



Pilots and services of the Health Surveillance Showcase of e-shape

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on behalf of Pilots Leaders:

Sergio Cinnirella (CNR), Jana Klanova (RECETOX-MU), Evangelos Gerasopoulos (NOA), Konstantinos Tsaprailis (NOA)



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The Showcase Health Surveillance

- ✓ **The overarching goal** was to demonstrate the incomparable value of EO in surveillance of environmental pollution and public health, under the **Group on Earth Observations (GEO)**.
- ✓ **It was aimed to contribute** to **GOS⁴M**, **GOS4POPS** and the **EO4SDGs** with a set of KETs.
- ✓ Recently a **new Pilot was on-boarded** to contribute to **EO4HEALTH**.
- ✓ **Each Pilot has developed applications as web services** which bring knowledge from scientific observations to decision-makers.



<https://e-shape.eu/>



Pilot 1 - EO-based surveillance of mercury pollution in the framework of Minamata Convention

- Leader: **CNR**, IT (Sergio Cinnirella)
- Participants: **HZG** (DE), **UNICAL** (IT)



Pilot 2 - EO-based surveillance of POPs pollution in the framework of Stockholm Convention

- Leader: **MUNI-RECETOX**, CZ (Jana Klanova)
- Participants: **NOA** (GR), **CNR** (IT)



Pilot 3 - EO-based pollution-health risks profiling in the urban environment

- Leader: **NOA**, GR (Evangelos Gerasopoulos)
- Participants: **CNR** (IT), **DLR** (DE), **FMI** (FI), **IIASA** (AT)



Pilot 4 - EYWA - Early Warning System for Mosquito-Borne Diseases

- Leader: **NOA**, GR (Konstantinos Tsaprailis)
- Participants: **LapUp** (GR), **BNITM** (DE), **CSRS** (CH), **FMCU** (TH)



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German
Aerospace Center



ENVIRONMENTAL TECHNOLOGIES



CSRS
Centre Suisse de Recherches
Scientifiques en Côte d'Ivoire





EO-based surveillance of mercury pollution

To provide a Knowledge Hub to:

- **Estimate deposition patterns and annual rates** with changing atmospheric emissions of mercury from various anthropogenic sources
- **Evaluate long-term changes** of mercury concentrations in the oceans and its bioaccumulation in fish and other biological endpoints
- **Assess the temporal trends** of Hg bioaccumulation in fish with changing atmospheric deposition scenarios and Hg emissions to the atmosphere
- **Provide cost-effective strategies** for emission reductions and Hg concentrations reductions in fish
- **Transfer knowledge** for a better risk-assessment of Hg pollution impact on human health



Stakeholders

Member States, ONG and Observers that are part of the Minamata Convention (over 100+ countries and 30+ NGOs and other parties)

