"Ecoregionalisation" approach in VBDs
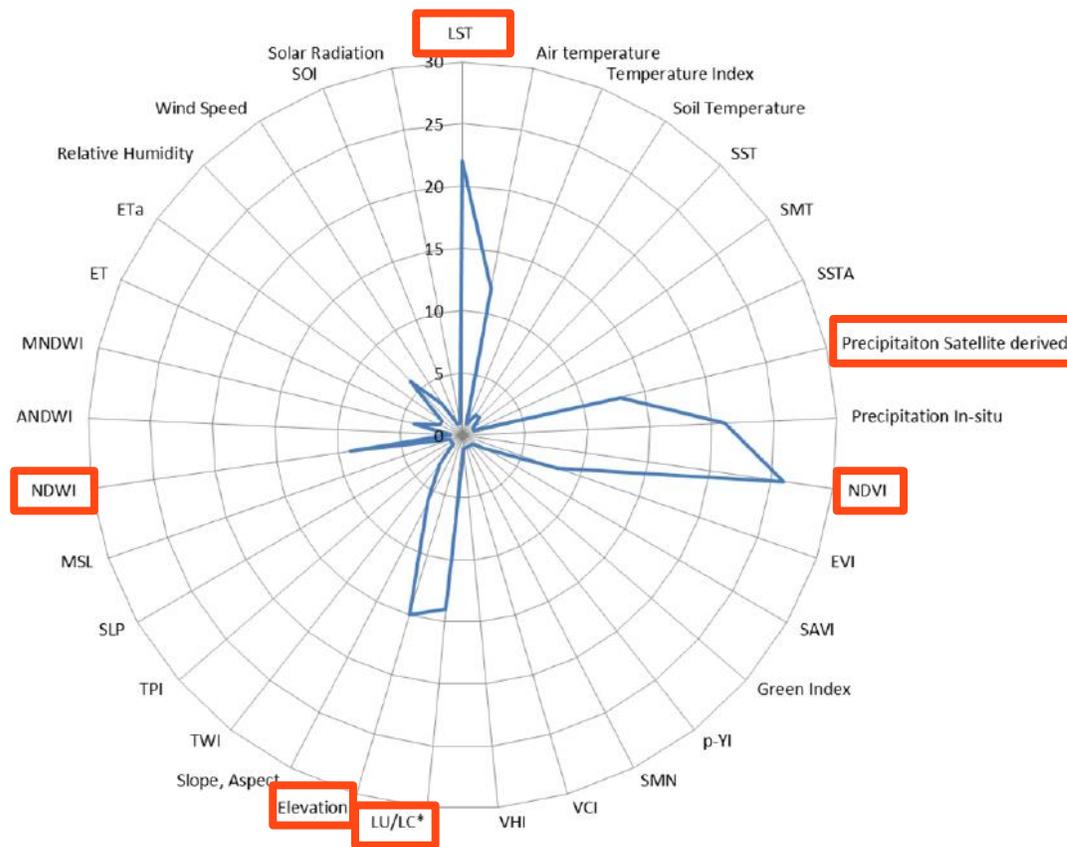
- WOAH Head Quarter Paris
- WOAH Office North Africa in Tunis
- IZSAM – WOAH CC for Epidemiology, Modelling and Surveillance

"Ecoregionalisation to support the surveillance and control of Vector Borne Diseases in North Africa, and beyond"
