EYWA
Early Warning System
for Mosquito Borne Diseases

EO creates opportunities for Health & Epidemics

EO based Early Warning System for Mosquito-Borne Diseases

An operational application in EU

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Earth Observation for Epidemics of Vector-borne Diseases / EuroGEO Action Group

EuroGEO

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EuroGEO

Action Group EO4EVIDence

(Earth Observation for Epidemics of Vector-Borne Diseases)

EYWA is a vision, a network, a European and even global standard

EYWA offers a scalable, reliable and sustainable early warning system, relying on Earth observation big data combined with entomological, epidemiological and socioeconomic data, to forecast and monitor Mosquito-Borne Diseases.

SUSTAINABLE DEVELOPMENT GOALS

3 GOOD HEALTH AND WELL-BEING

11 SUSTAINABLE CITIES AND COMMUNITIES

13 CLIMATE ACTION

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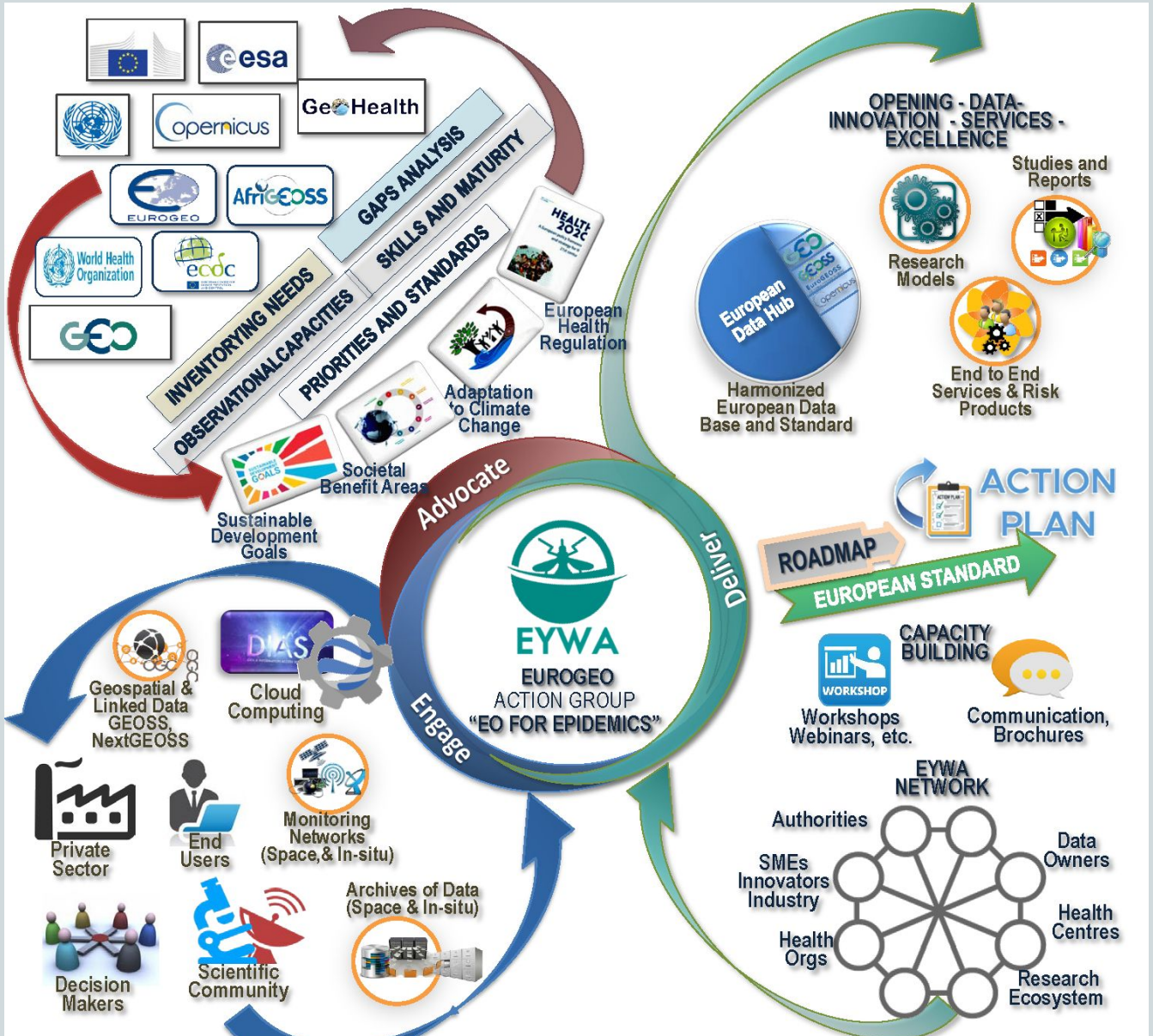
EYWA is built on the GEO triptych:

