 European countries
- **Lead:** German Space Agency, German Aerospace Center (DLR)
- **General objectives:**
 - enhancing the user uptake of Copernicus data and products
 - strengthen the European **autonomous access to environmental knowledge** and key technologies for Earth observation and geo-information service and thereby enable Europe to achieve independent decision-making and action
 - foster the **development of a competitive European space and service industry** and maximise the opportunities for European enterprises to develop and provide innovative Earth observation systems and services
- Currently, about 200 **Actions** are running

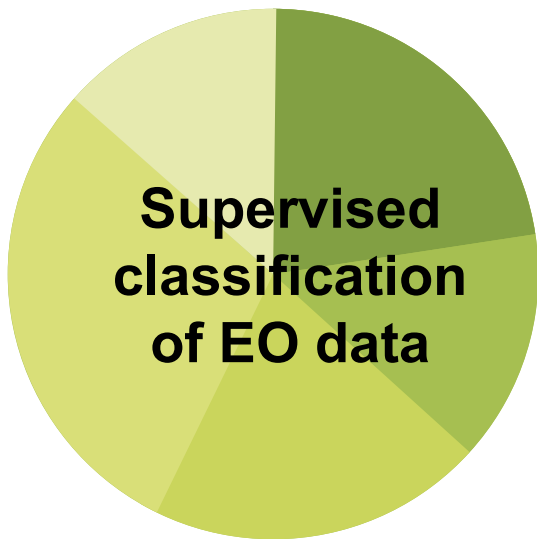


FPCUP Action „Downstream service / application development for national statistics and reporting”



- Focus: improving the **generation and selection of training data** for classification purposes by exploiting Copernicus Sentinel data, in combination with existing geodata.
- An application was developed (**training area selection tool**) that shall support public agencies and other users to produce classifications based on EO data in a more automated manner.
- **Pilot:** tailor application to the requirements of the German Federal Agency of Cartography and Geodesy (BKG) in collaboration with the German Federal Statistical Office (Destatis) for supporting updates land cover/use classifications using the example of ecosystem classification.
- **User Workshop** (23rd Nov. 2022) to present and hand over the tool to other interested stakeholders.