EUROGEO WORKSHOP 2022



The Knowledge Hub

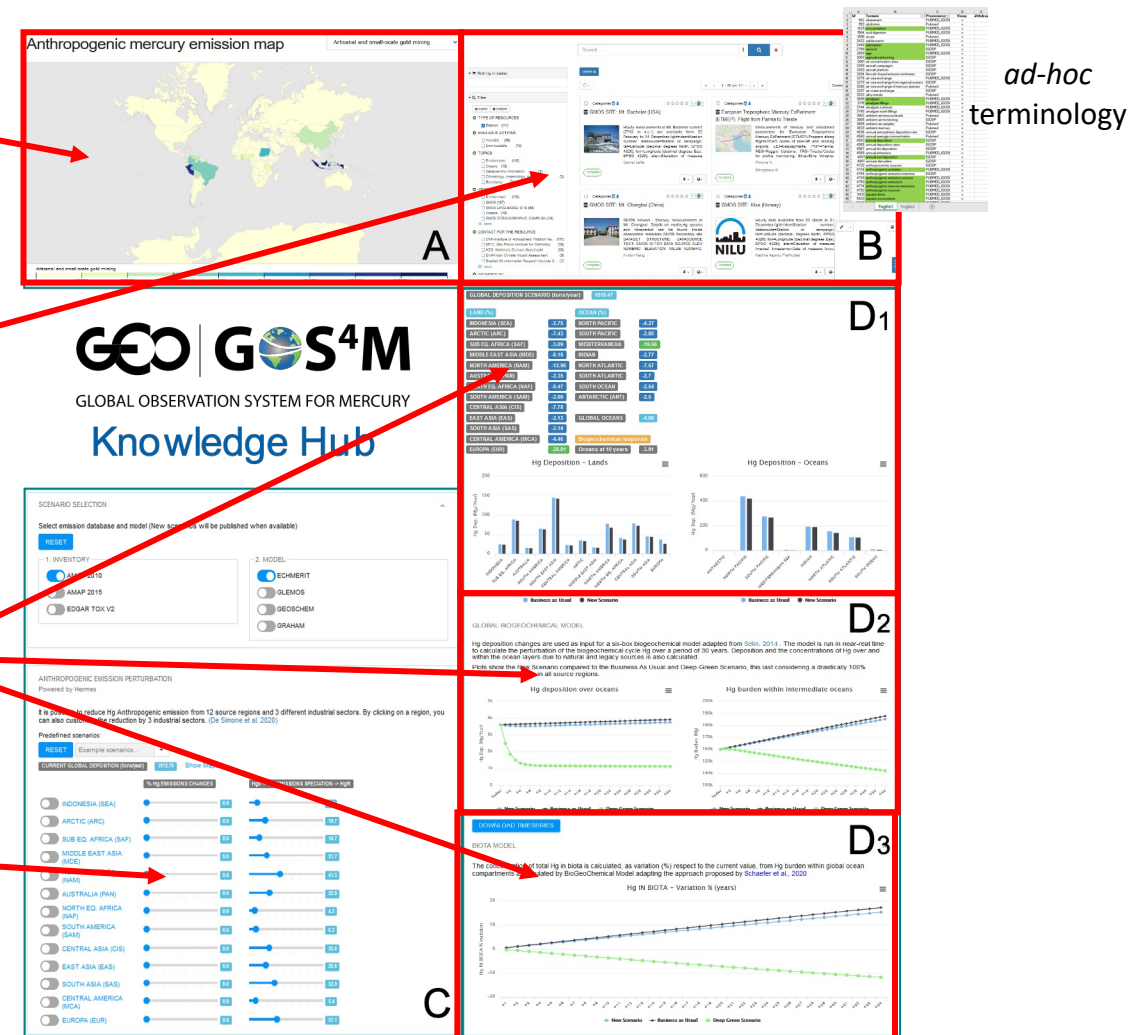
Understand and browse the last emission data by Country and emission sector (A)

Browse and download dataset on Hg concentration in air, water as well ancillary parameters (B)

Evaluate changes in deposition scenarios over land and oceans (D1) and long-term trends of Hg concentrations in oceans (D2) and marine biota (D3)

