

WEBINAR

# Geospatial trends 2023: Opportunities for data.europa.eu

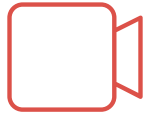
The logo for Data.europa academy is located in the bottom left corner. It features a large orange circle with a smaller white circle inside it. The text "data.europa academy" is written in white lowercase letters within the white circle. The word "data" is on the top line, "europa" is on the middle line, and "academy" is on the bottom line. There are small orange dots above the 'a' in "data" and above the 'o' in "europa".

data.  
europa  
academy

8 September 2023

10.00 — 11.30 CET

# Rules of the game



The webinar will be recorded



For questions, please use the ClickMeeting chat.



Please reserve 3 min after the webinar to help us improve by filling in our feedback form

# Introduction



**Inmaculada Farfan  
Velasco**  
Project Manager,  
Data.europa.eu,  
Publications Office of  
the EU



**Antje Kügeler**  
*con terra*  
Consultant  
Spatial Data Infrastructures



**Dr. Christopher Britsch**  
*con terra*  
GeoAI Lead  
*con terra* Technologies



**Dr. Simon Jirka**  
*52°North*  
Managing Director

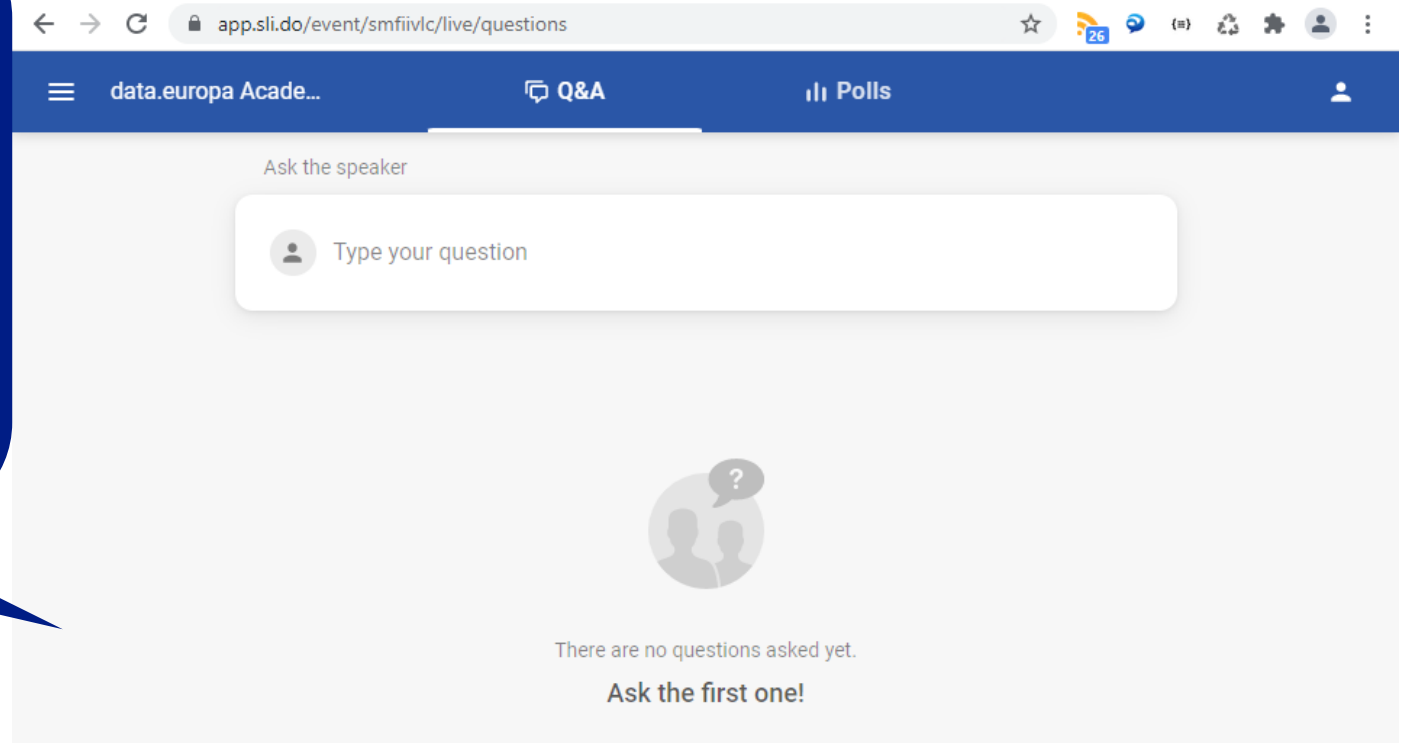
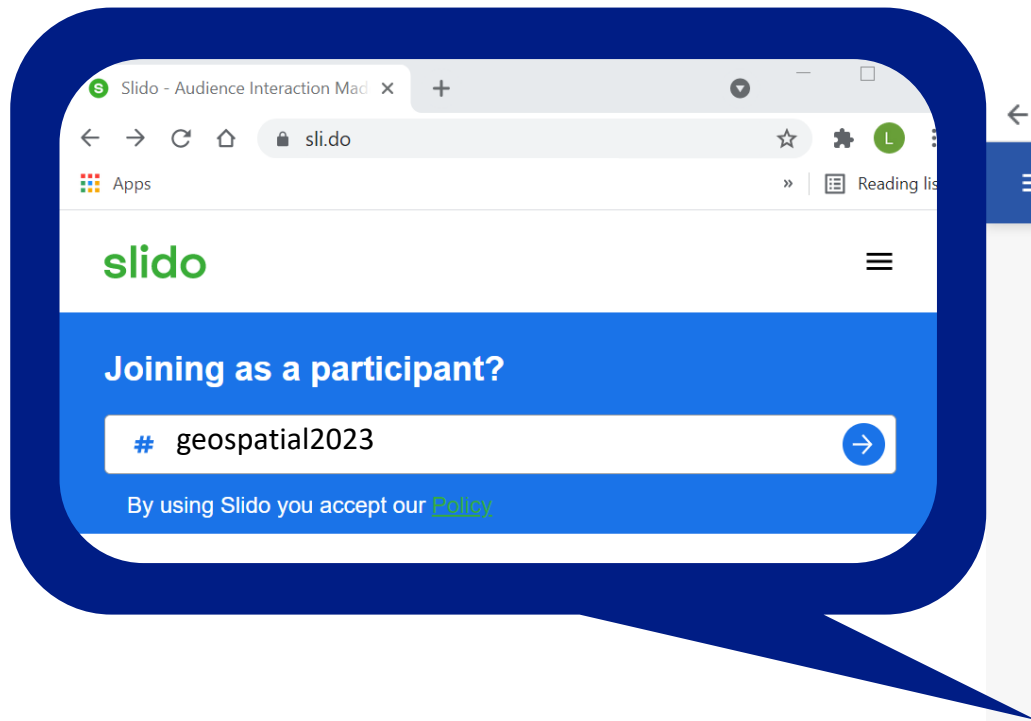


**Dr. Benedikt Gräler**  
*52°North*  
Managing Director

# Agenda

10.00 – 10.05	Welcome and introduction
10.05 – 10.15	Warm-up: What current trends regarding geospatial topics come to mind?
10.15 – 10.45	GeoAI- Artificial Intelligence for geospatial insights
10.45 – 10.55	Q&A
11.20 – 11.25	Summary and next steps
11.25 – 11.30	Closing

# Ask your questions in sli.do using the code *geospatial2023*



# Goal of this Webinar

- Explain a current trend in the geospatial community
- Discuss:
  - What opportunities for data.europa.eu might arise from these trend?
  - How can data.europa.eu benefit from and support the new trend?

