

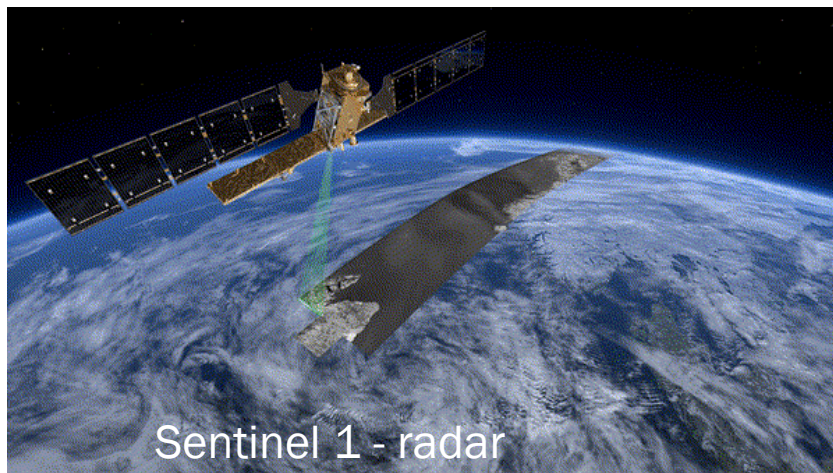
Earth Observation in vector-borne diseases

Annamaria Conte

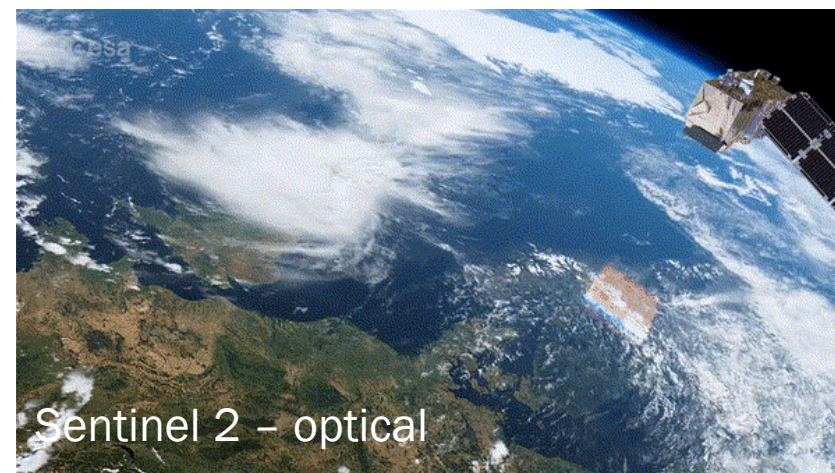
Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, Teramo – Italy

WOAH Regional Seminar – Vector-Borne Diseases in the European Region
25 - 27 June 2025 Teramo, Italy