Cost assessment (C)

Optimization of scenarios to assess the best policy-option (developed but **not yet deployed as a service**)



ad-hoc terminology

www.gos4m.org/kh

ATHENS 7-9 DECEMBER 2022



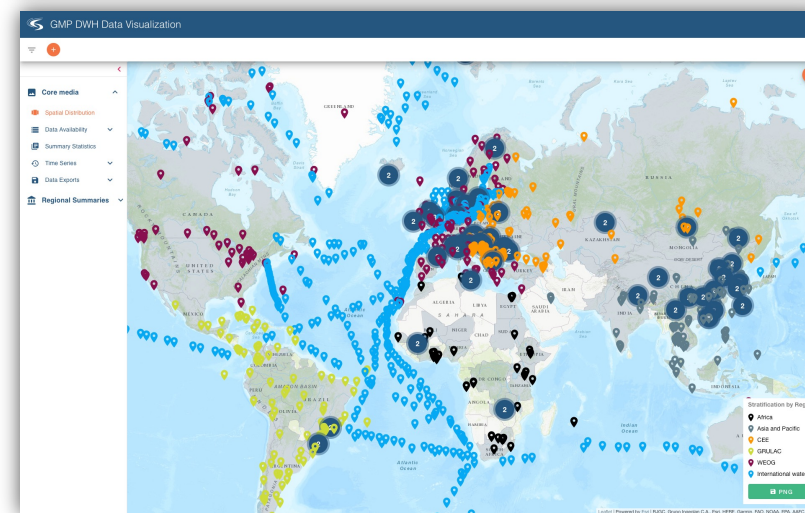
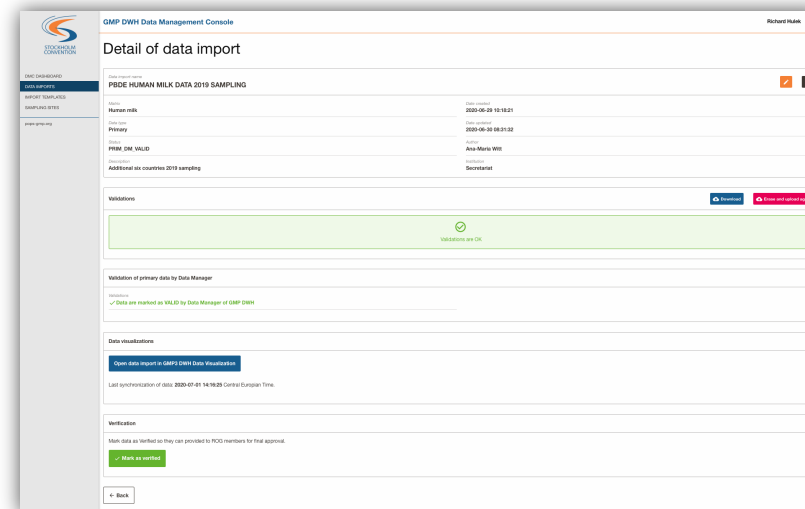
EO-based surveillance of POPs pollution