# data.europa.eu

- Single access point to open data in Europe
- Includes metadata from 179 catalogues
  - Open Data Portals and **Geoportals**
- from 36 countries
- Descriptions of more than 1.5 Mio. datasets
- Strategic objective is to improve accessibility of open data



The screenshot shows the homepage of data.europa.eu. At the top left is the European Commission logo. At the top right are 'Log in' and 'English' links. Below the header is a navigation bar with 'Home', 'Data', 'Academy', 'Community', 'Publications', and 'Documentation'. The main banner features the title 'European Single Access Point: harvesting guidelines' and a 'Find out more' button. Below the banner is a search bar with a 'Search' input field, a 'Datasets' dropdown menu, and a search icon. At the bottom, there are six statistics cards: '1 532 558 Datasets', '179 Catalogues' (circled in red), '36 Countries', '1 424 News pieces', '199 Data stories', and '11 Courses'. Each card includes a brief description of the category.

Category	Count
Datasets	1 532 558
Catalogues	179
Countries	36
News pieces	1 424
Data stories	199
Courses	11

# geospatial data

- Data often has a *location* component
- Geodata contains information on properties that are linked to a position on earth
- The geospatial context will often uncover interesting revelations
- Information on the *where* often makes data more meaningful

## Formats

GML, KML, ArcGIS Map Previ	
ArcGIS Map Service, WFS, W	
<input checked="" type="checkbox"/>	KML 789
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# What's a trend?

A trend is a *“general development or change in a situation or in the way that people are behaving”*

(quoted from Cambridge Dictionary)

<https://dictionary.cambridge.org/dictionary/english/trend>

# Warm-up

What current trends regarding geospatial topics come to mind?

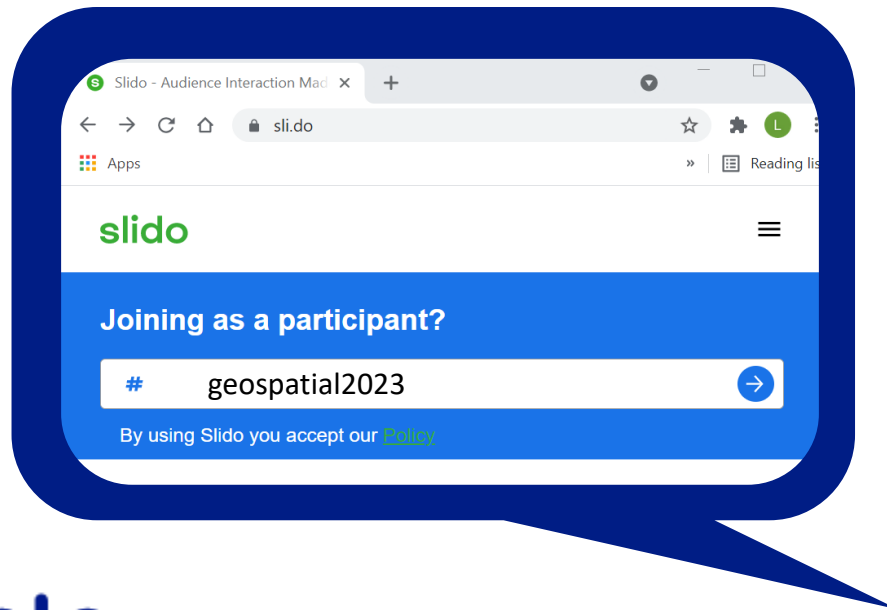


Photo by [Jeffrey F Lin](#) auf [Unsplash](#)

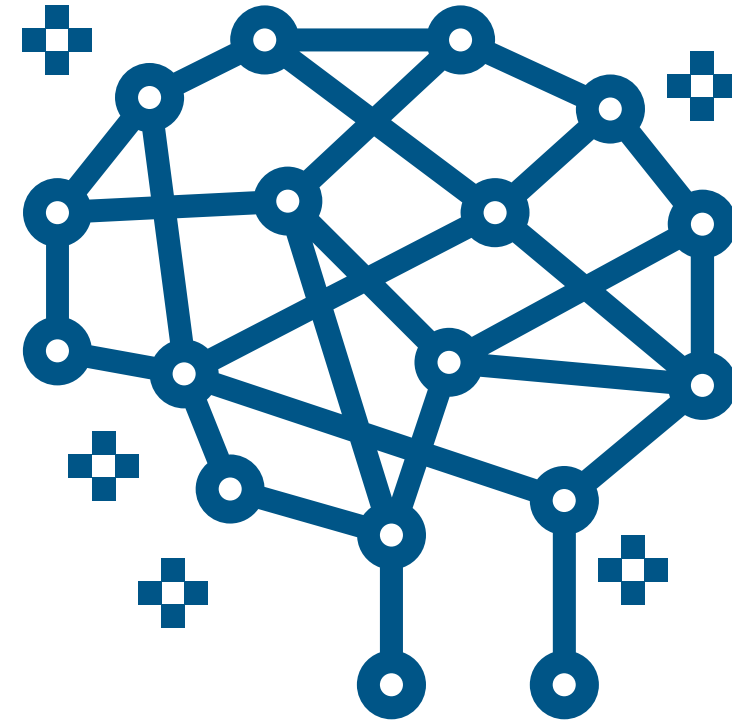
# Trends in working with geospatial data

Trend to be discussed today: GeoAI – Artificial Intelligence for geospatial insights

- Introduction to GeoAI
- Examples of using GeoAI

# GeoAI - Definition

GeoAI is a **Machine Learning technology**, which enables the caption and analysis of **complex patterns and structures** in (geospatial) data.