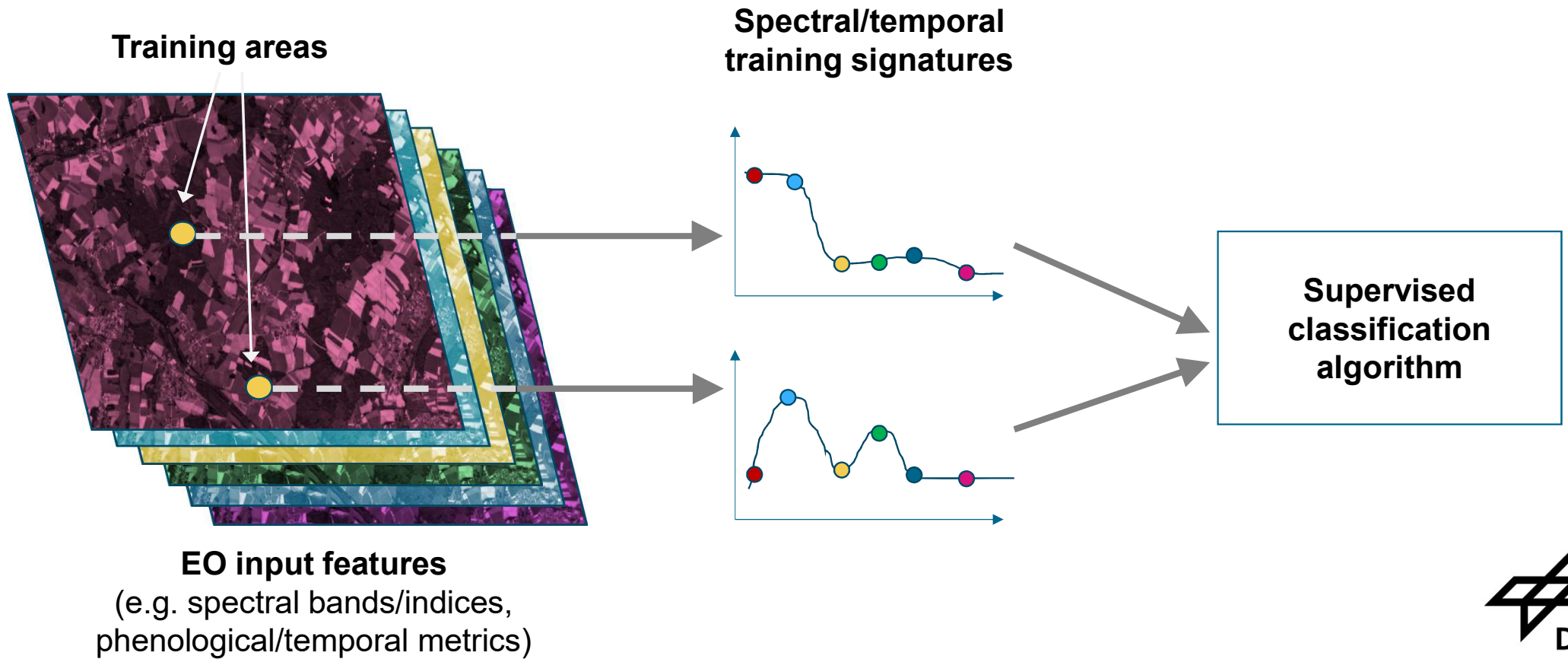
Challenge – Training Area Definition



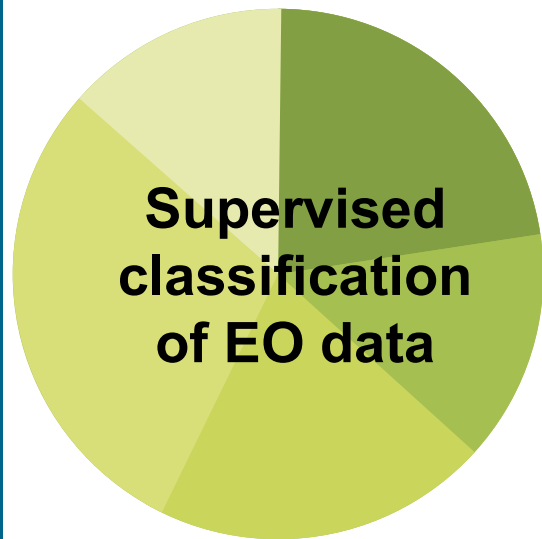
**Training
Area
Definition**



What are Training Areas needed for?