The **GMP Data Warehouse** (launched in June 2022)

- Harmonized data and information structure
- POPs data format: annually aggregated concentrations
- Largest pool of global POPs data
- User-friendly access to the POPs monitoring data by all stakeholders and the broad public

GEO – related achievements:

- interactions with GOS4Health, proposals for Community activities (CoP)
- data sets in GMP3 linked to GEOSS
- Preparation of the initiative GOS4POPs for 2023-25



<https://dmc.pops-gmp.org>

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The **Teaser** Platform of Health Surveillance Air Quality Pilot (HSAQ, **e-shape**)

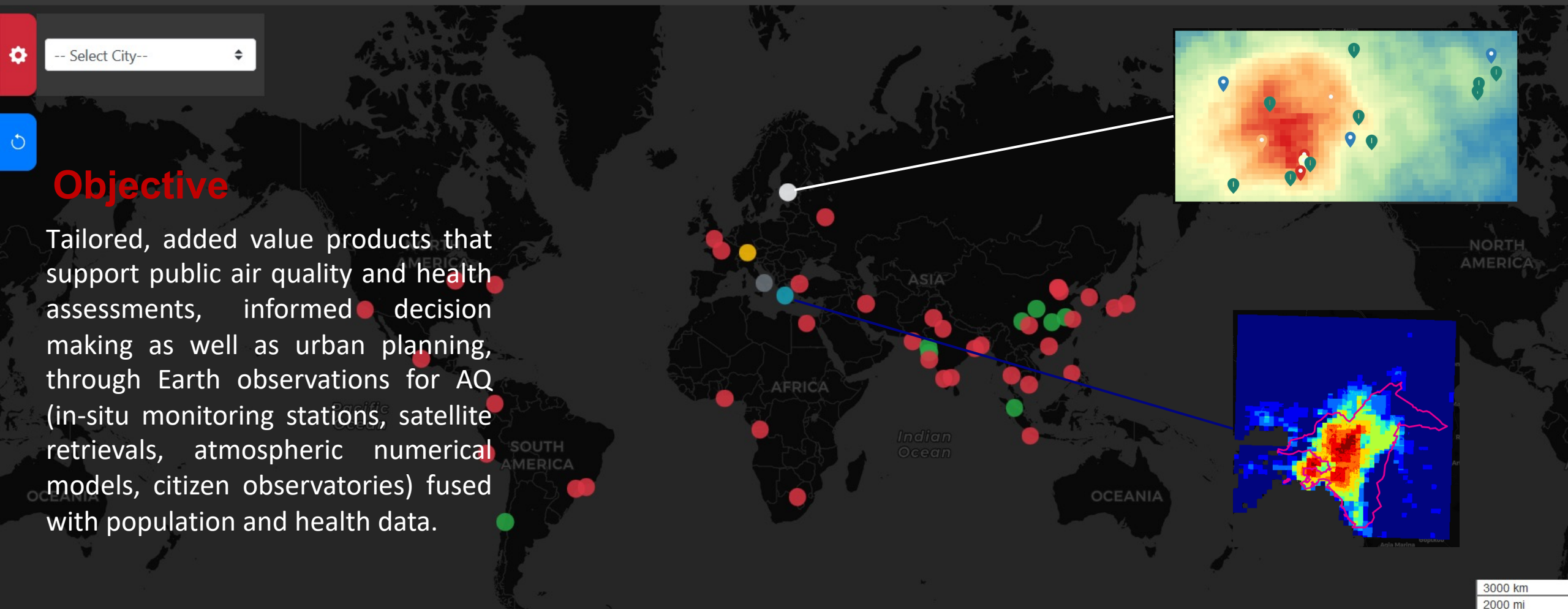


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Objective

Tailored, added value products that support public air quality and health assessments, informed decision making as well as urban planning, through Earth observations for AQ (in-situ monitoring stations, satellite retrievals, atmospheric numerical models, citizen observatories) fused with population and health data.



3000 km
2000 mi



The e-shape project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 820852

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Munich, Germany

Health risk assessment due to air pollution exploiting World Settlement Footprint
<https://www.alpendac.eu/eshape>

Athens, Greece

Population exposure to urban air pollution
<https://hsaq-eshape.eu/>

Helsinki, Finland

The industrial footprint on urban air quality
<https://sampo.fmi.fi/airpollution/no2/>

Global Service: The Teaser Platform of Health Surveillance Air Quality Pilot HSAQ <https://hsaq-eshape.eu/>

UN list of Megacities

Air quality-health aspects in world's megacities
<https://hsaq-eshape.eu/>

Selected European cities

Thermal/Pollutant human (dis)comfort
<https://hsaq-eshape.eu/>

Bari, Italy

Address
<https://hsaq-eshape.eu/>

Vienna, Austria

Access
ions

More information, later today:

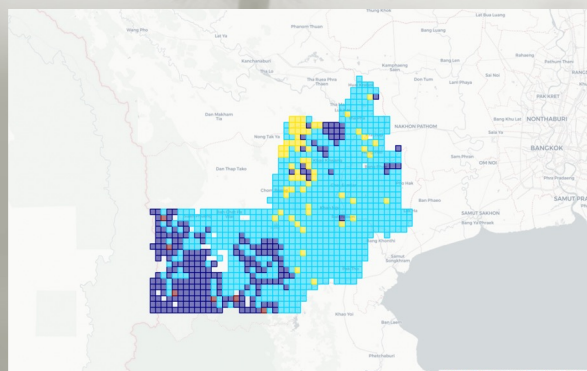
08.12.2022 | 14:15 - 15:45 am
Pathways to sustainable development through use cases in the Athens metropolis
| Room: Alkioni



EYWA - Early Warning System for Mosquito-Borne Diseases



Mosquito
abundance
Abidjan, Ivory
Coast



Mosquito
abundance on a
2x2 km grid
Ratchaburi,
Thailand

- ❑ As part of the e-shape project the **entomological risk MAMOTH model was expanded** to provide predictions for the *Aedes aegypti* mosquito in Ivory Coast by ingesting in-situ historical data from the region. The model provided the first predictions of entomological risk
- ❑ In the local Cocody-Bingerville health district in Côte d'Ivoire, that is the main foci of arboviruses (dengue, yellow fever, Zika, etc.) the **predictions** for *Aedes aegypti* mosquito abundance have been **shared with the National Institute of Hygiene** in the charge of National Arbovirus Programme and are being directly informed on any increase in arbovirus risk.
- ❑ The **predictions were used to sensitize the local communities** about the upcoming abundance of *Aedes* vectors and possible increase in arboviral transmission risk, and this have improved the adherence of the target communities with the project.
- ❑ As a new expansion step the model trained in Ivory Coast has been **transferred in Thailand** to predict the *Aedes aegypti* populations using transfer learning due to the lack of in-situ entomological data.
- ❑ Finally the accuracy gain of the inclusion of the entomological risk predictions of **the MAMOTH model in the MIMESIS West Nile Virus risk model was investigated** and was found to be important, and as such this improvement will be included in the 2023 operational season.