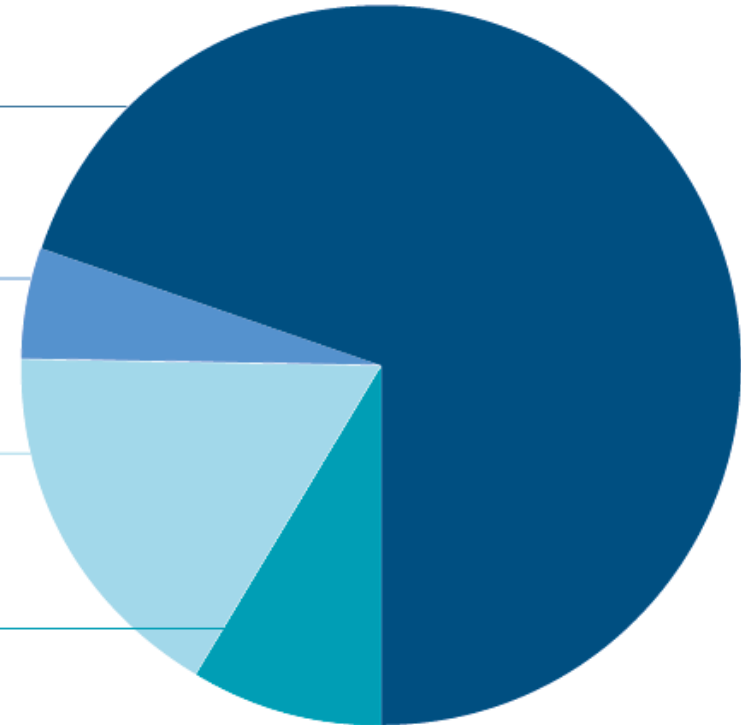
# Setup of a „typical“ GeoAI-Project

Data Preprocessing

AI Methods

Integration and Operation

Visualization and Application

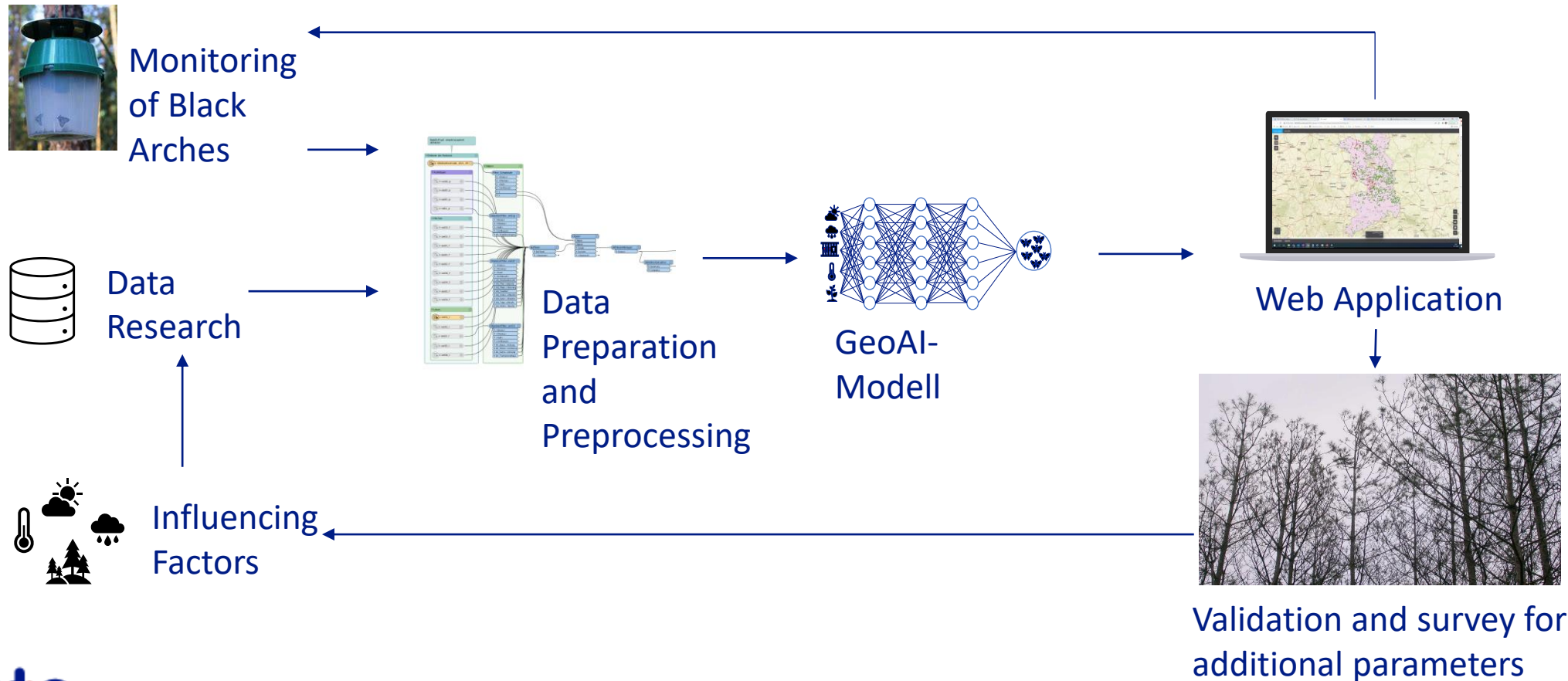


# KINoPro

- Research Project of University of Dresden and con terra
  - Data from state forestries Brandenburg and Saxony
- Climate Change Influence
  - Trees struggling with dry and hot weather
  - Forest pests (Black Arches moths) adapt faster than plants
    - Irregular population growth/appearance
- Forestry personnel needs to be managed more efficiently
  - New prediction models are necessary

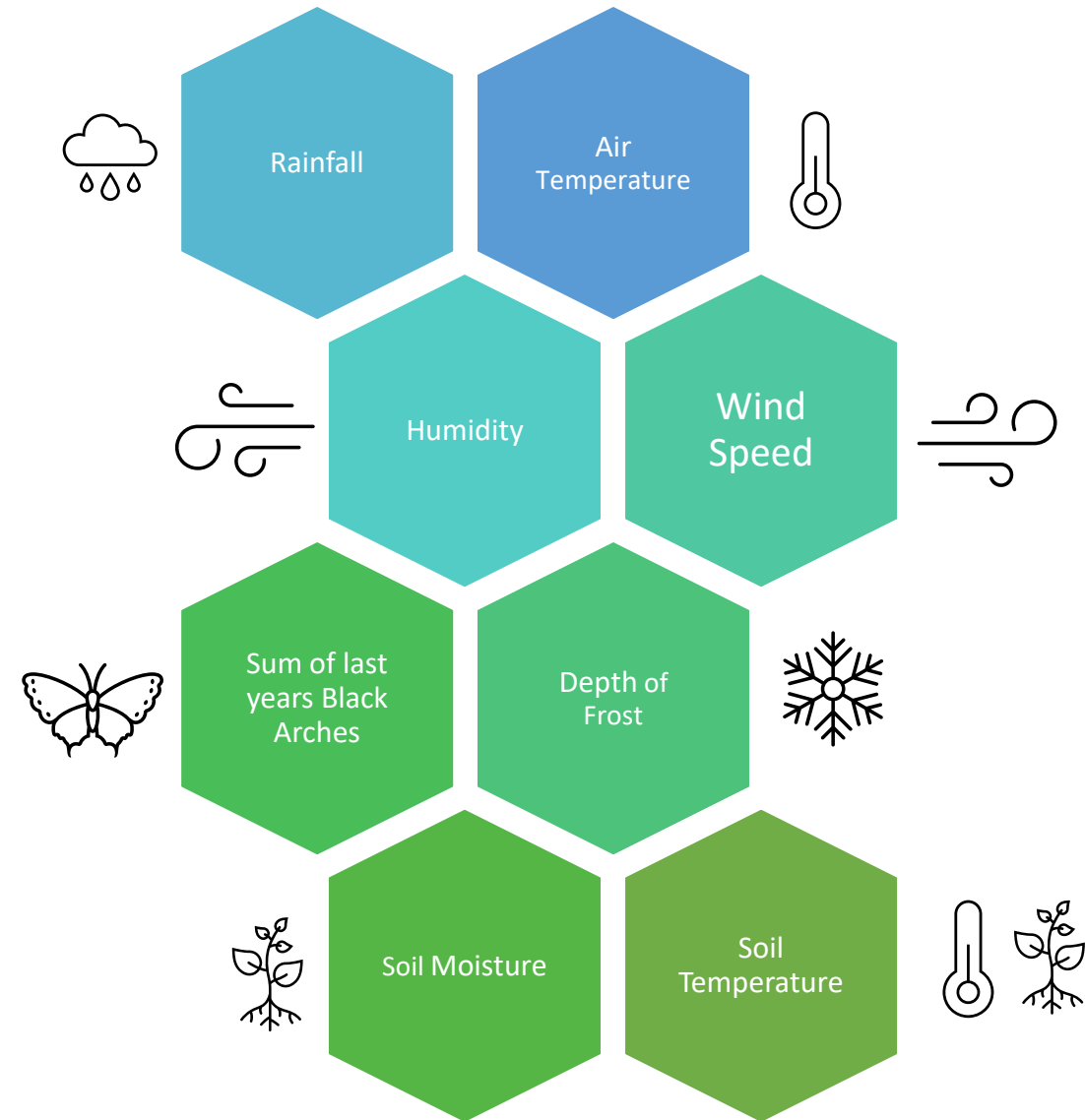


# KINoPro - Approach and Overview



# KINoPro - Parameters

- Target Variable:  
Moth Count per Year
- Additional Information:
  - Land Cover Classification
  - Altitude
  - Slope
  - Trap Alignment





