

Getting ahead of vector-borne disease outbreaks with the National Observatory of Athens (NOA)

Developed by BEYOND Centre of EO Research & Satellite Remote Sensing / NOA, Ecodevelopment S.A. (ECODEV) and the University of Patras, Physics Department, Laboratory of Atmospheric Physics (LapUp), using C3S Data

1 The Challenge

Vector-borne diseases are a significant threat to human health and burden public health systems worldwide. More than 700,000 deaths are caused by vector-borne infections each year (WMO). Mosquito-borne diseases - such as Malaria, Dengue and Zika - are particularly concerning, as they are responsible for the majority of deaths.

In the past, these viruses primarily infected inhabitants of tropical and subtropical regions, but with accelerating climate change, mosquito populations are expanding into previously unaffected regions. Without accurate forecasting tools public health officials and policymakers can merely react once the outbreak has begun.

There is an urgent need for advanced early warning systems that anticipate outbreaks before they occur, enabling decision-makers to proactively implement preventive measures.

2 The Solution

[Explore the EYWA platform](#)

The BEYOND/NOA, ECODEV and LapUp institutions, together with several additional data providers, designed and developed a new forecasting system:

EYWA - Early Warning System for Mosquito-Borne Diseases - By leveraging climate and environmental data, it develops two models: one forecasting mosquito populations, the other predicting disease outbreak risk and providing tailored insights for decision-makers.

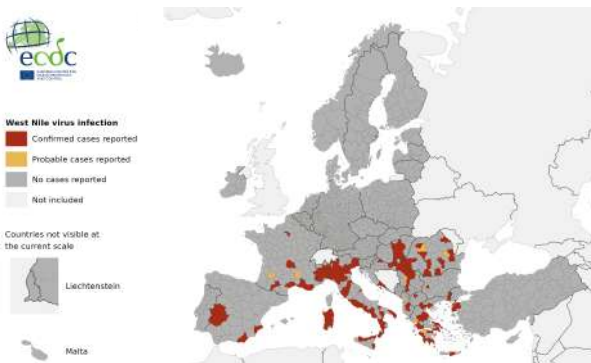


In support of the SDGs:



3 How can C3S help?

In a first step, C3S Data is fed into a mosquito prediction model: MAMOTH (Mosquitoes Abundance prediction Model auto-calibrated from features pleTHora). It predicts the development of any type of mosquito population, is adaptable to diverse regions and different mosquito-borne diseases. MAMOTH generates results by integrating C3S data with in-situ observations from mosquito traps. In a further step MAMOTH's output is processed by DVI (Disease Vector Intelligence), EYWA's model for disease outbreak risk prediction. It combines C3S climate data and other data, like historical disease cases, with MAMOTH's output, predicting the risk of an outbreak up to a month ahead.



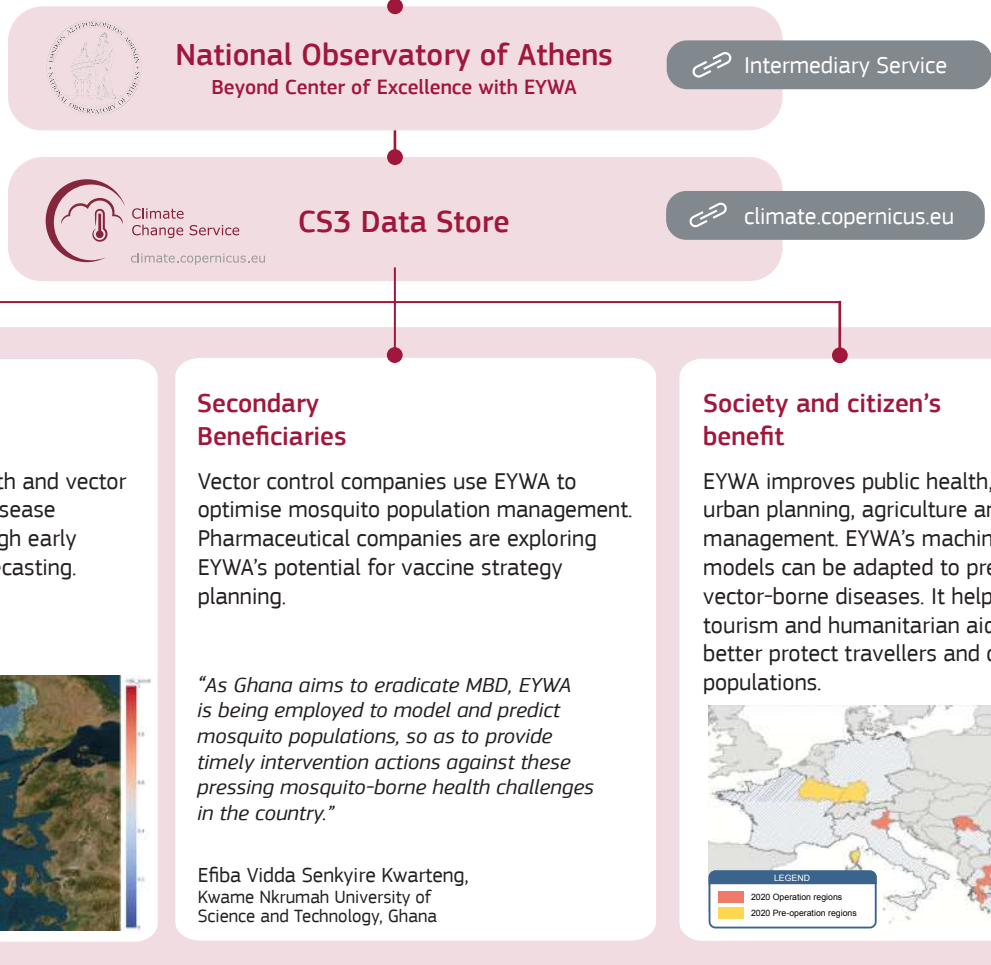
Administrative boundaries: © EuroGeographics © UN-FAO. The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union. Map produced by ECDC on 10 October 2025. Created with data reported to EpiFlux Cases as of 08 October 2025.

Key C3S data products used

- > ERA-5 Dataset - Surface Temperature [Link](#)
- > ERA-5 Dataset - Precipitation [Link](#)
- > Land Cover Data [Link](#)
- > Sentinel Satellite Observations [Link](#)



4 Data Application Workflow



5 What are the benefits?

EYWA improves mosquito surveillance, resource allocation and outbreak response. It provides early warnings, so public health and vector control agencies can take proactive measures and reduce the risk of large-scale infections.



ECONOMIC

EYWA reduces costs for health authorities and the general public. It can increase revenues for vector control or pharmaceutical companies.



SOCIETAL WELL-BEING

EYWA supports a general better public health.



SCIENTIFIC

Heavy research for EYWA has led to better research exploitation.



INNOVATIVE

EYWA can be applied globally and can easily be rolled out to new geographic markets.



REGULATORY

EYWA helps to improve public health policies by making more foresight information available.

Find Out More:

climate.copernicus.eu

[Climate Data Store](https://climate.copernicus.eu)

ecmwf.int