Earth Observation



Sentinel 1 - radar

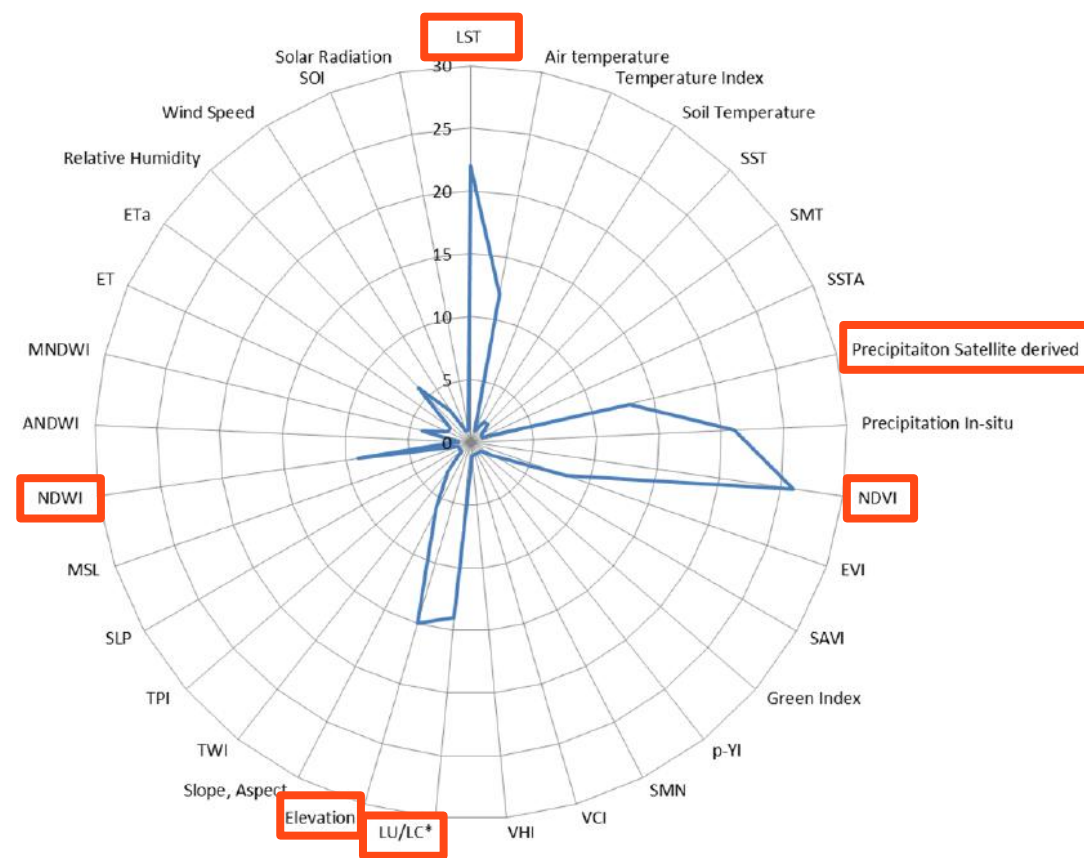
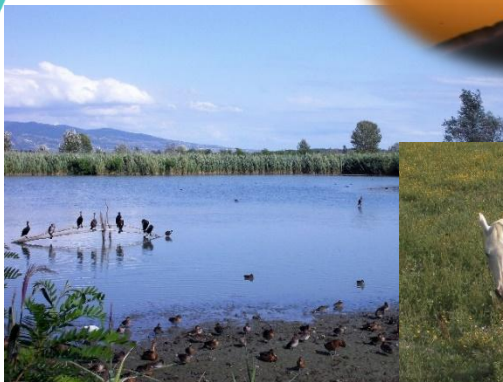


Sentinel 2 – optical

EO provides:

- **accurate** geo-locations for contiguous target areas;
- **objective**, consistent measurements of physical properties of the Earth and its atmosphere that can be interpreted to define its features and conditions;
- **repeated** coverage to enable detection of changes in features and/or their condition.

Climatic and Environmental variables in vector-borne diseases



Parselia et al. Satellite Earth Observation Data in Epidemiological Modeling of Malaria, Dengue and West Nile Virus: A Scoping Review. *Remote Sens.* 2019, 11, 1862; doi:10.3390/rs11161862