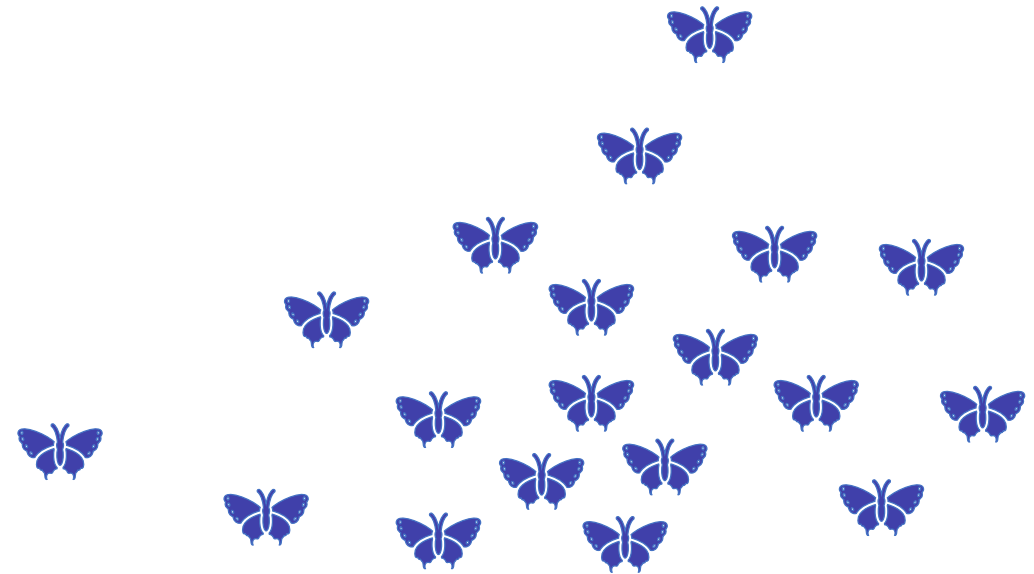
# KINoPro - Output



4 weeks prior to  
moth activities



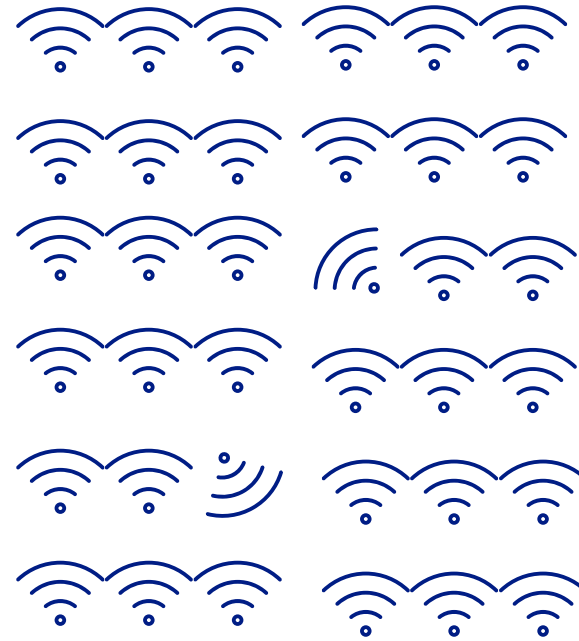
June 15<sup>th</sup>



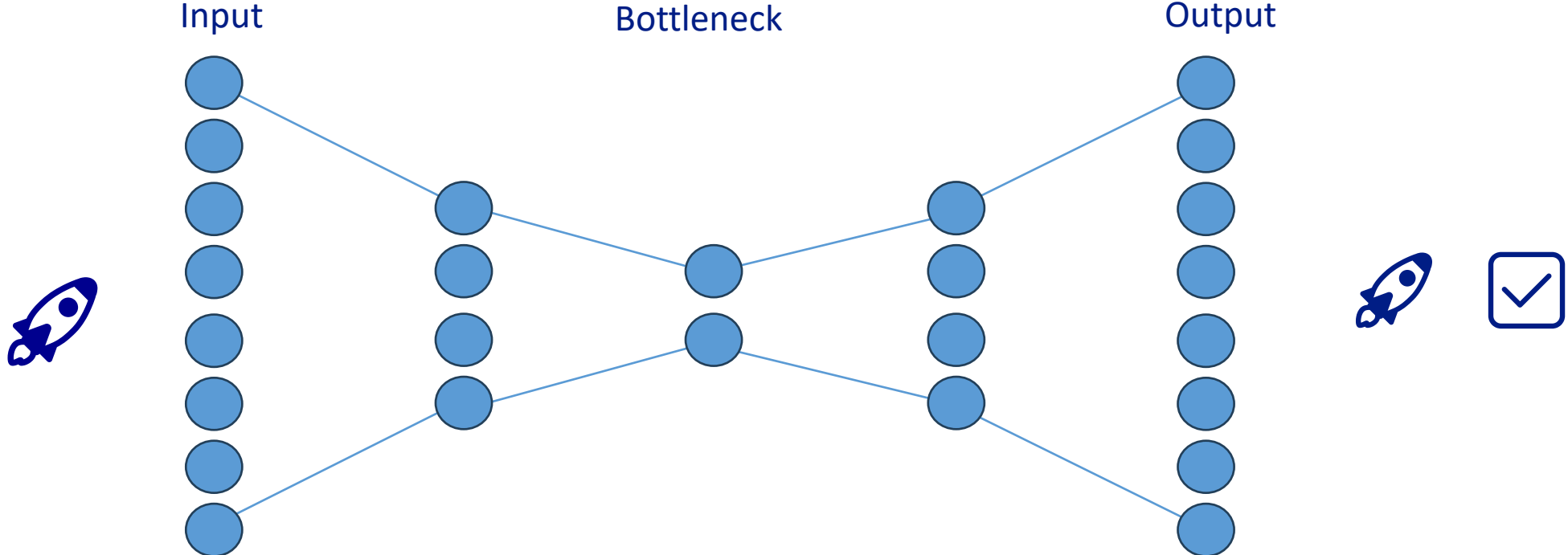
August 16<sup>th</sup>

# Anomaly Detection in Cellular Towers

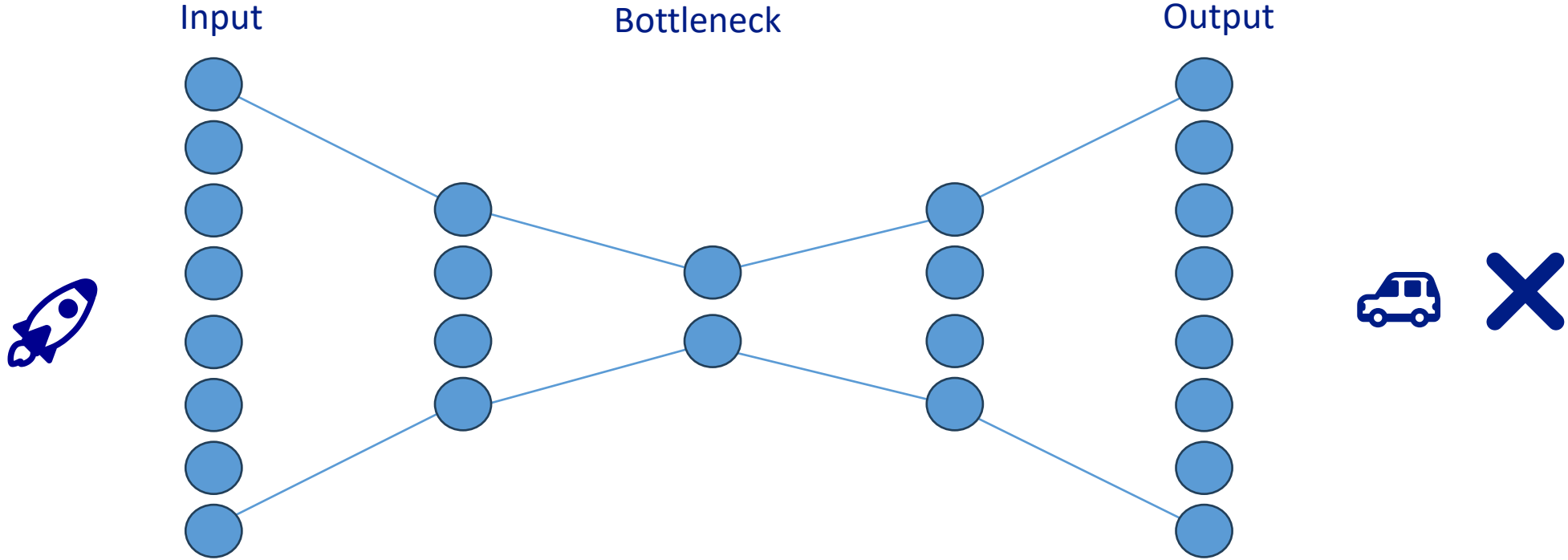
- Cellular tower data contains errors/anomalies that are difficult to detect
- Complex Data
  - Large number of parameters, different scaling
- Multidimensional Spectrum
  - „Seeing“ Anomalys often impossible
- GeoAI-Solution:
  - Artificial Neural Network detects Anomalys
    - No preset rules needed
    - LSTM layers allow viewing time series



# Anomaly Detection in Cellular Towers



# Anomaly Detection in Cellular Towers



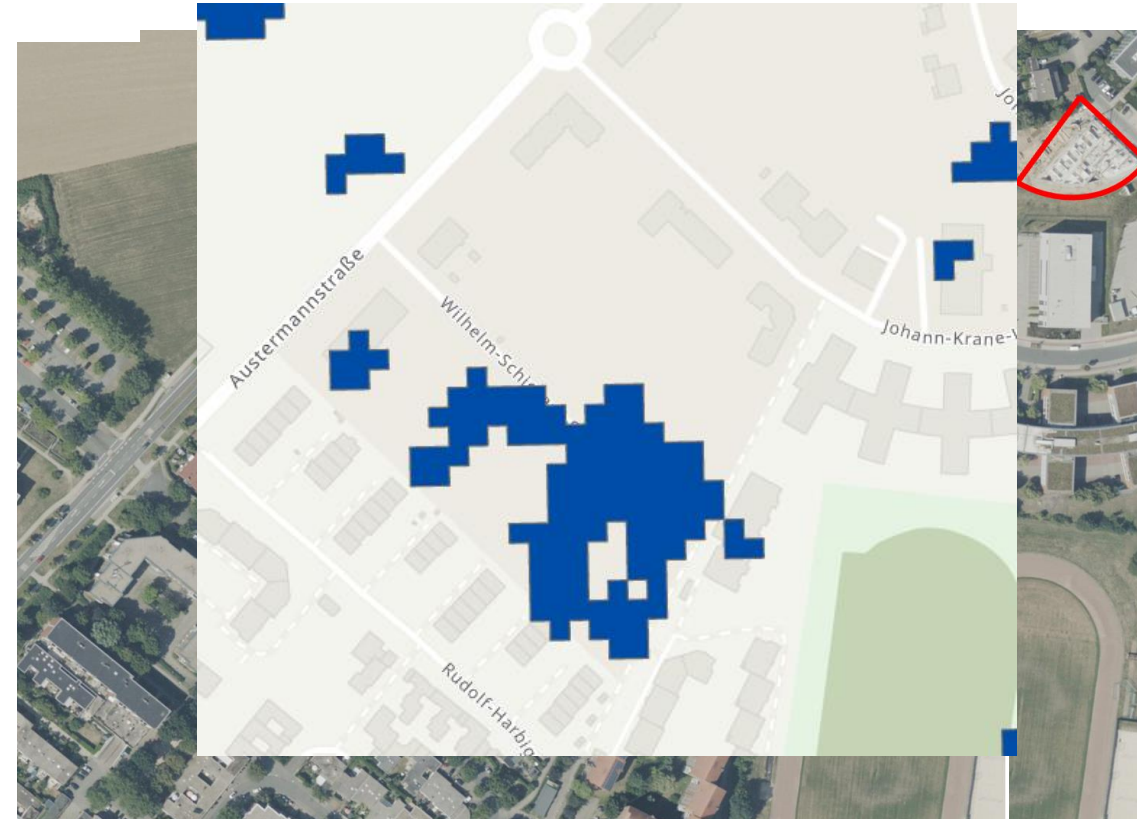
# Detection of Building Areas

- New building areas are interesting for marketing and sales
  - Manual search is resource and time consuming
  - Information is needed as early as possible
- GeoAI-Model uses only Open Data
  - Copernicus Sentinel-2 Data
  - Building Footprints (open.nrw)
  - DLM (open.nrw)



# Detection of Building Areas

- Interaction of two models
  - Model 1 detects potential changes
  - Model 2 analyses changes and predicts if the changes are due to building activities
- Models are built on Data from March to May (typical building phases)
  - For detection in other phases, new models would need to be trained





# MariData

- Goal: Reduction of maritime transport emissions by 10% through hydrodynamically optimal ship operation and routing
- Partners
  - Hamburgische Schiffbau-Versuchsanstalt GmbH
  - AVL Deutschland GmbH
  - DSL Entwicklungszentrum für Schiffstechnik und Transportsysteme e.V.
  - Friendship Systems AG
  - Technische Universität Berlin
  - Technische Universität Hamburg
  - 52°North Spatial Information Research GmbH
  - Universität zu Lübeck
  - Maritimes Zentrum der Hochschule Flensburg
  - Carl Büttner Shipmanagement
  - AVL Software & Functions