ADVOCATE
ENGAGE
DELIVER



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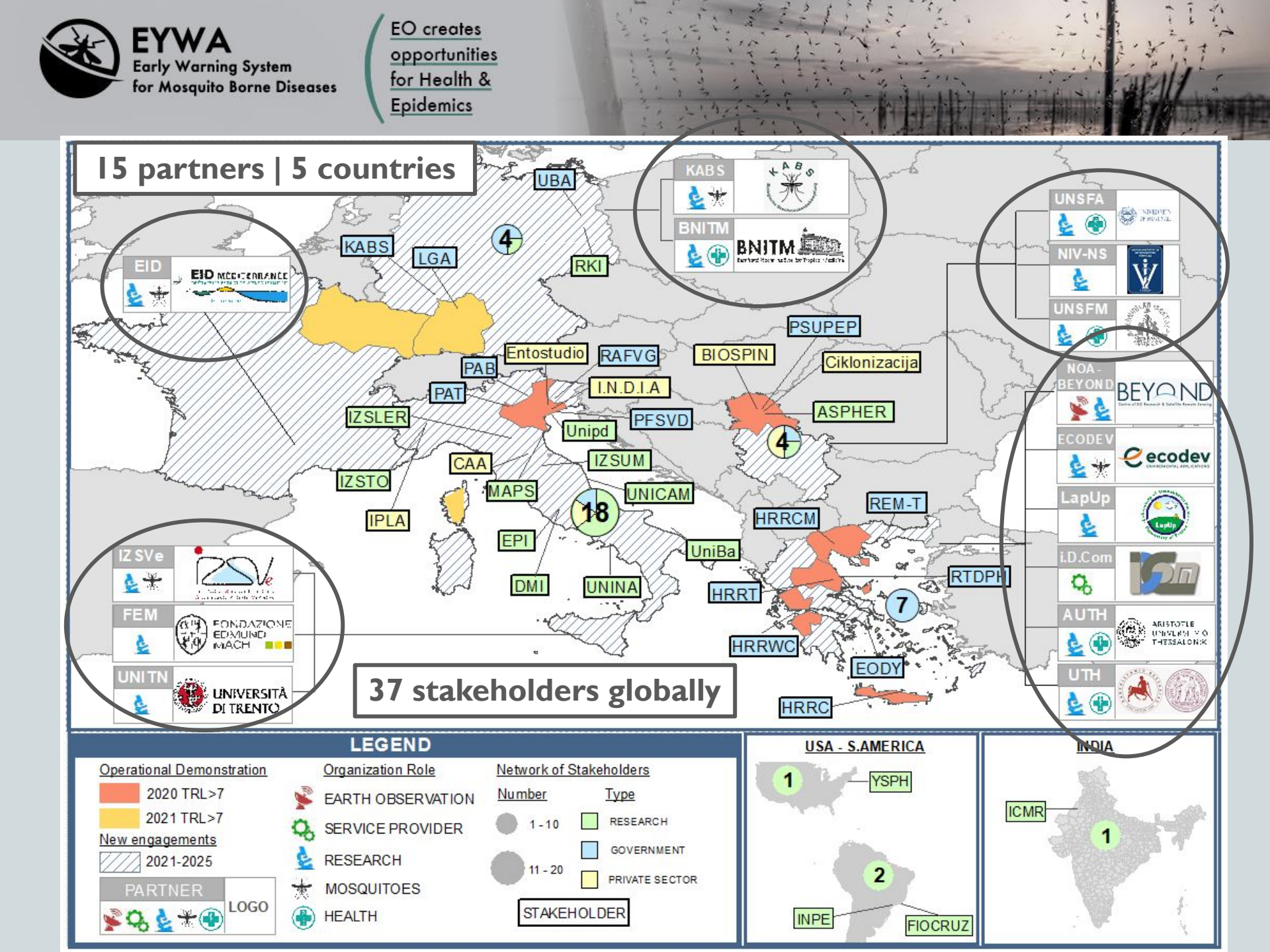