EO data application in vector-borne diseases

Surveillance data available

- **WNV circulation in Italy (AIDEO)**

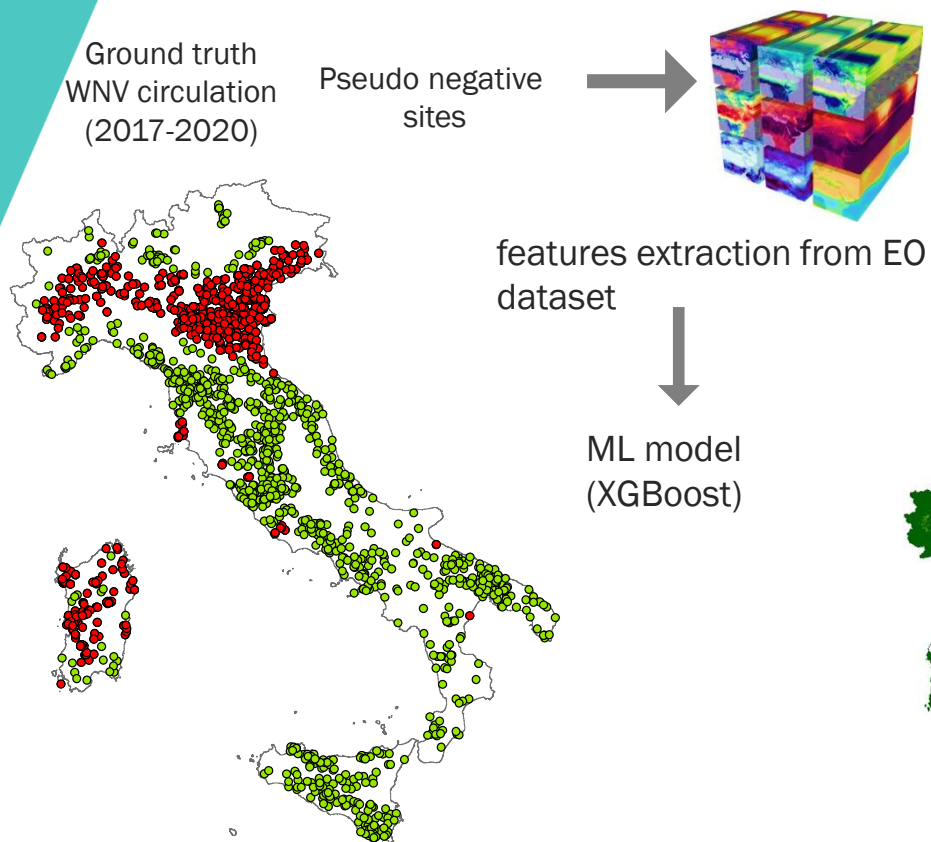


Surveillance data not available

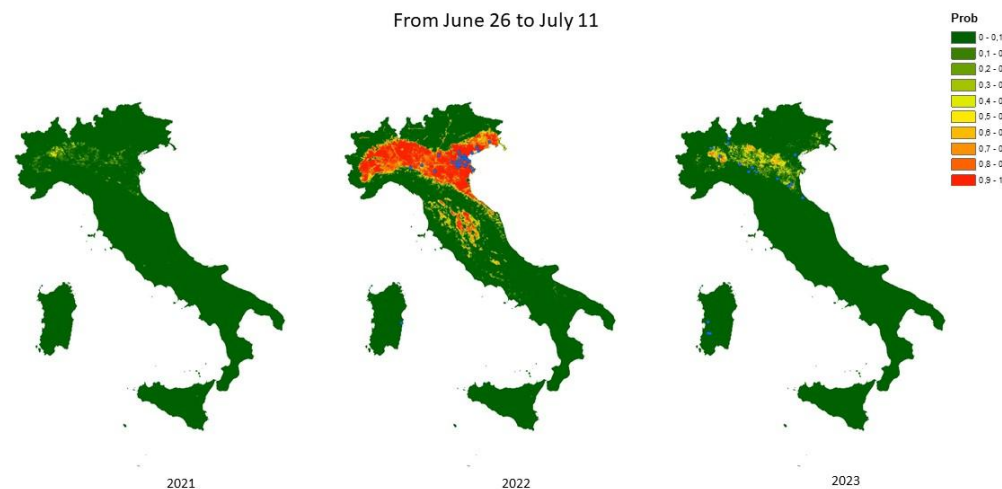
- **PROVNA Project**



WNV circulation in Italy



- Land Surface Temperature Day (Modis)
- Land Surface Temperature Night (Modis)
- Normalised Difference Vegetation Index (Modis)
- Surface Soil Moisture (Copernicus)
- Rainfall (IMERG)