Building on e-shape

EUROPEAN ENVIRONMENTAL EXPOSURE ASSESSMENT (EIRENE) RI

BACKGROUND

Evaluation of the **exposome** represents a challenge of simultaneous **assessment** of thousands of synthetic and natural **chemicals** with a wide range of physicochemical properties, concentrations, and **biological effects**

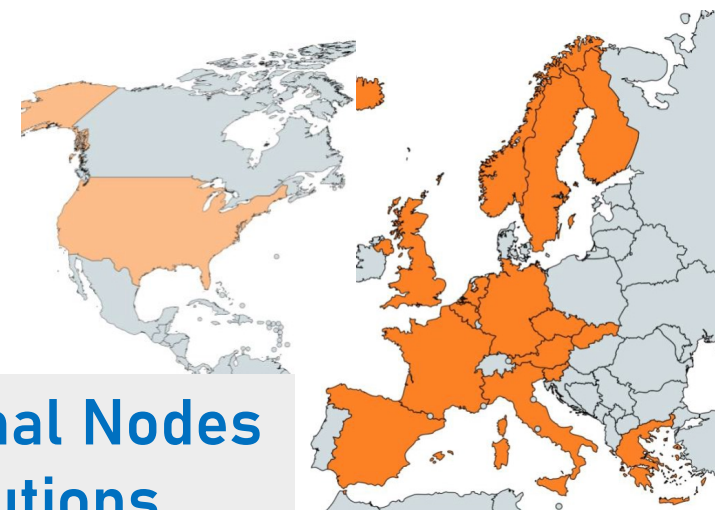
VISION

To mediate an open access to the infrastructures supporting a world-class research expanding the **scientific knowledge** in the area of human exposome, supporting the **development of new technologies** and translation of the research results to the daily lives of citizens via public-private (industry, spin-offs) or public-public (policy-making) partnerships in order to tackle a problem of non-genetic factors behind the development of chronic conditions and to **improve the population health**.