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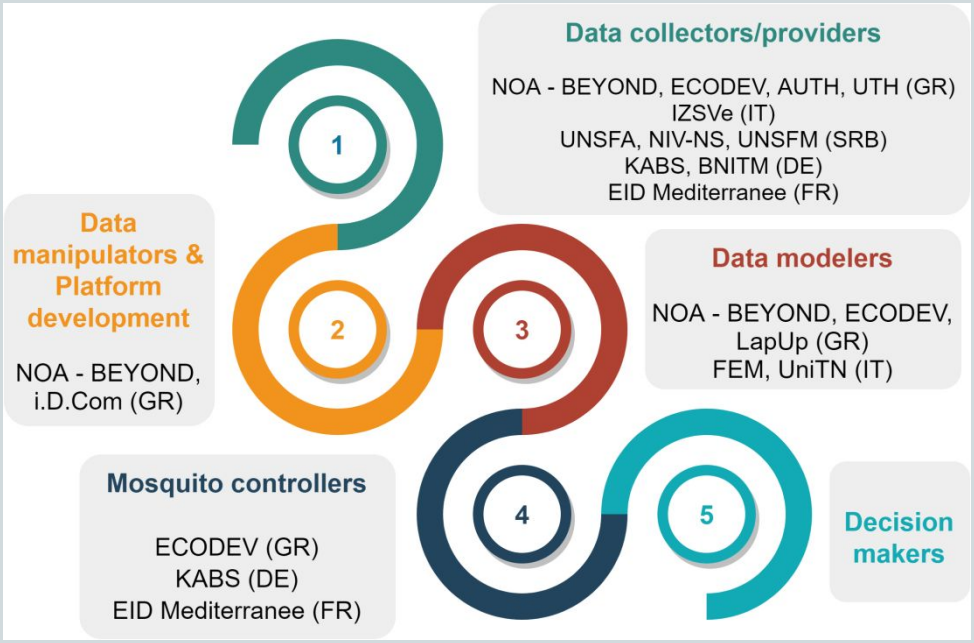
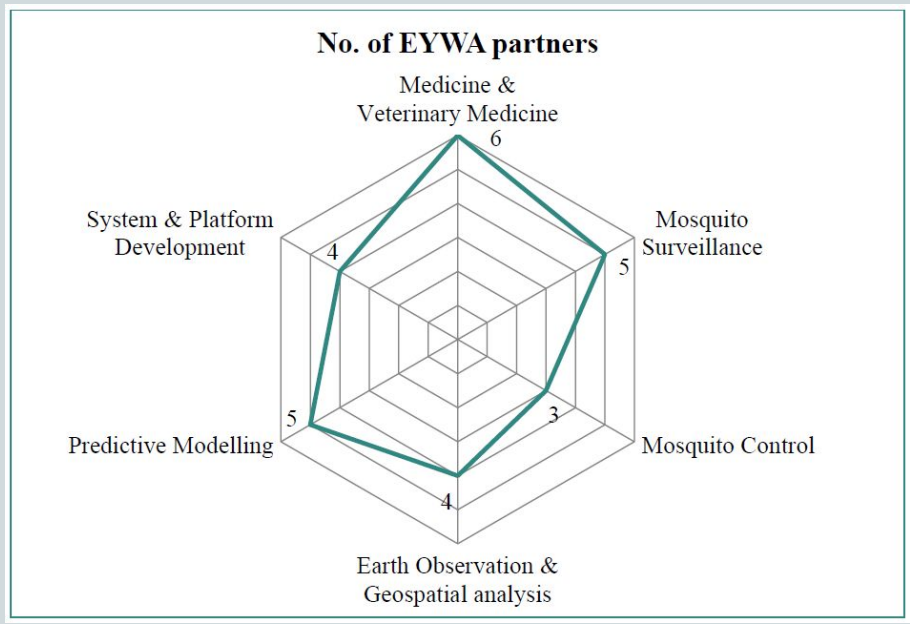
EYWA TEAM
"Together Everyone Achieves More"