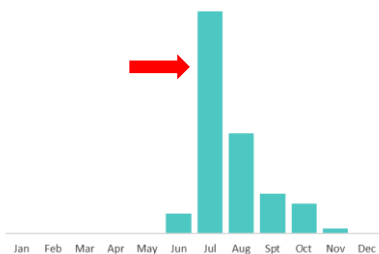


Prediction 26 June–11 July

2022



Epidemic curve



2023



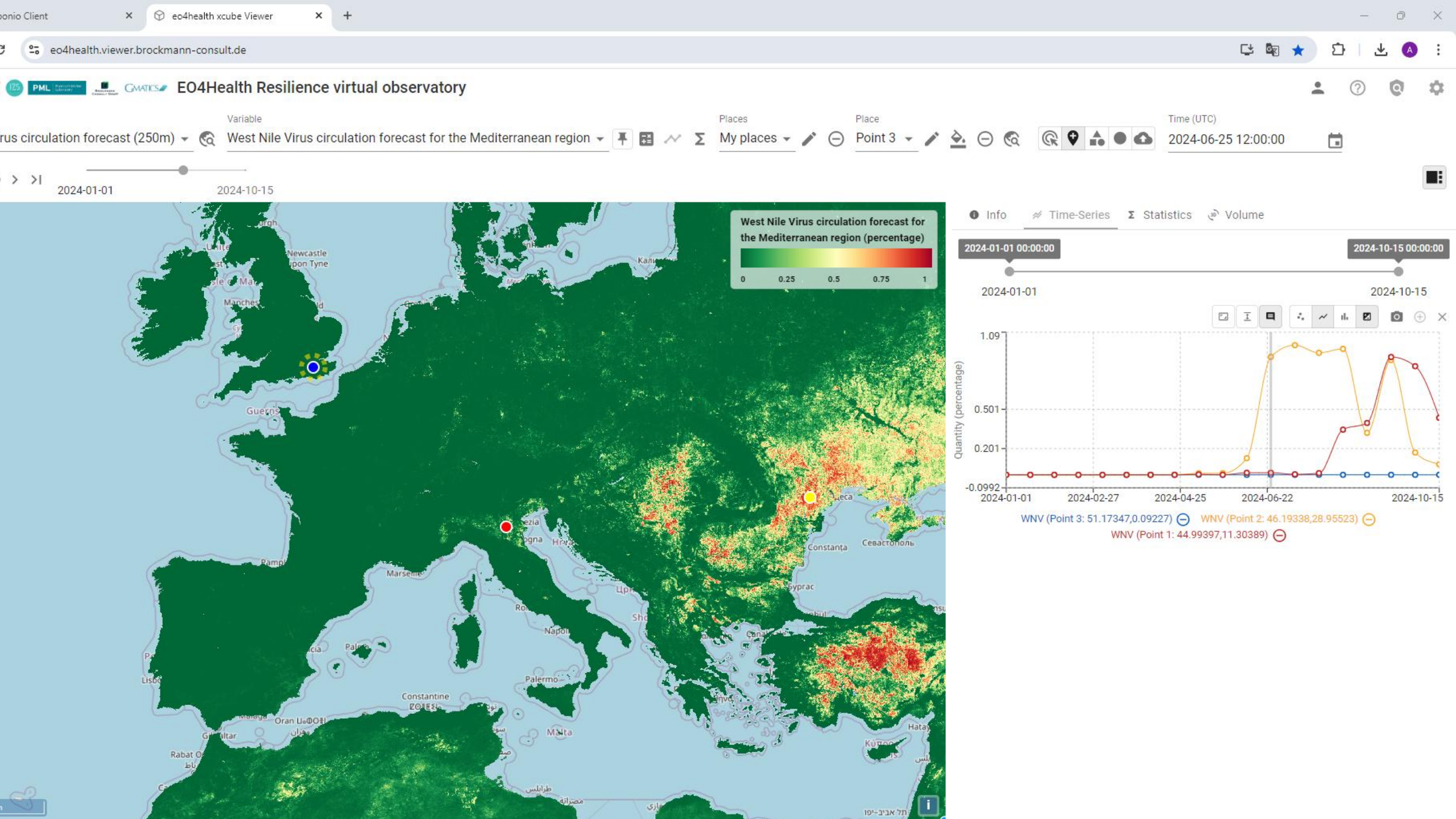
2024



2025



Jan Feb Mar Apr May Jun Jul Aug Spt Oct Nov Dec



EO data application in vector-borne diseases

Surveillance data available

- WNV circulation in Italy (AIDEO)