Challenge – Training Area Definition



Can be complex

Can be time-consuming

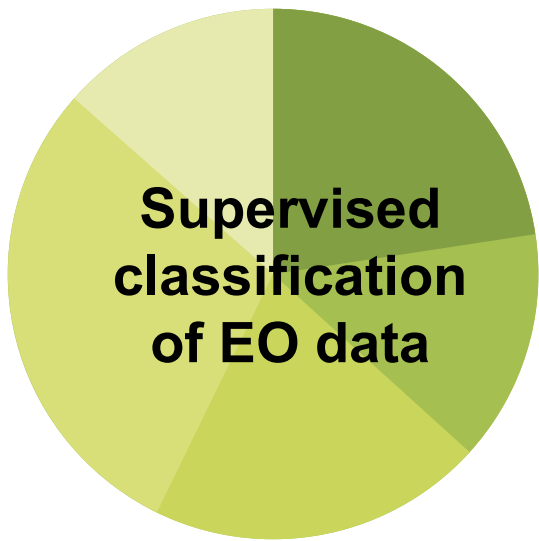
**Training
Area
Definition**

Needs to be done repeatedly

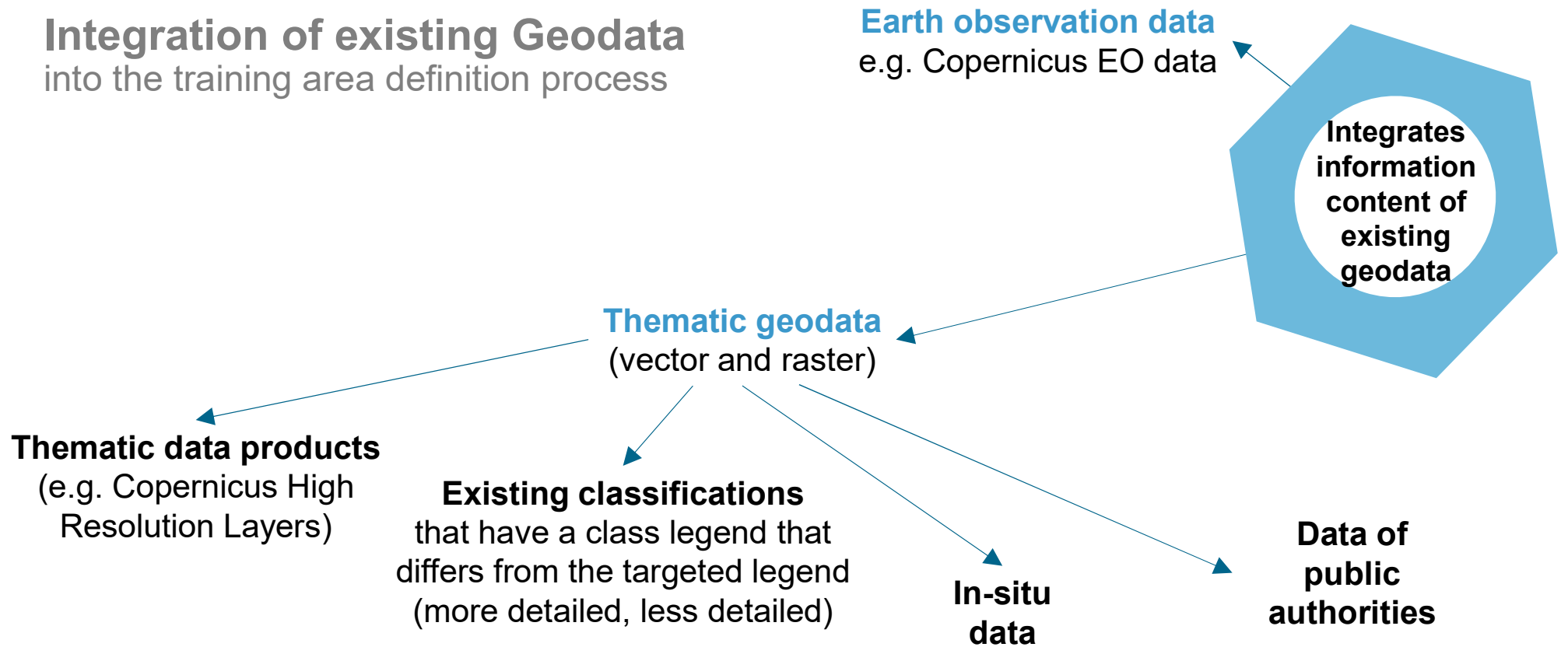
How to select training areas in an appropriate way?