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How EYWA competes

Free and open satellite Earth Observation and meteorological data

Open data

European technology

Copernicus Sentinels, CAMS, CLMS, CCS, CreoDIAS, GEOSS, Sentinels Greek Hub, Hellenic Mirror site

Streamlined and automated pipeline for EO, entomological, epidemiological and auxiliary data ingestion

Automation

Scalable

EYWA's generic models are designed to scale-up easily and were in pre-operational phase in 5 European regions

EYWA's generic and site-specific models can be transferred in multiple geographic regions

Transferable

Fully operational

EYWA is in successful operational use since April 2020 in Greece & Italy. From 2021 and onward, will be operational in more countries.

"EYWA is a robust and scalable Early Warning & Decision Support System that welcomes new partners from around the world to share data and transform scientific knowledge into decision-making & mosquito control actions"

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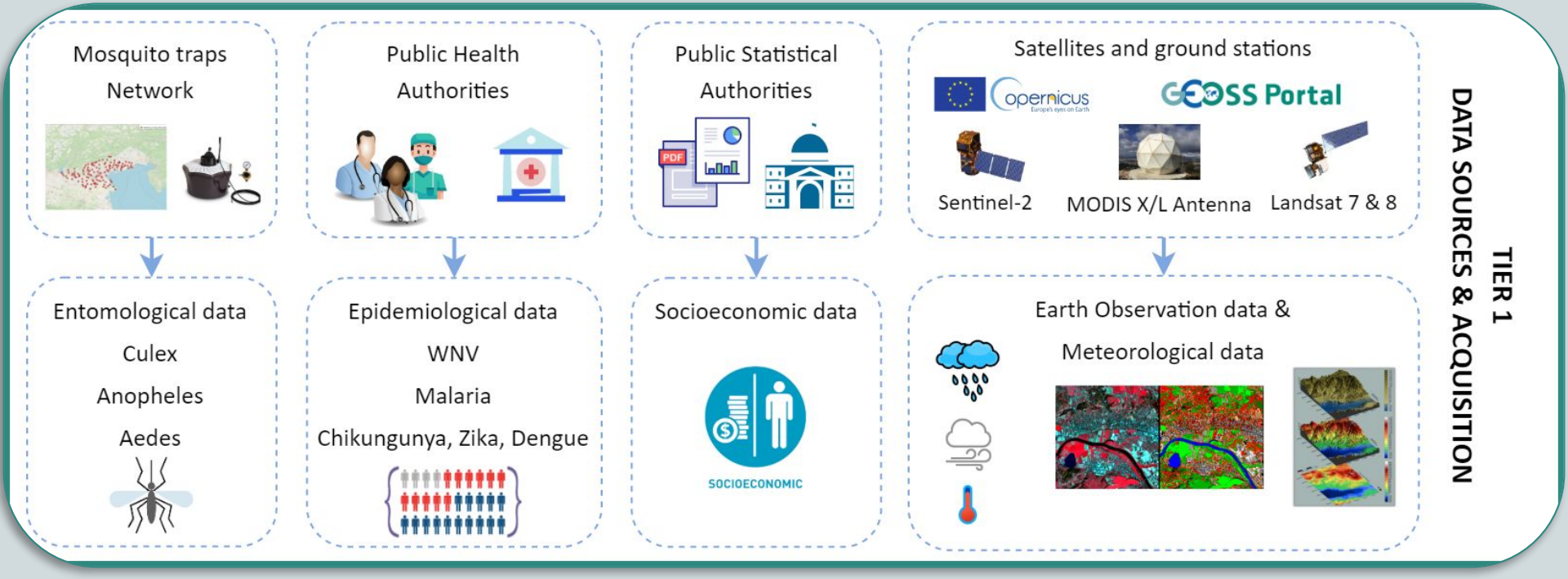
EYWA System Architecture



EYWA incorporates 10-years time-series of Copernicus (Sentinel-2) and other space-based data (Landsat-7 & -8, MODIS and ERA-5) in addition to in-situ entomological, epidemiological, socioeconomic and crowdsourcing data.

