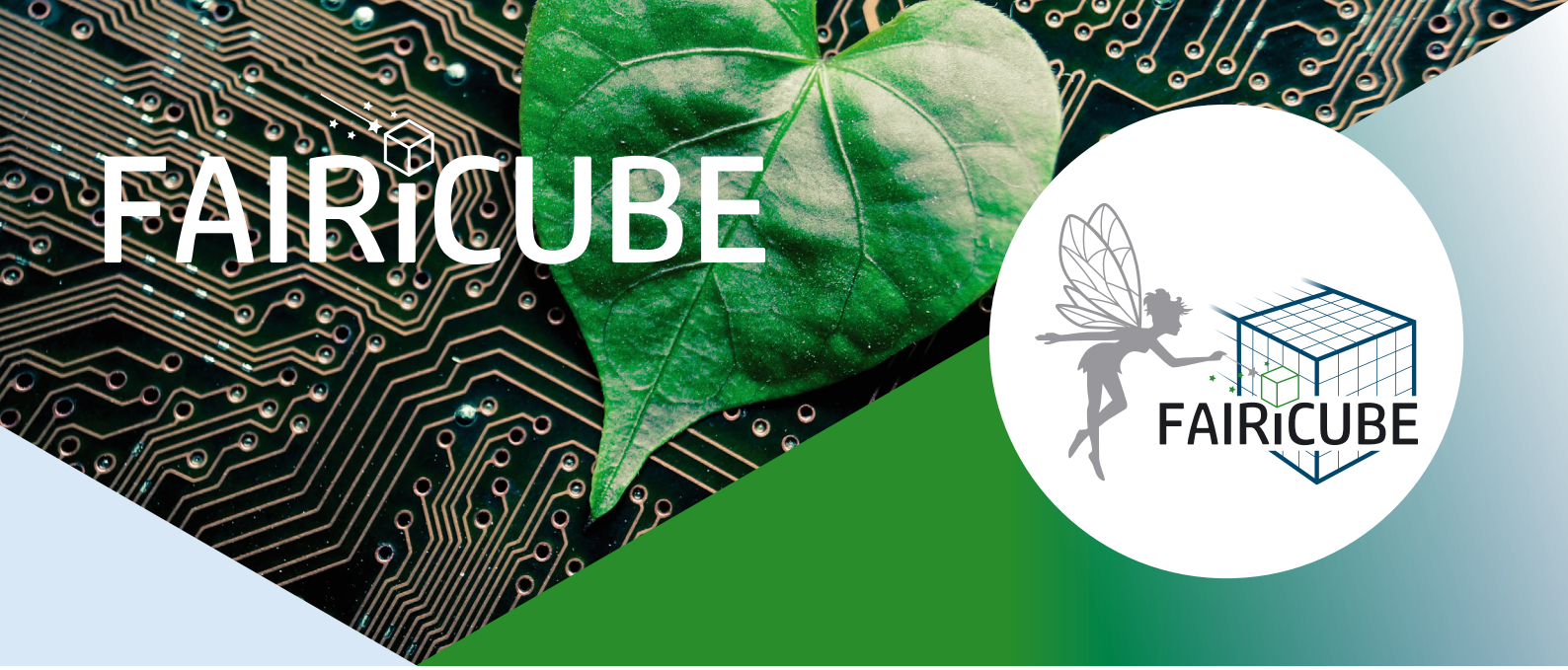

Deliver the power of data cubes and machine learning (ML) to decision/policy makers and data scientists.

Why FAIRiCUBE?

There is an ever-increasing amount of earth observation data available, largely in the form of data cubes. The relevant data formats are quite mature, data is (at least partially) freely available, various data processing libraries as well as visualization and data storage tools have been developed. Additionally, compute platforms can be used, they scale well and are becoming affordable.

Despite these relevant evolvements, non-EO experts who would greatly profit by integrating these resources into their work are still struggling to make full use of the available data as well as relevant analysis and processing tools. Diverse aspects continue to confound potential users, such as:

- How to connect different data sources with storage & compute resources? What if you bring your own data?
- What computational aspects must be considered when dealing with gridded spatiotemporal data?
- How can we share tooling such as (trained) machine learning models?
- How do we visualize and share the results with the relevant stakeholders?
- How can we properly document what processing has been applied to the data? How can we include this essential provenance information?

Our vision

Within FAIRiCUBE, we demonstrate a harmonized data space, the FAIRiCUBE Hub, where we connect all the pieces required for a data science pipeline into a user-friendly framework, where everything is FAIR (Findable, Accessible, Interoperable, Reusable) and TRUSTable (Transparency, Responsibility, User focus, Sustainability, and Technology). In this manner, we illustrate how the Green Deal Data Space (GDDS) could be formed pertaining to gridded data and the analysis thereof.

Objective

The objective of the FAIRiCUBE project is to enable players from beyond classic Earth Observation (EO) domains to provide, access, process, and share gridded data and algorithms in a FAIR and TRUSTable manner.

FAIRiCUBE

FAIRiCUBE HUB

The FAIRiCUBE Hub is a crosscutting platform and framework for data ingestion, provision, analysis, processing and dissemination, tightly integrated to the common European data spaces. As such, the FAIRiCUBE Hub is intended to support domain experts and data scientists to access and analyze pre-processed data without being burdened by technical issues.

It aims to provide an overview of data and processing modules readily available to unleash the potential of environmental, biodiversity and climate data. Potentially, every scientist or decision maker that works with regular discretized spatiotemporal data can benefit from FAIRiCUBE Hub. This way, the power of data cubes and ML can be unlocked for a wider community. All the elements of the FAIRiCUBE Hub already exist, for example as part of community tools like GitHub or commercial solutions provided through our data cube collaborators rasdaman and EuroDataCube/EOX. We nevertheless need to make sure these elements are interoperable. Like puzzle pieces fitting together, each piece much seamlessly slot into the next piece; where this is currently not possible, we develop shims to enable such seamless integration. Our vision is to define, standardize and if required create these connections.

Use cases

Five Use Cases have been designed to illustrate how data-driven projects can benefit from cube formats, infrastructure, and computational benefits. The requirements from these Use Cases will drive the development of the FAIRiCUBE Hub. The use cases address different aspects such as:

- EU green deal action items
- different scales (urban / regional)
- pilot cities (Barcelona, Vienna, Oslo, Luxembourg)
- using different objectives and technical platforms

The five use cases are

Urban adaptation to climate change (urban focus)

Biodiversity and agriculture nexus (regional focus)

Validation of Phytosociological Methods through Occurrence Cubes (urban/regional focus)

Analysis of genetic drift in Drosophila melanogaster (regional focus)

Spatial and temporal assessment of neighborhood building stock (urban focus)

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