Photo by Fabius Leibrock on Unsplash

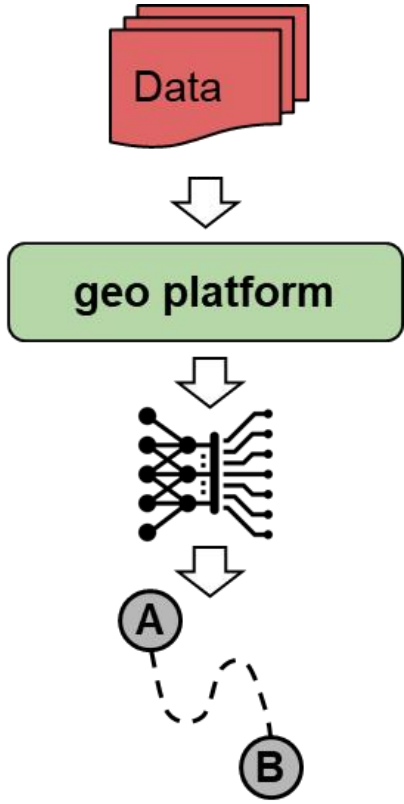
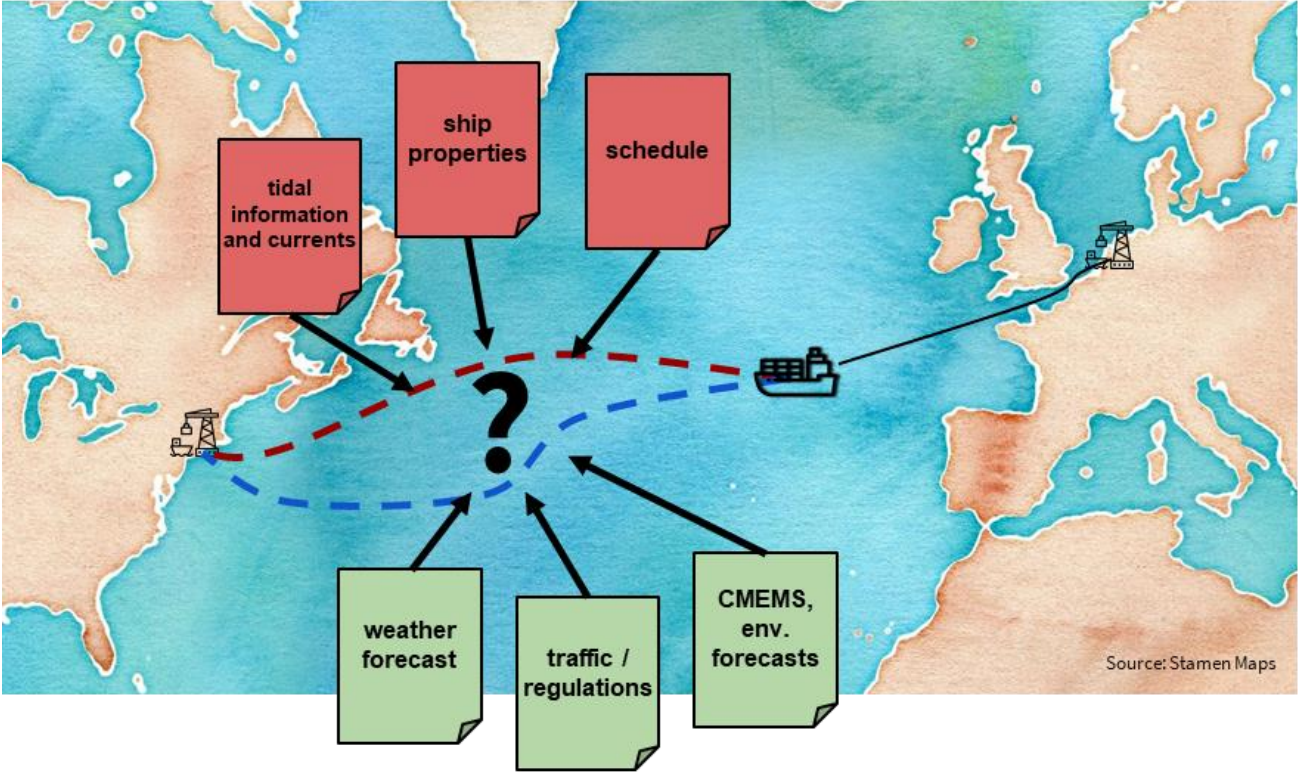
MARI  DATA

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Federal Ministry  
for Economic Affairs  
and Energy