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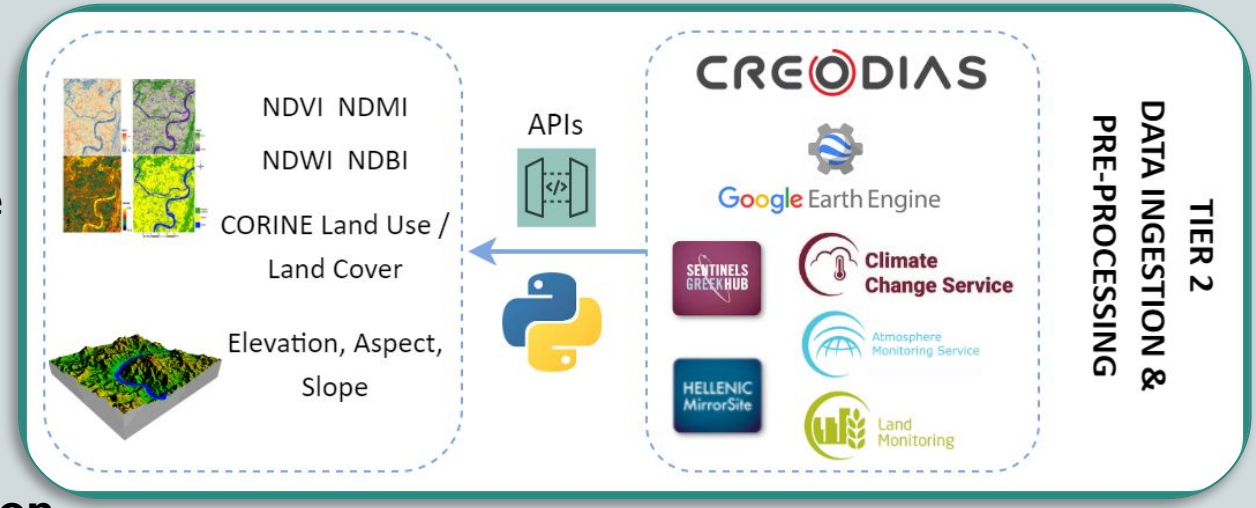
EYWA System Architecture

A suite of APIs is developed and publicly available through BEYOND-NOA's GitHub profile for automatic:

- **Data Harvesting**
- **Data Pre-processing**
- **EO-based indices derivation**



Satellite data harvesting and processing, exploiting European and non-European services:

- Umbrella Sentinel Access Point of the Hellenic Mirror Site (an API that constitutes 100% EU innovation and has been developed by BEYOND-NOA in the framework of the NextGEOSS and EOPEN EU projects)
- CreoDIAS and Google Earth Engine