Surveillance data not available

- PROVNA Project





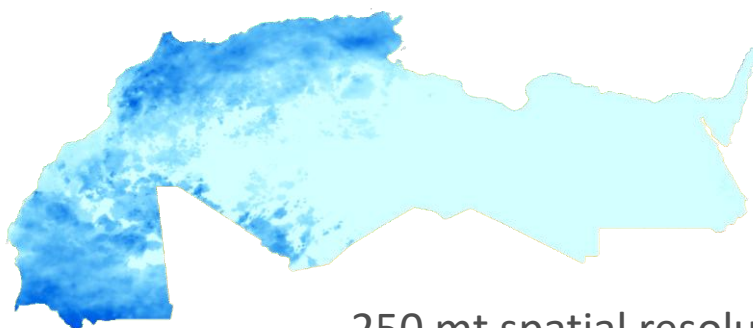
PROVNA project

Main objective: ECOREGIONS IN NORTH AFRICA

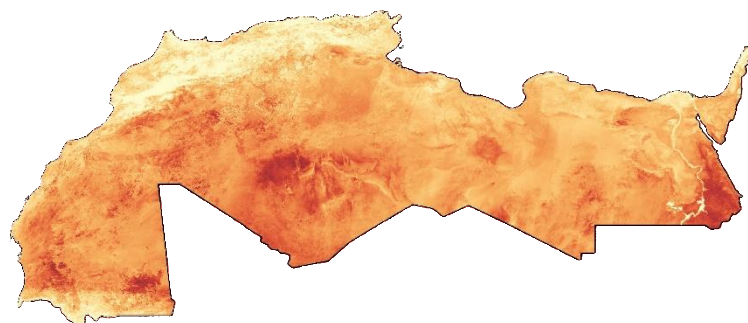
to define the “ecoregions” of the North African territory (Mauritania, Morocco, Algeria, Tunisia, Libya and Egypt), each one characterized by distinct environmental and climatic factors, on the assumption that similar areas (in space and time) are subject to similar vectors or diseases