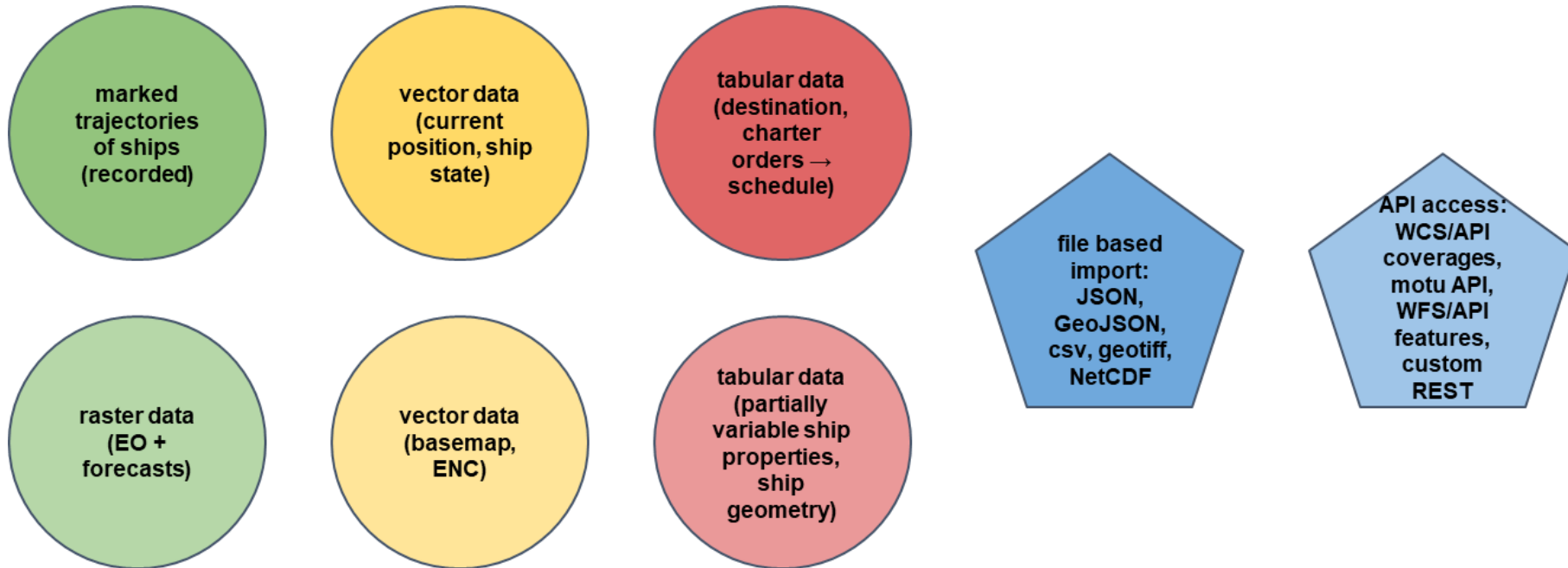
# MariData





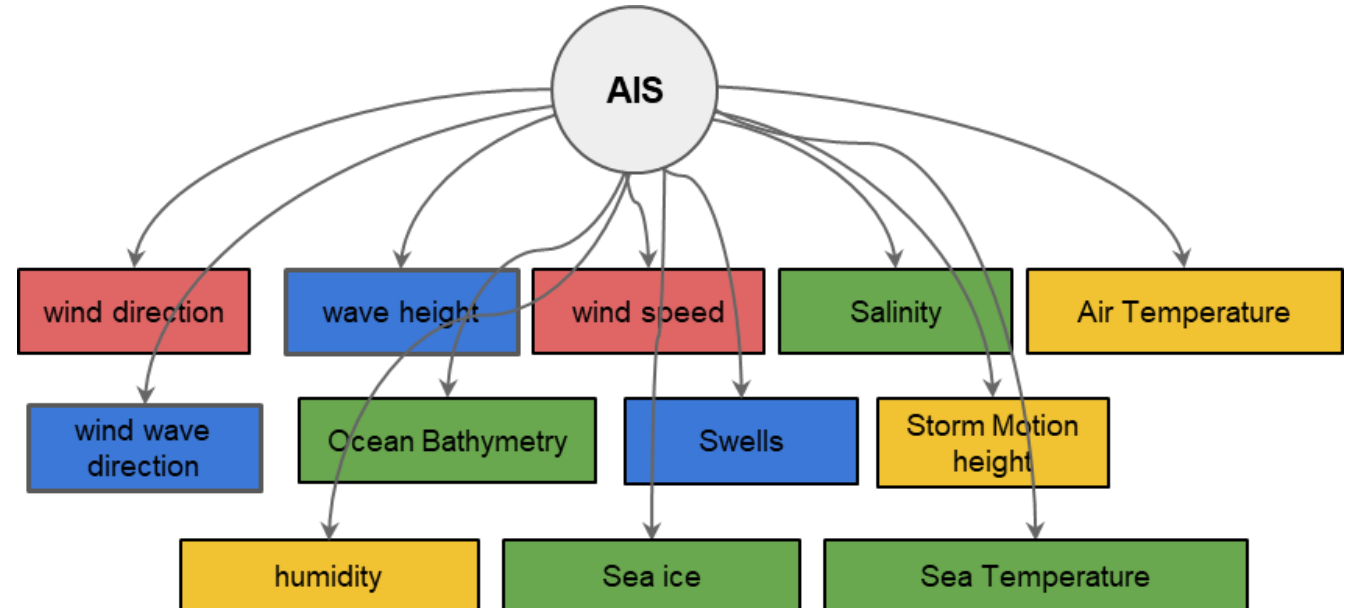
# MariData

- Data demand and sources



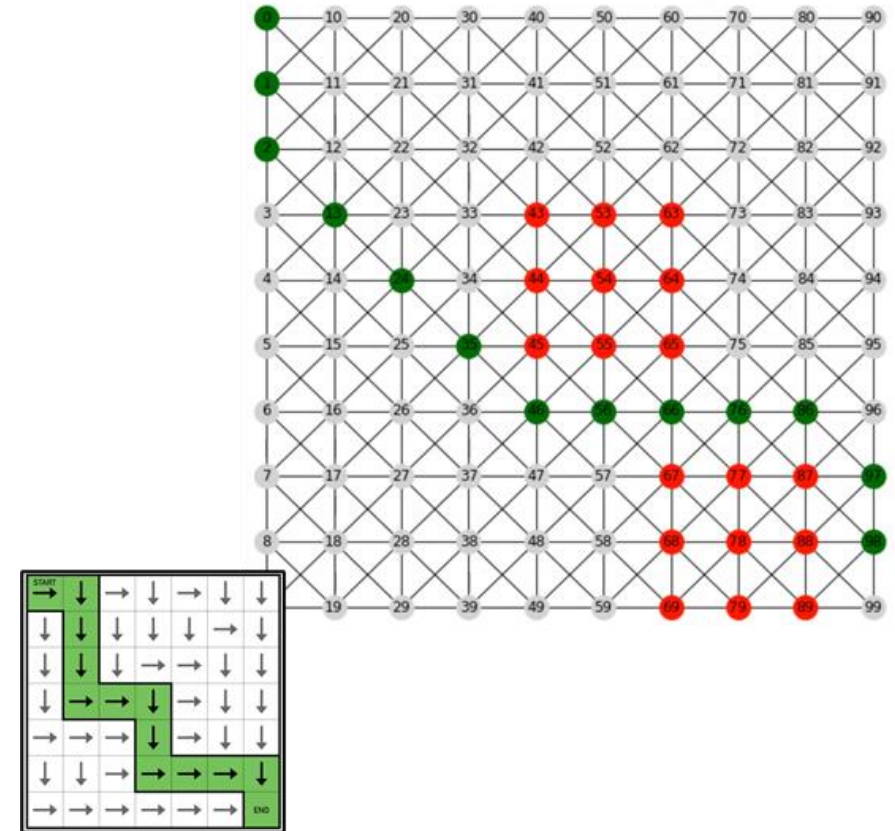
# MariData

- Geodata preparation
  - Intersection of AIS data (ship tracking) with environmental conditions
  - Basis of the ML modelling



# MariData

- AI-based routing
  - Routing across different cost surfaces
  - Comparison of different algorithms
- Multi-objective optimization problem
- Criteria:
  - Travelled distance and velocity
  - Approximate fuel consumption
  - ETA
  - Safety constraints



# MariData

- Data is a key factor for the success of the project
- Discovery of suitable data sets is critical
- Provision standardised data access interfaces (APIs) and formats massively facilitates data integration --> increased value of the data

# KI:STE

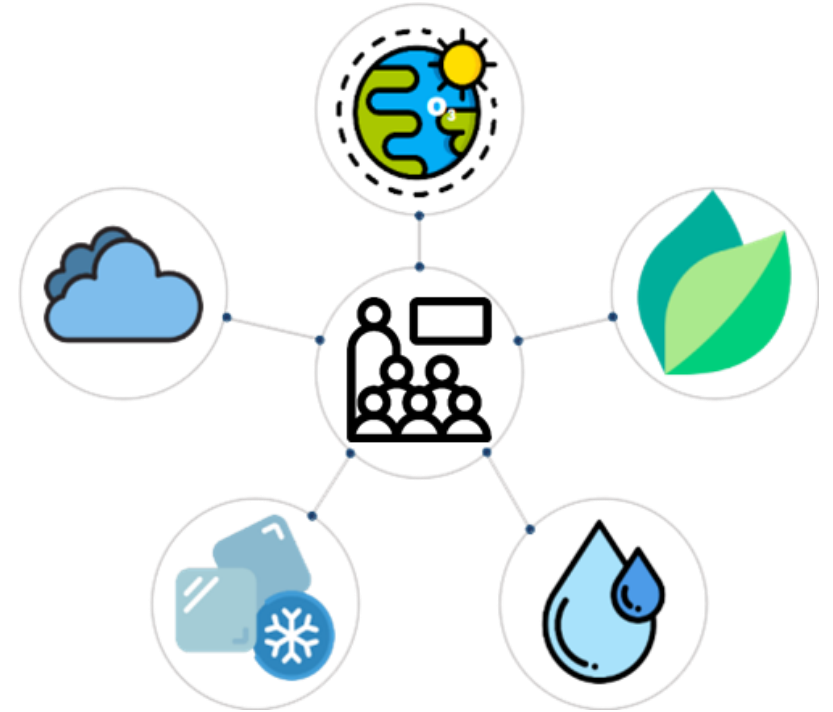
- Bridging the gap between domain knowledge and infrastructure
- Partners:
  - FZ Jülich
  - University of Cologne
  - RWTH Aachen
  - University of Bonn
  - Ambrosys GmbH
  - 52°North Spatial Information Research GmbH