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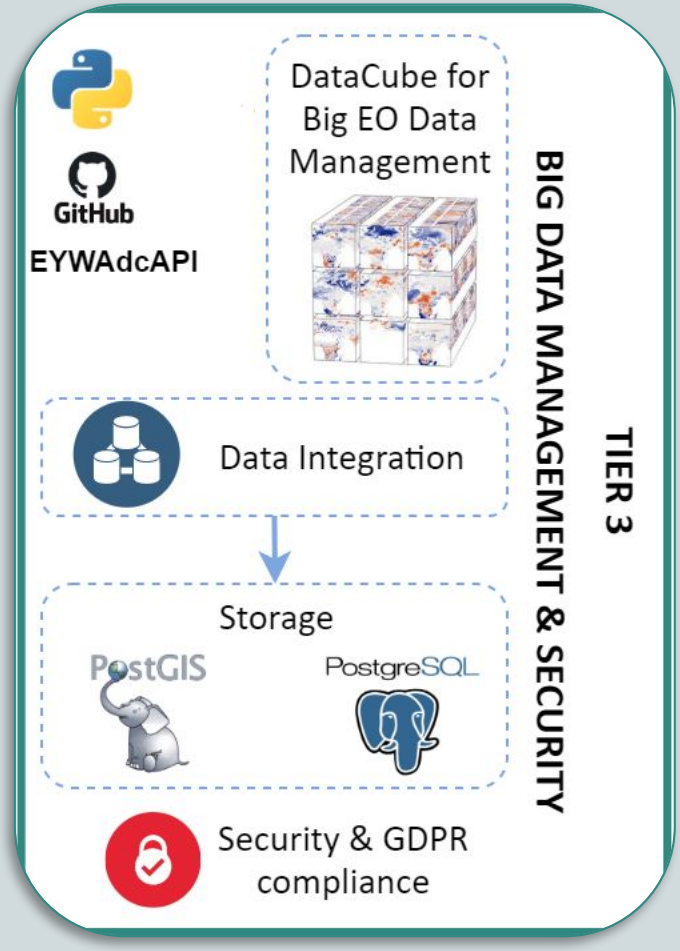
EYWA System Architecture

- Big Data management (**278 TB and counting**)
- Open Data Cube (ODC) technology, state-of-the-art tool for Earth Observation and other data fusion, feature engineering and data analytics
- All these processing steps are available through the dedicated Python API "**EYWAdcAPI**" at BEYOND-NOA's GitHub profile in the epidemics repository



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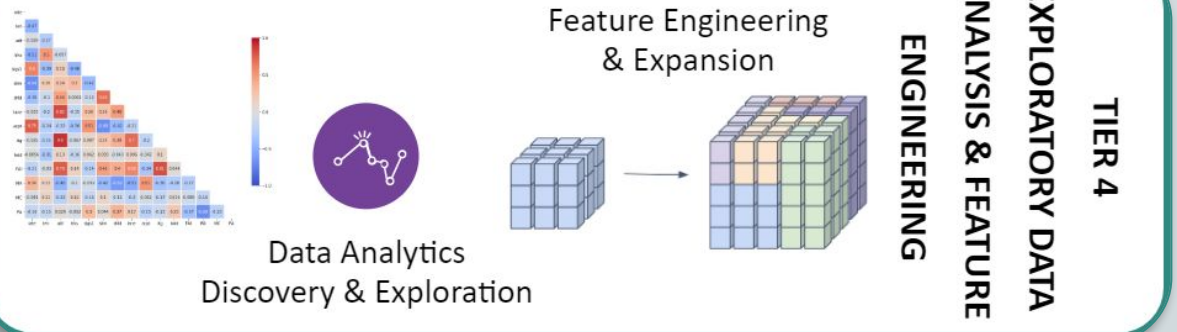
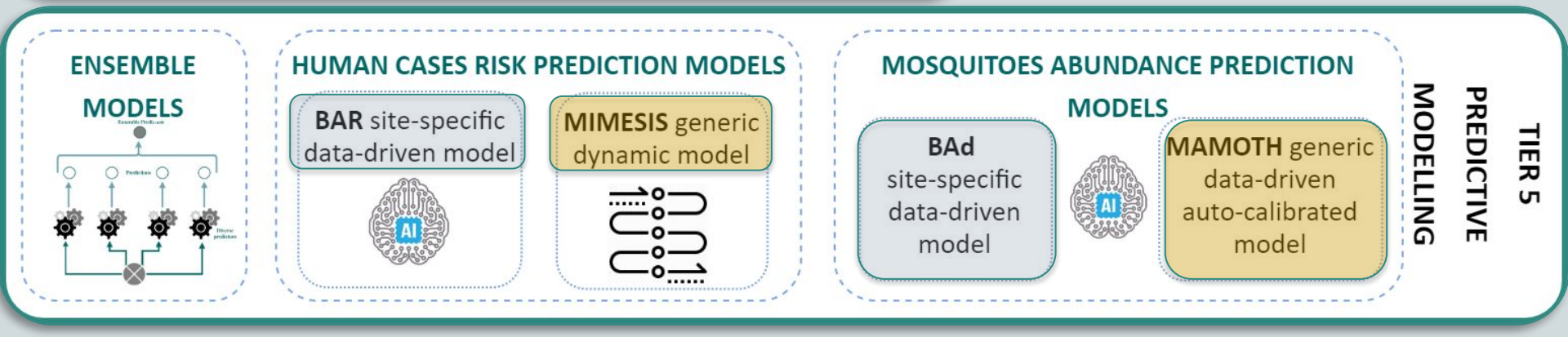