A Tool for Training Area Definition – User Requirements

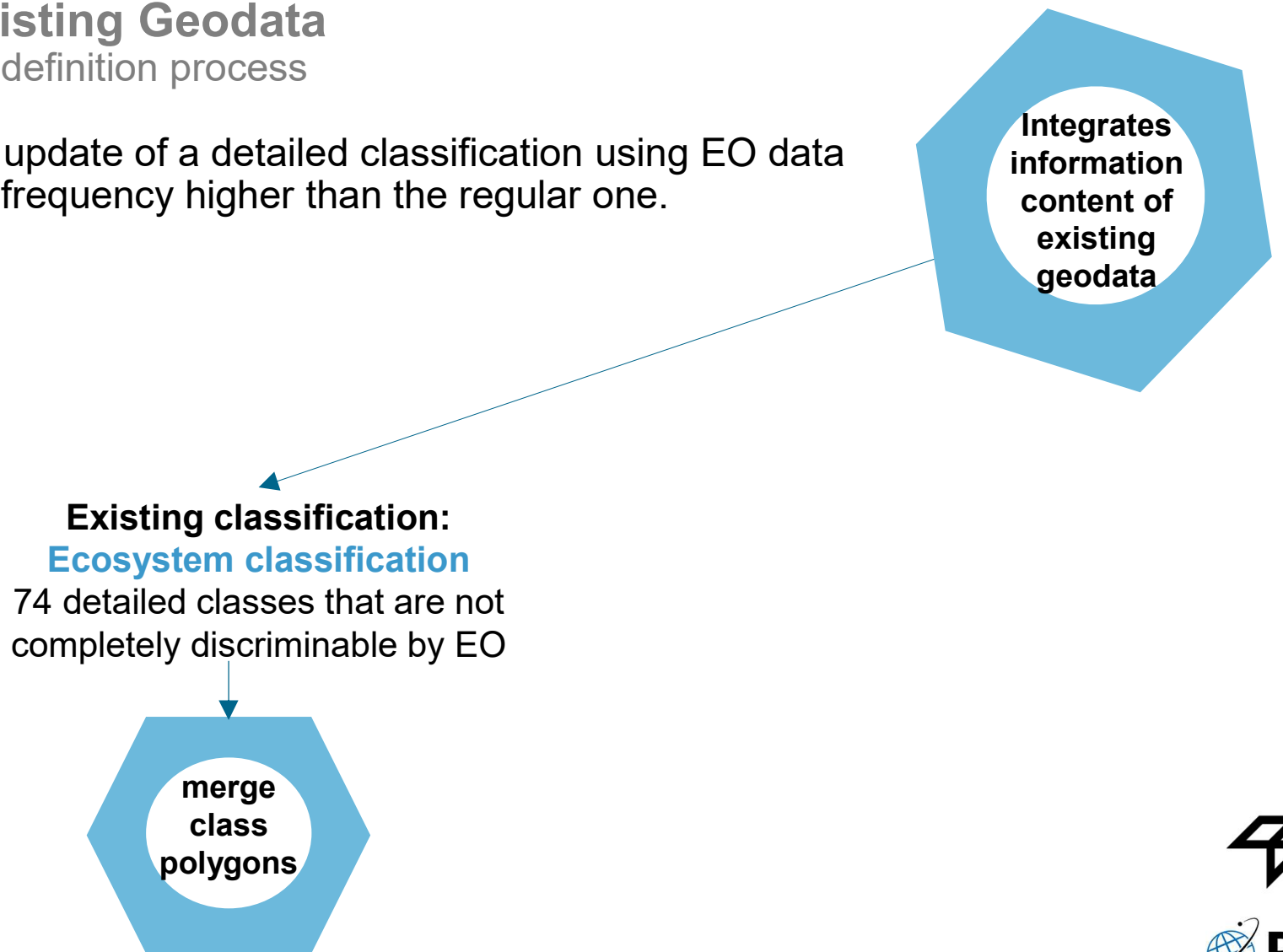


Integration of existing Geodata into the training area definition process



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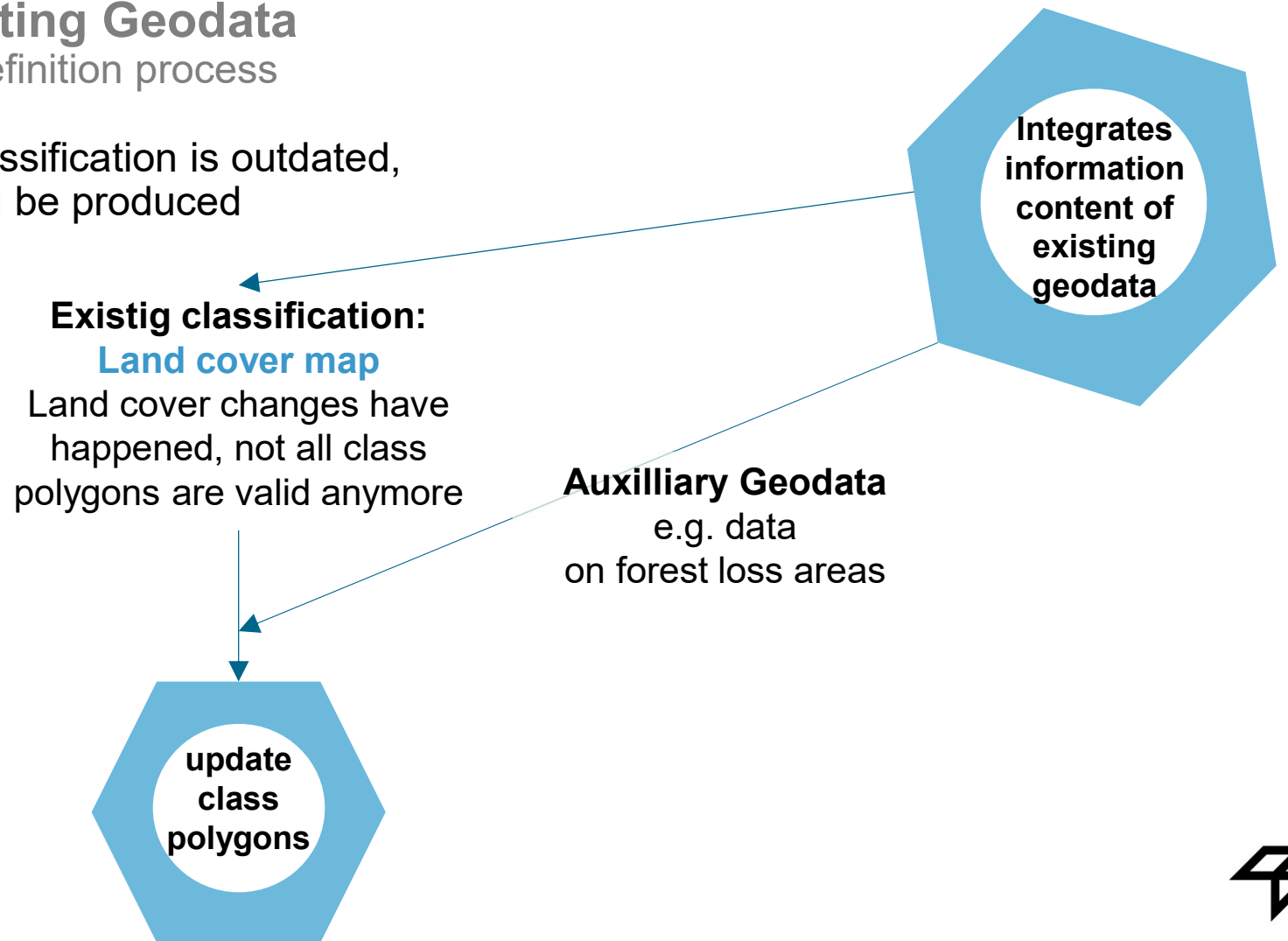
Example 1: „Coarse“ update of a detailed classification using EO data to provide an update frequency higher than the regular one.