is funded by

# KI:STE

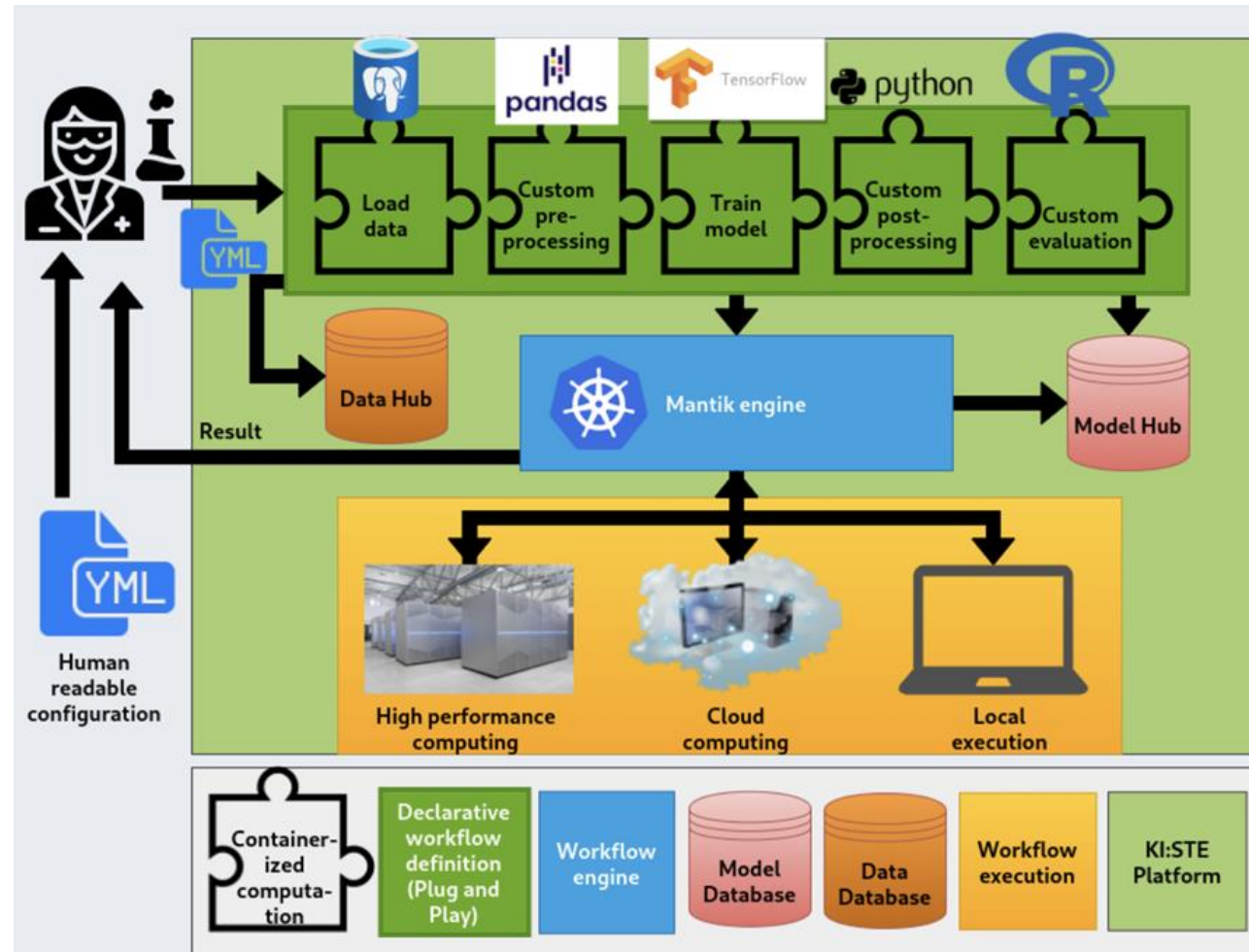
- Challenges
  - Access across different data providers
  - Support of different analytical infrastructures (local, cloud, high performance cluster)
  - Different fields of application
  - Storage of trained models
  - Versioning of data and models
  - E-learning platform for domain experts



# KI:STE

- Use cases
  - **Wilderness:** sensitive concepts for wilderness by classifying Sentinel-2 images into (non-)protected areas
  - **Biogenic emissions:** unsupervised methods in estimating biogenic emissions from Earth Observation
  - **Hazard prediction:** hazard mapping workflow that incorporates both physics-based models and machine learning algorithms based on heterogeneous data sources
  - **Hydrometeorological extremes:** AI methods for merging modelled and reanalysis/observational for quantification of hydrometeorological extremes
  - **Cloud variability:** self-supervised learning on Meteosat

# KI:STE

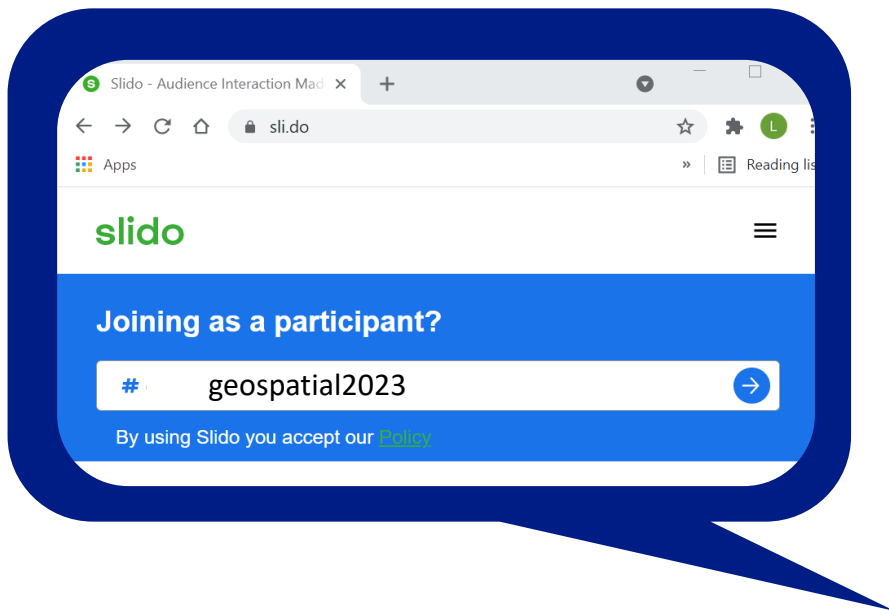




# Questions & Answers

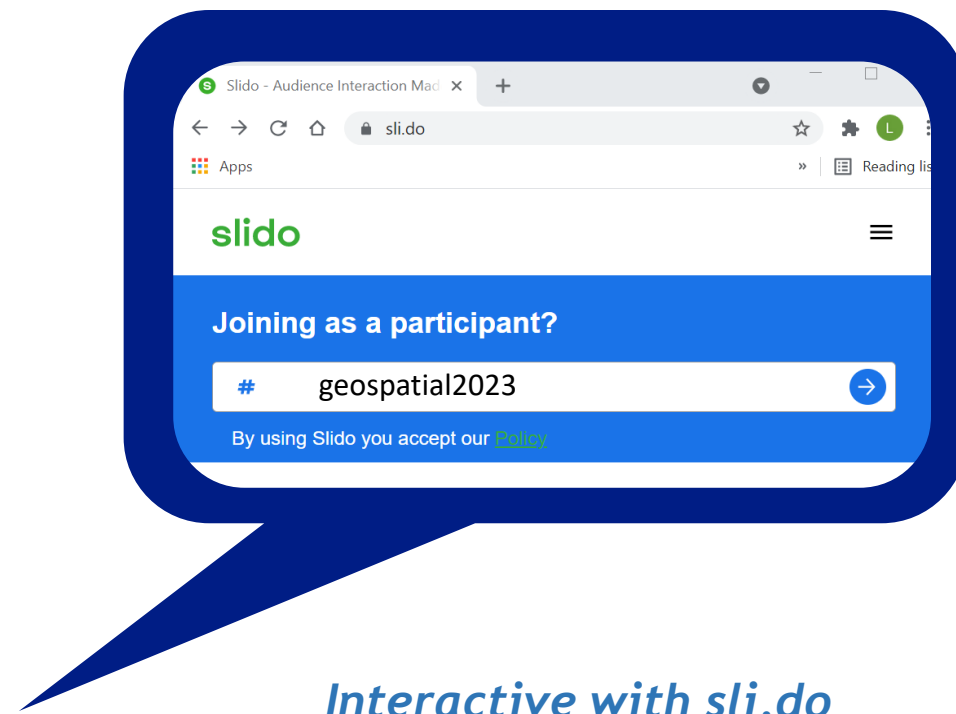


# Questions?



# Discussion

- What opportunities for data.europa.eu might arise from this trend?
- How can data.europa.eu benefit from and support GeoAI?



*Interactive with sli.do*

# Next steps

- Short report to be published

Link to last year's report:

<https://data.europa.eu/sites/default/files/course/Geospatial Trends 2022.pdf>

- Findings will provide input to further development of data.europa.eu

*Thank you!*

## Geospatial Trends 2022

*Opportunities for data.europa.eu from emerging trends in the geospatial community*

Stay up-to-date on our  
**2023 activities!**

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strategic data  
spaces



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15 September 2023  
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Open Data Maturity  
2022: Diving deeper  
into the policy  
dimension



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your feedback!





# Thank you