A "mammoth" feature space of at least 10-years time-series of data for every mosquito-traps network in nine regions in Europe.



How is this plethora of independent data transformed into meaningful scientific knowledge?

EYWA has a factory of dynamic and data-driven models, learning about the dynamics of mosquitoes' abundance and mosquito-borne diseases transmission, and providing monthly, weekly, daily predictions.

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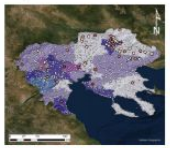
EYWA System Architecture

TIER 6 – KNOWLEDGE REPRESENTATION & EXPLANATION

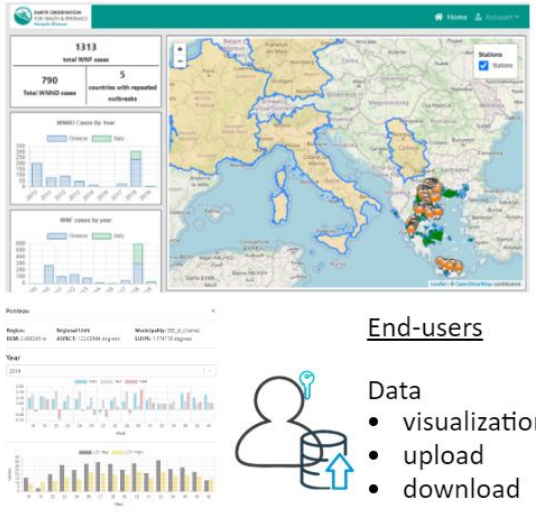
Mosquitoes abundance and human cases risk prediction maps & statistics



Reports for end-users

TIER 7 – EYWA WEB SERVICES

Web Platform UI



Mosquito Vision application

End-users

Data
- visualization
- upload
- download

Open data sharing through the **EYWAopenAPI**

NEXTGEOSS

GEOSS Portal

The reports indicate
- Up-to-date epidemiological status of the Region
- The state-of-the-art models used
- The mosquito abundance predictions for the month
- The estimated human risk

Predictions results dissemination to the relevant Public Health Authorities through monthly reports and the EYWA Web Platform