Integration of existing Geodata

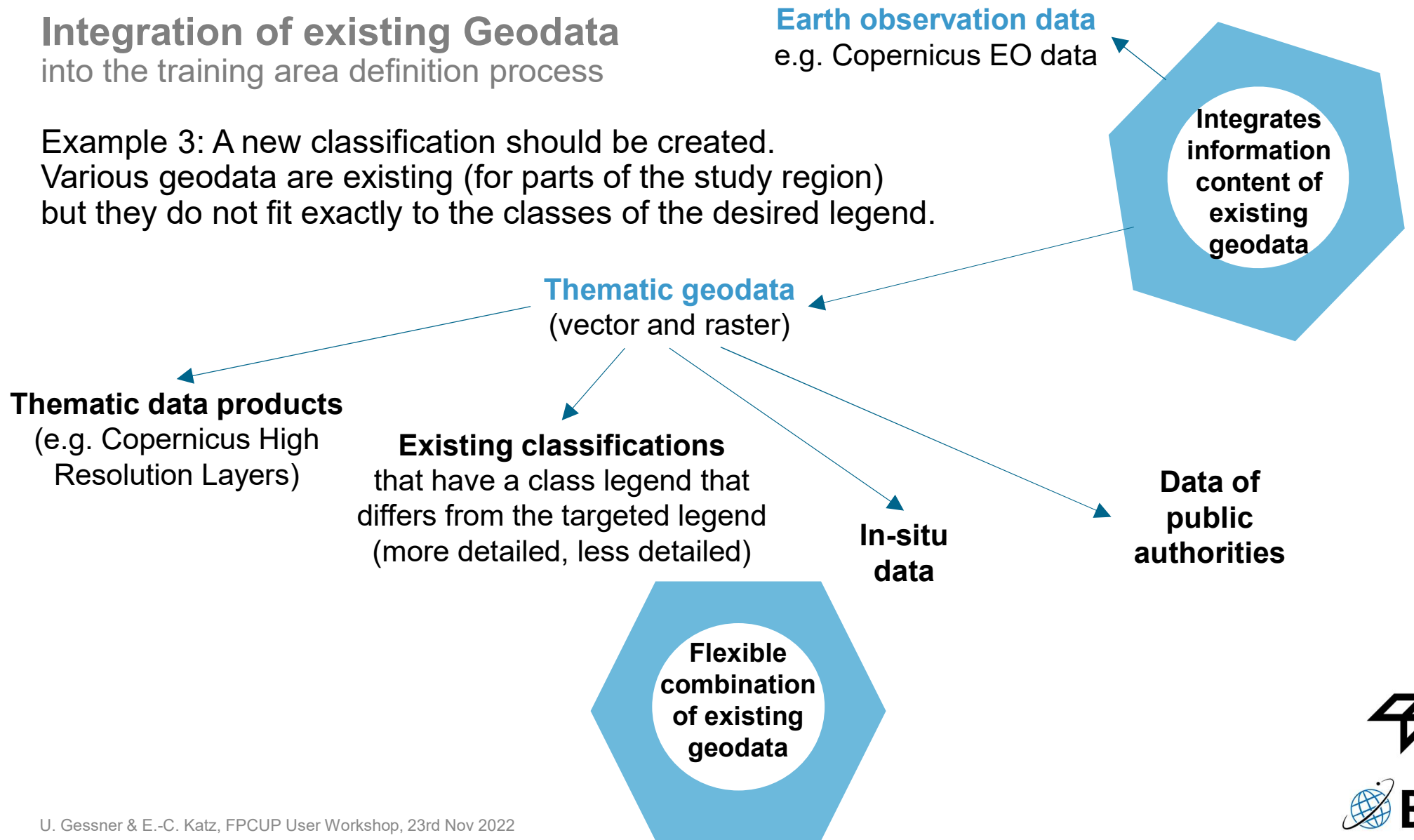
into the training area definition process

Example 2: Existing classification is outdated, an updated map should be produced



Integration of existing Geodata into the training area definition process

Example 3: A new classification should be created.
Various geodata are existing (for parts of the study region)
but they do not fit exactly to the classes of the desired legend.