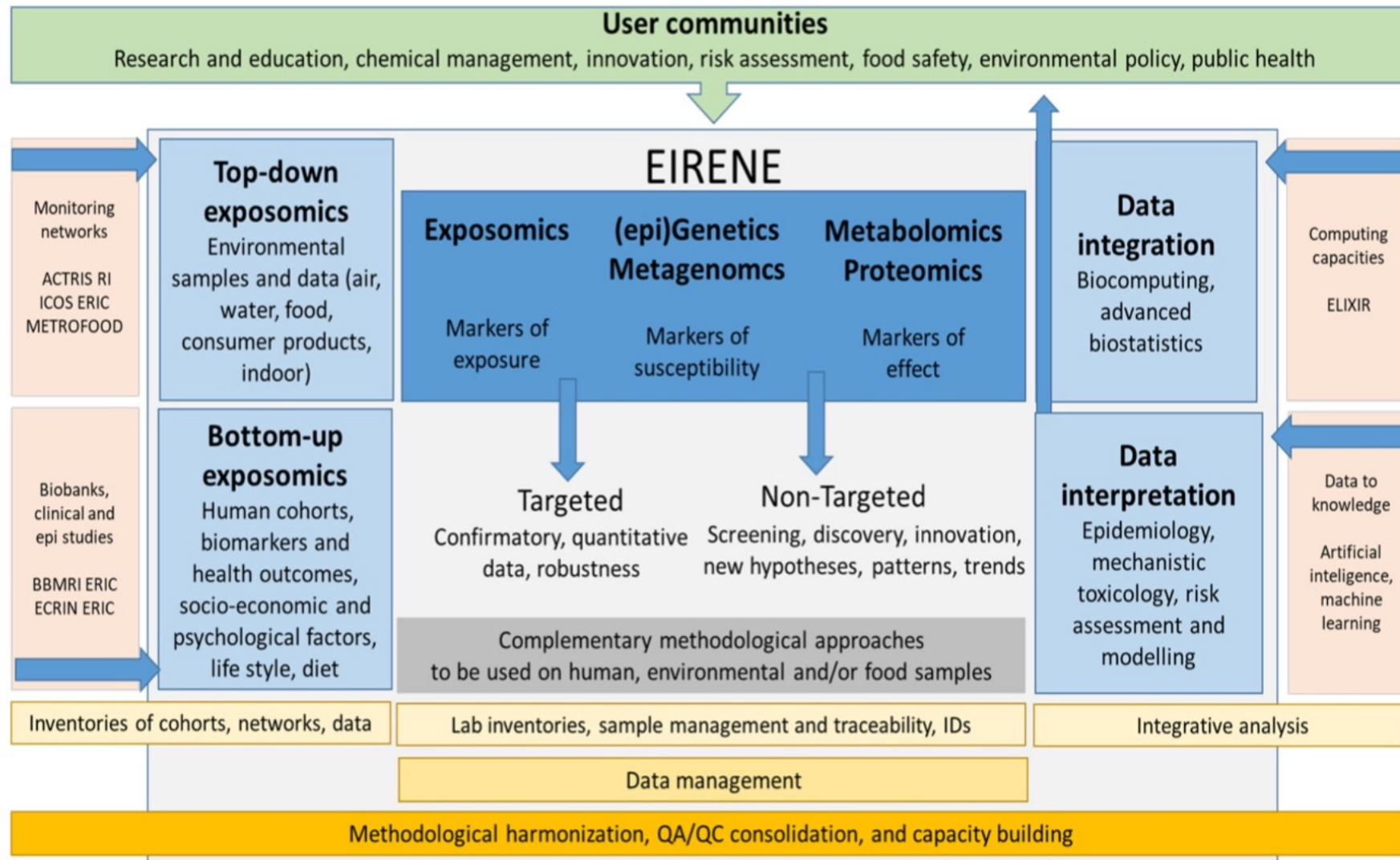


<https://www.eirene-ri.eu/>

Coordinator: Jana Klanova, MU

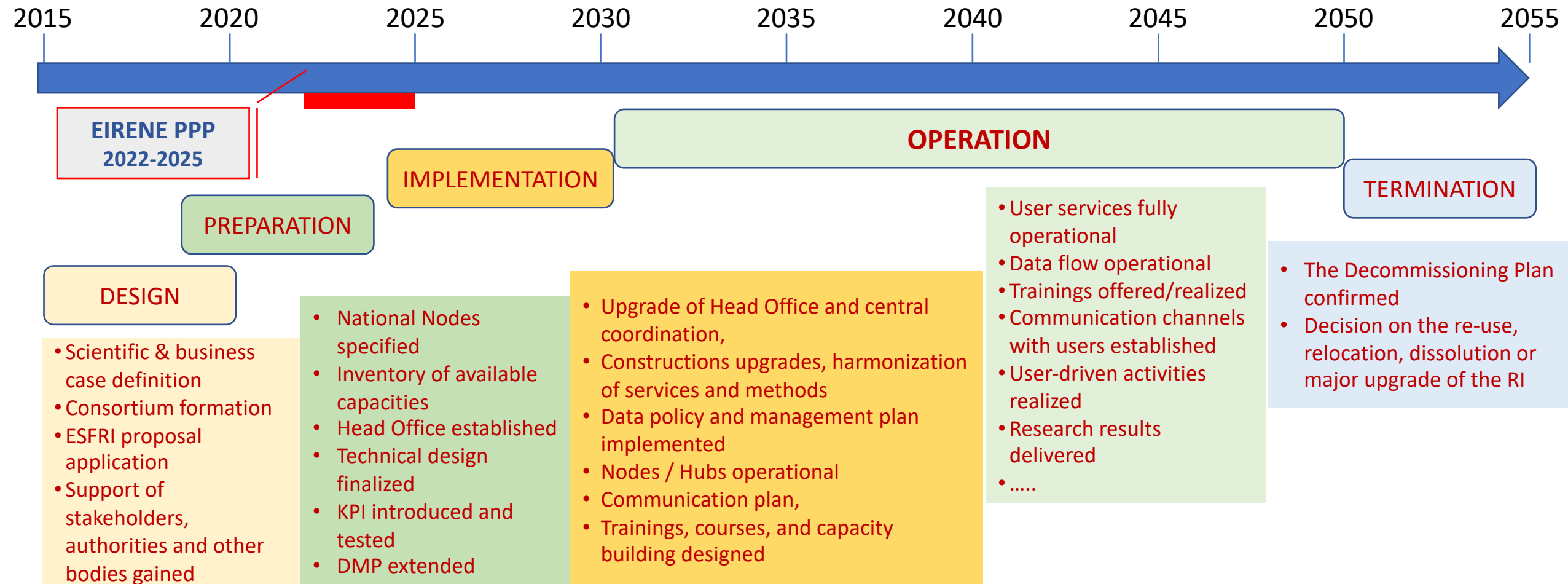


17 National Nodes
50 institutions





EIRENE RI lifecycle & EIRENE PPP





Thank you!