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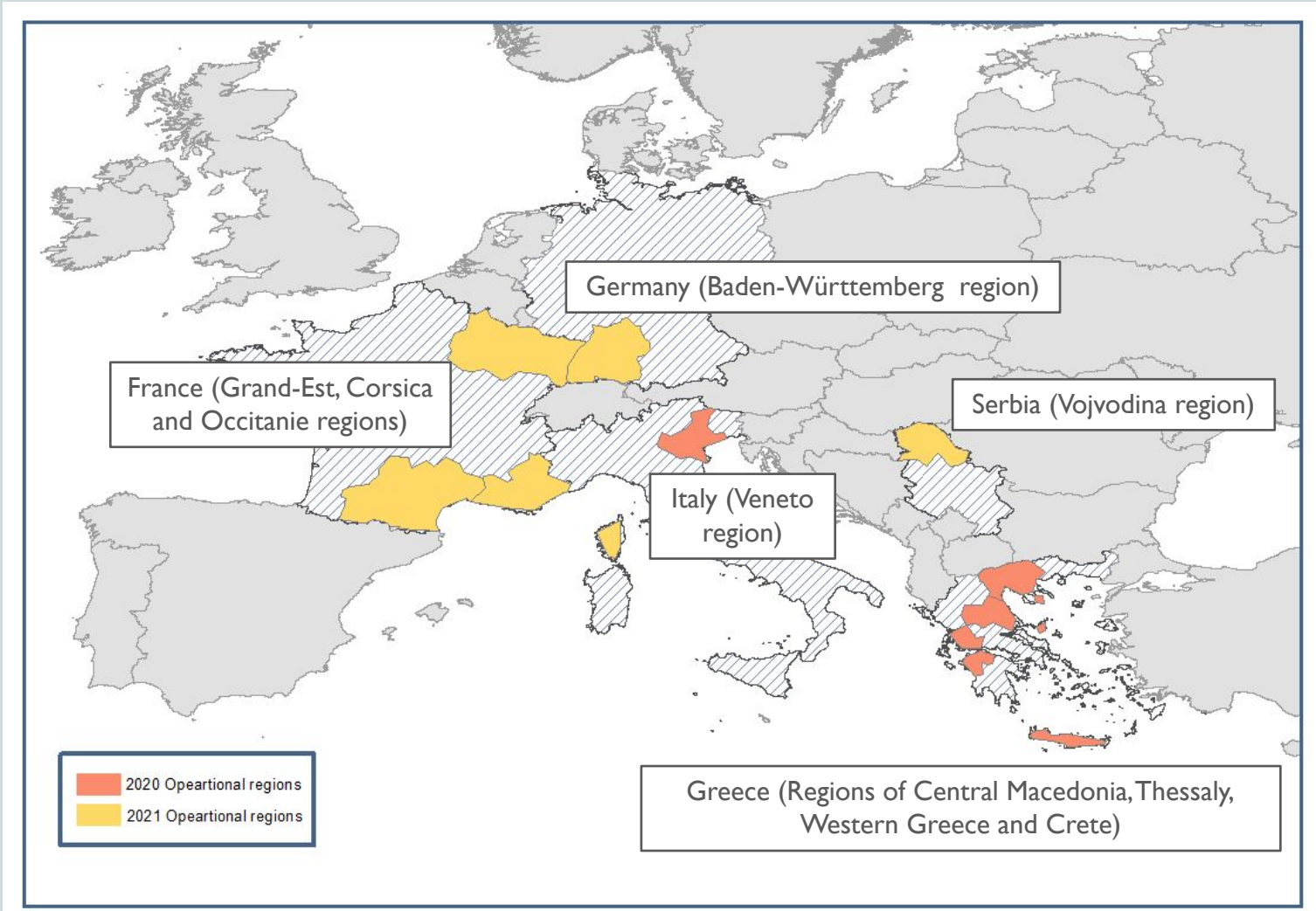
EYWA in Action



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EYWA in a nutshell

- Plethora of satellite Earth Observation data
- Entomological, epidemiological, crowdsourced, socioeconomic and auxiliary data
- State-of-the-art technological tools

Leveraging scientific knowledge and ultimately proving that EO can upend our understanding in the field of epidemics

The pivotal role of EYWA is to become a key lever for Public Health authorities and decision makers, support preparedness and timely strategic design of the health system response actions, and raise citizens awareness on the expected risk, with a view to fight Mosquito-Borne Diseases.

Thank you!

Partners

Greece

National Observatory of Athens (NOA) – BEYOND Centre of EO Research & Satellite Remote Sensing

Ecodevelopment S.A

University of Patras – Physics Department - Laboratory of Atmospheric Physics (LapUP)

Dimitrios Vallianatos (IDCOM)

Aristotle University of Thessaloniki

University of Thessaly, Medical School. Laboratory of Hygiene and Epidemiology

Italy

Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe)

Edmund Mach Foundation

University of Trento

Serbia

University of "Novi Sad", Faculty of Agriculture, Laboratory for Medical and Veterinary Entomology

Scientific Veterinary Institute "Novi Sad"

University of Novi Sad, Faculty of Medicine

Germany

German Mosquito Control Association (KABS)

Bernhard Nocht Institute for Tropical Medicine

France

EID Méditerranée

Contact us

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