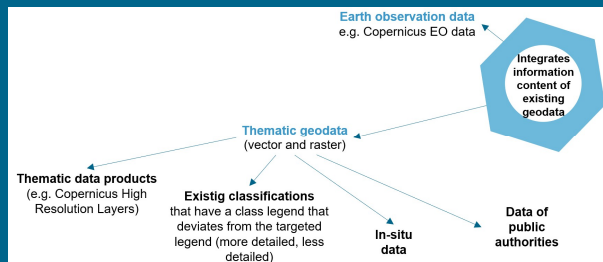
FPCUP Tool for Training Area Definition

Stage 1



Definition of broader class regions indicating potential locations of training areas

➤ Integration of existing geodata

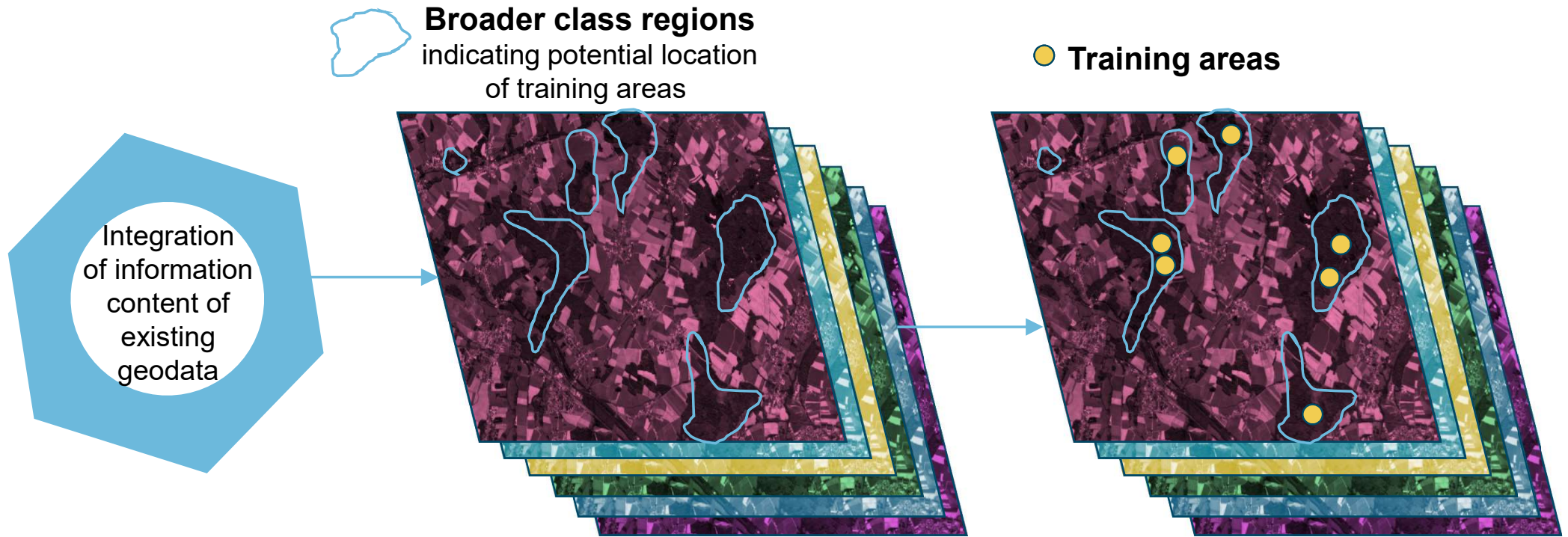


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Broader Class Regions vs. actual Training Areas



Why should we not use the complete area of all polygons for training?

- Avoid too many samples as they are computationally intensive
- Avoid oversampling (overfitting) of classifiers
 - use only samples, not (almost complete) population
- Create balance between samples of all classes (stratified equal sampling)
 - is useful when a population's characteristics are diverse and you want to ensure that every characteristic is properly represented in the sample set
- Exclude mixed pixels (mainly at polygon borders)
- Exclude unrepresentative (e.g. small) polygons