ECOREGIONS IN NORTH AFRICA

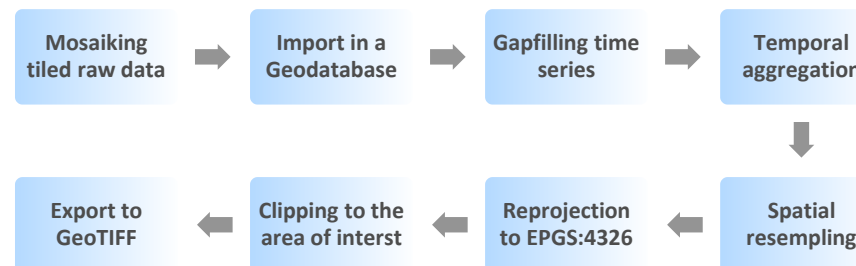
rainfall



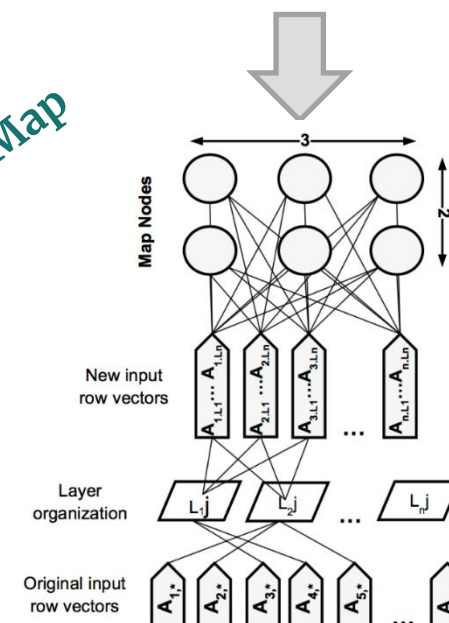
250 mt spatial resolution



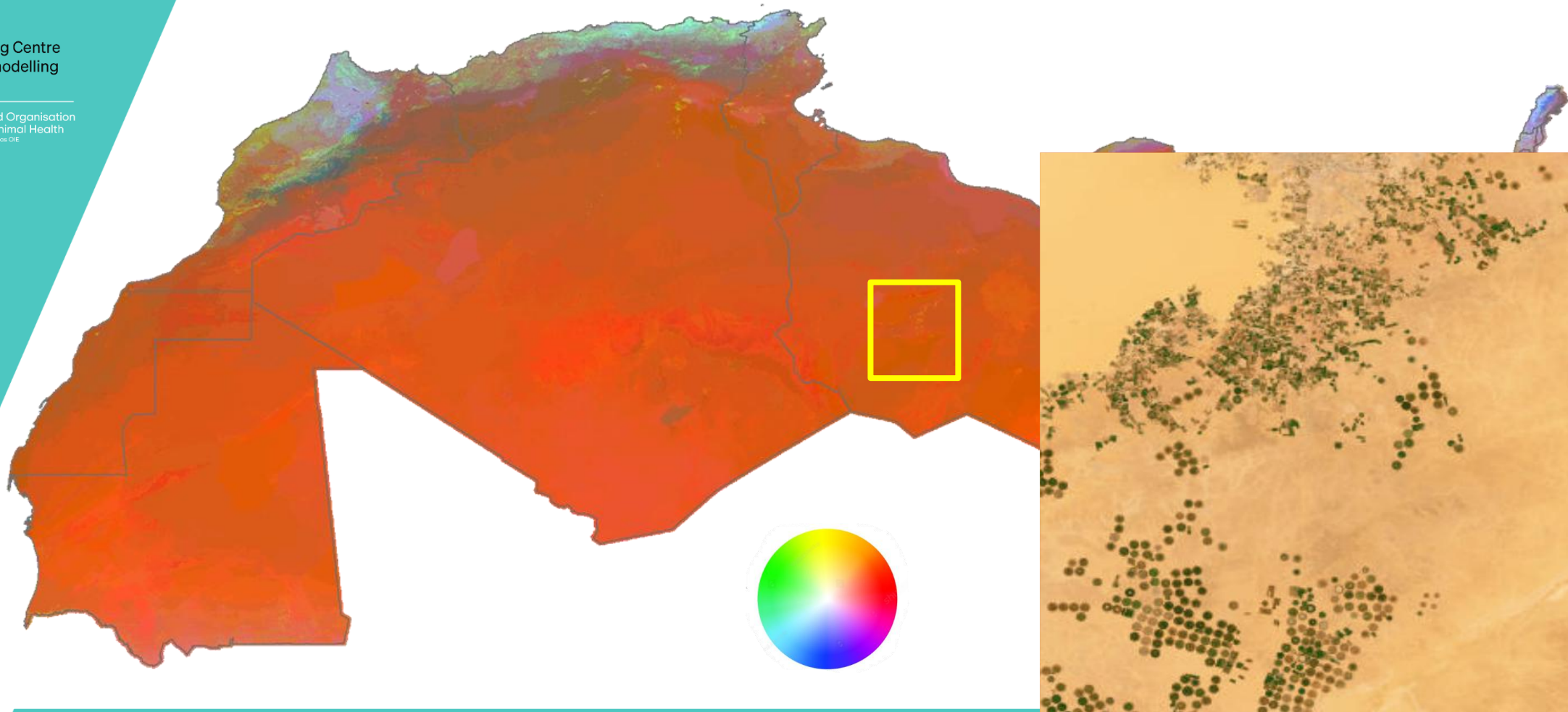
16 days temporal resolution



Super Self-Organising Map

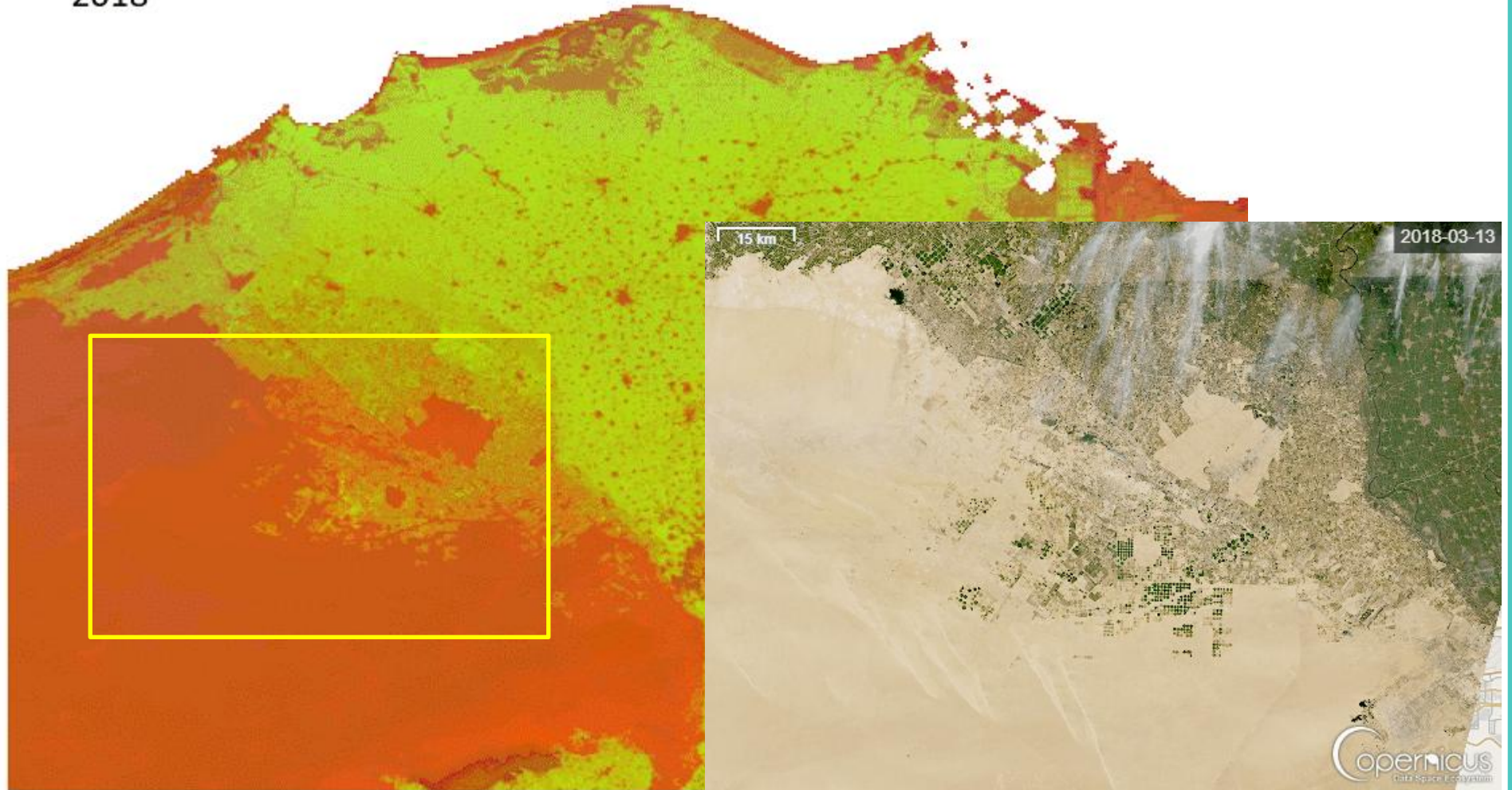


ECOREGIONALIZATION in North Africa



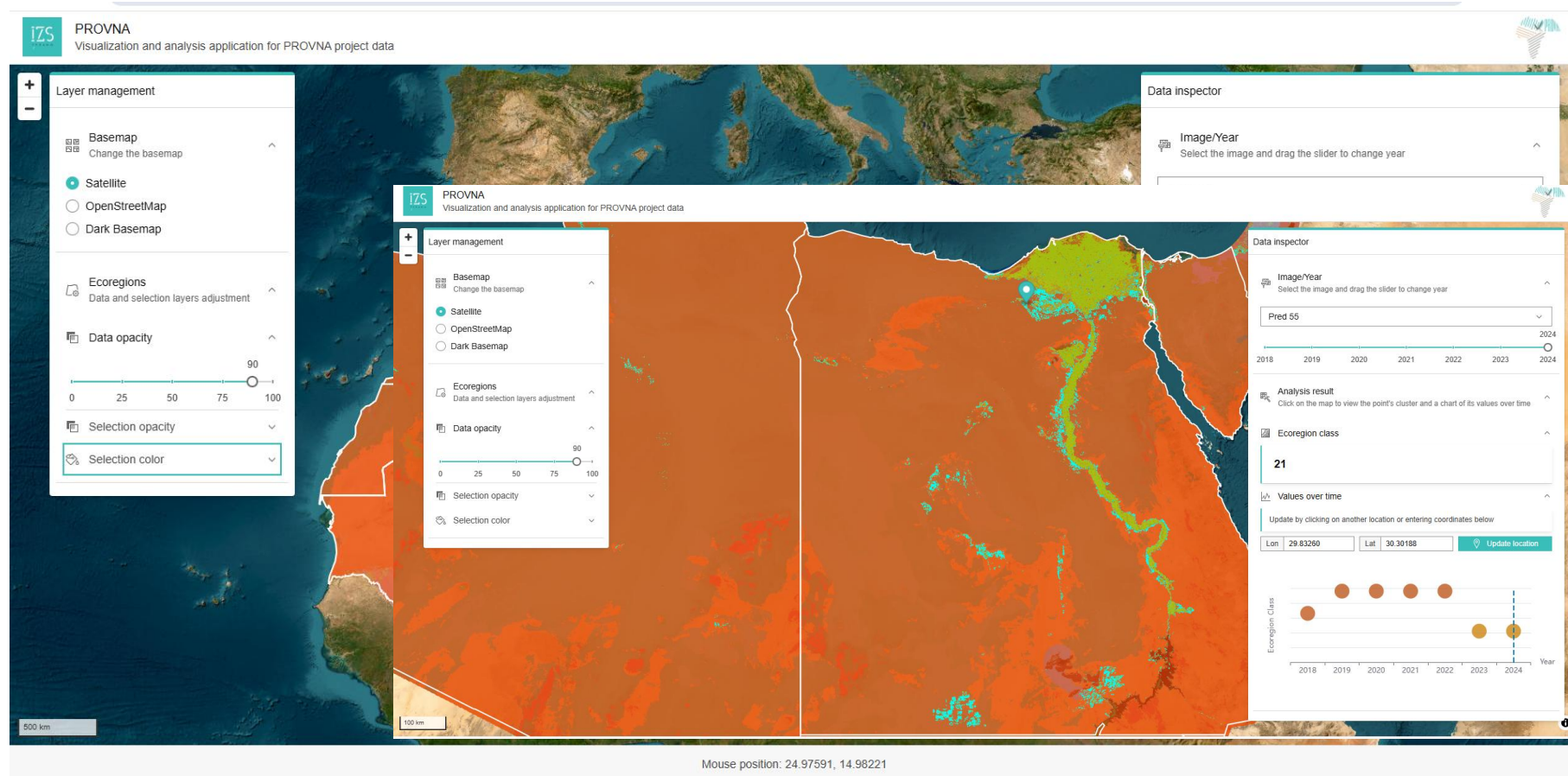
ECOREGIONS IN NORTH AFRICA

2018



PROVNA Inspector

<https://izsam-statgis.github.io/PROVNA-Inspector/>



DIFFERENT ECOREGIONS means:

1. Different vectors, vector species, viruses and diseases
2. Different seasonality and vector population dynamic
3. Different surveillance strategies to be implemented

Surveillance DATA

Thank you