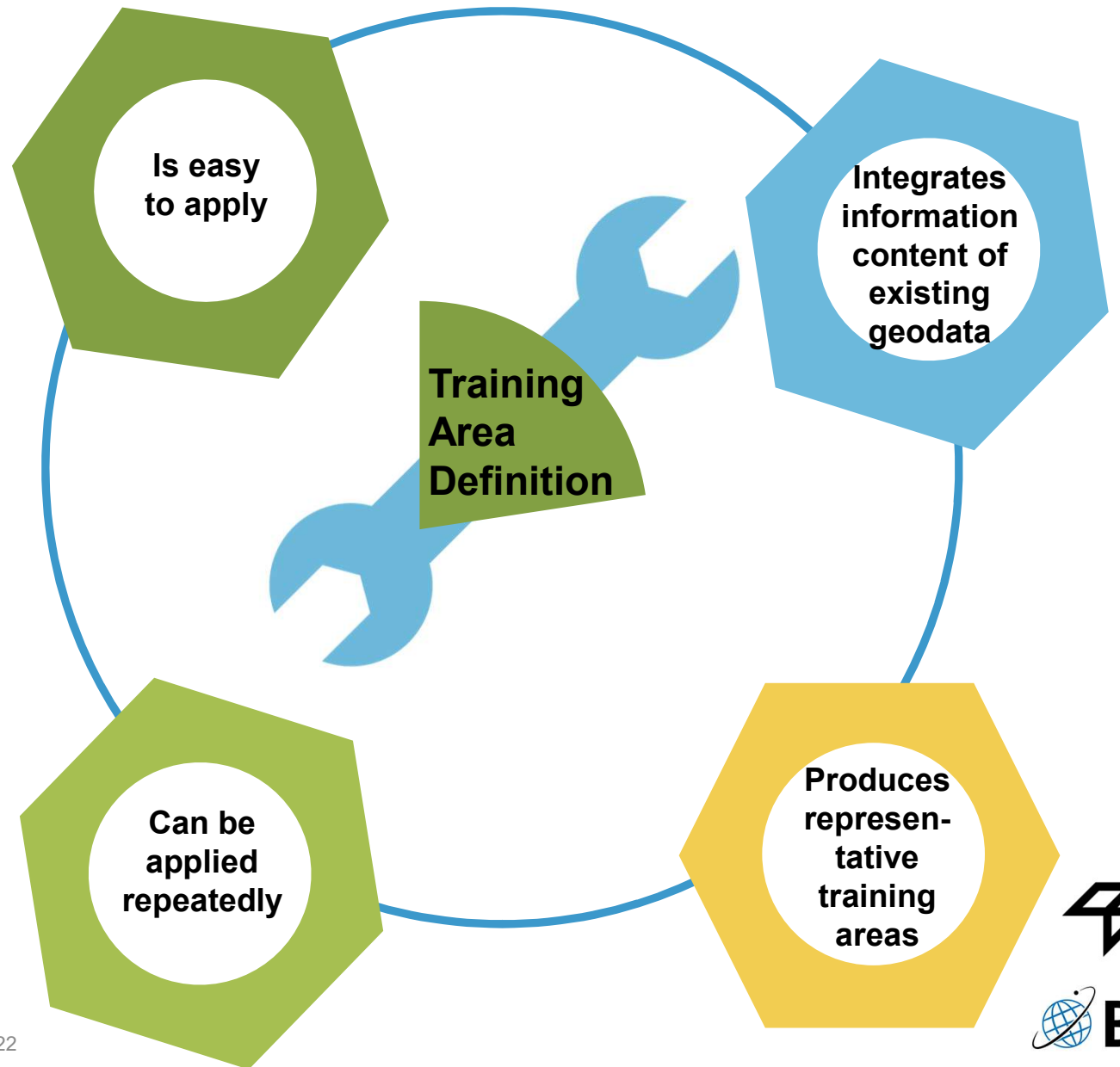
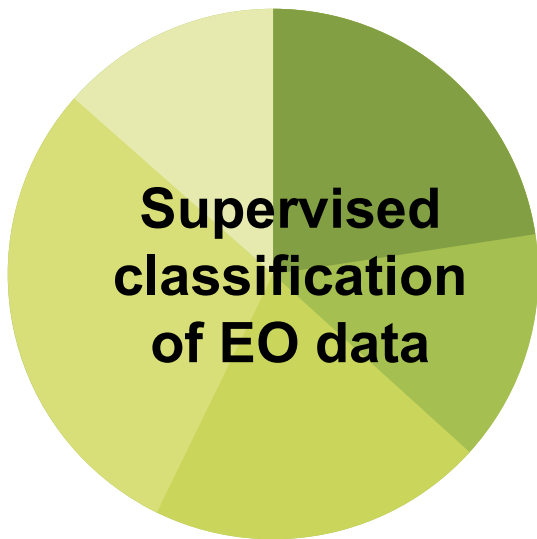


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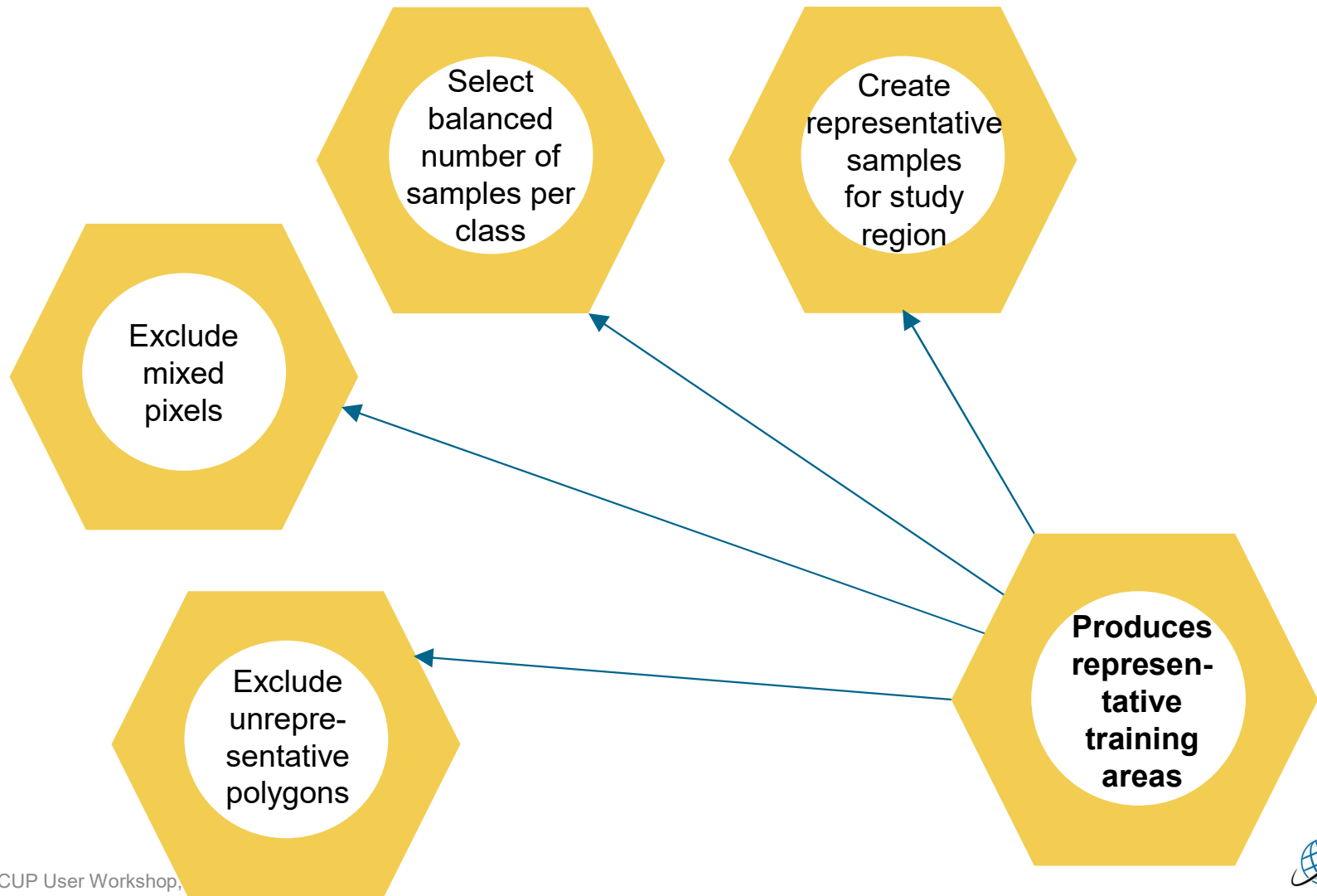


BKG

A Tool for Training Area Definition – User Requirements



Selection of Training Areas (Sampling) – Requirements



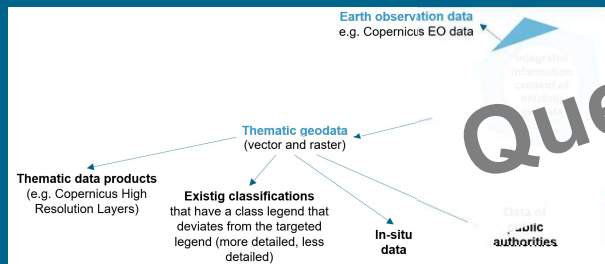
FPCUP Tool for Training Area Definition

Stage 1



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- Integration of existing geodata

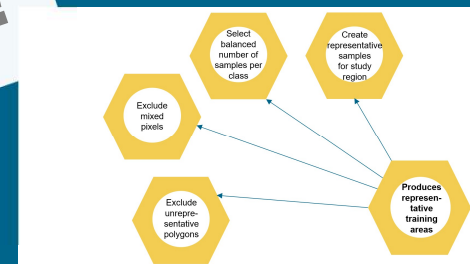


Stage 2



Selection of training areas (sampling)

- Produce representative training areas



Questions?