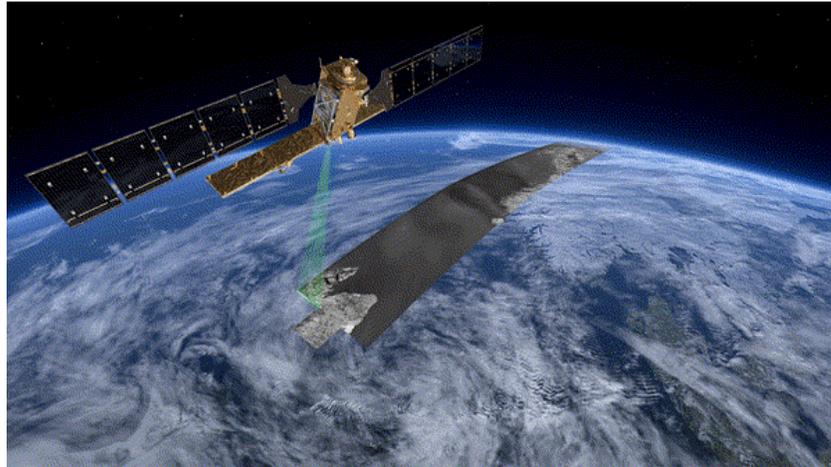*Webinar on the new PROVNA Platform – December 10, 2025*

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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
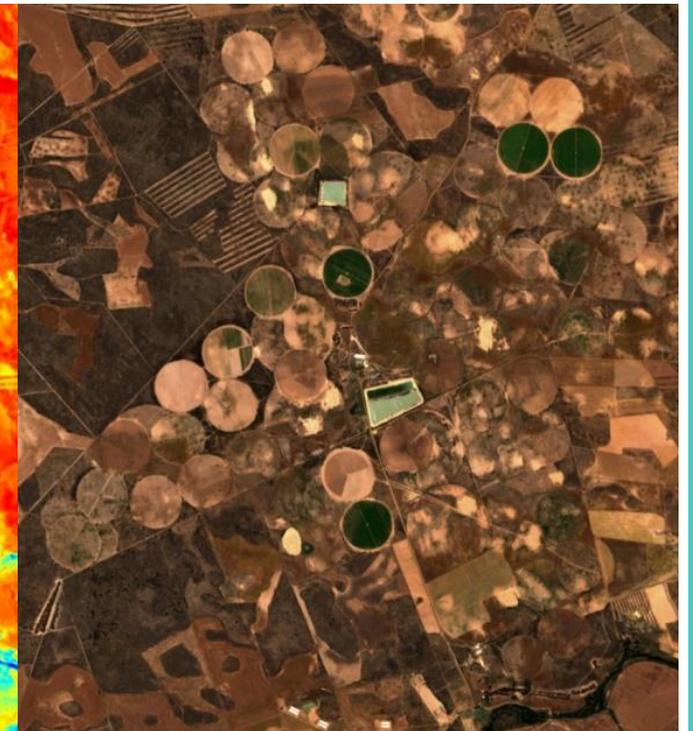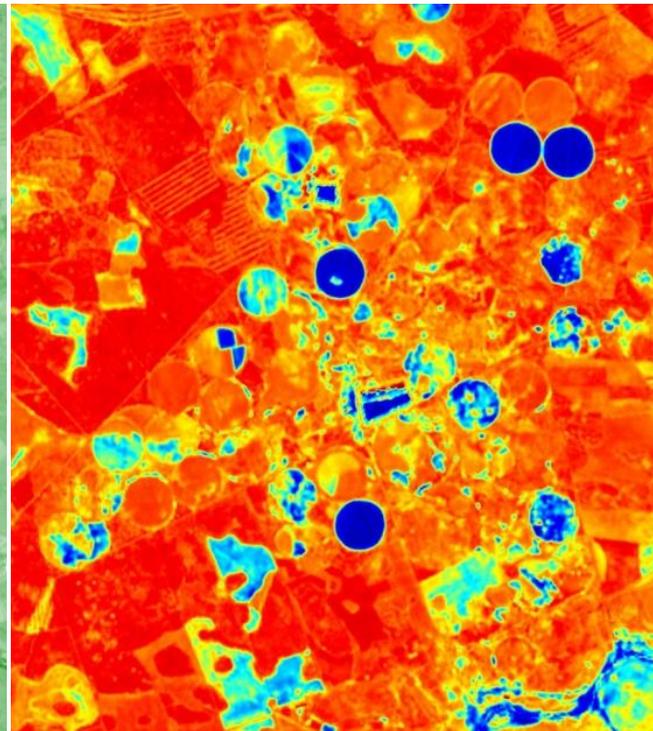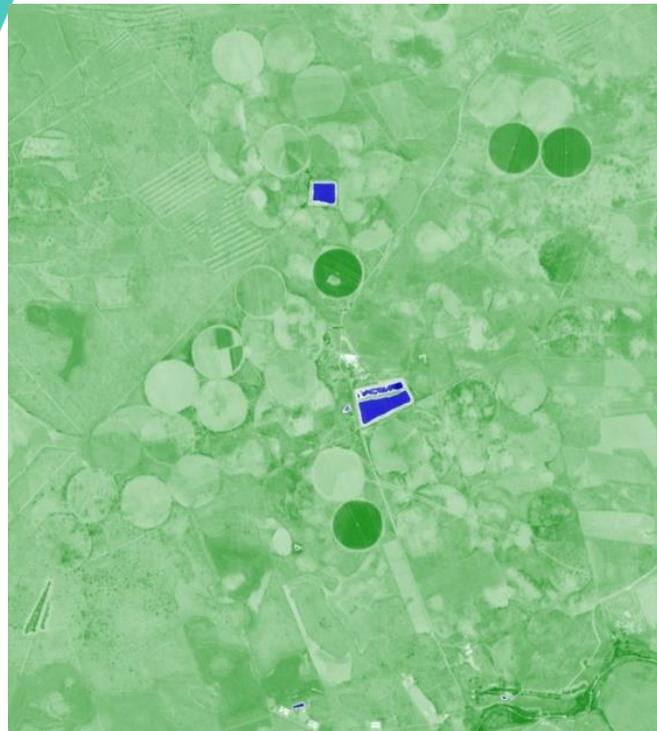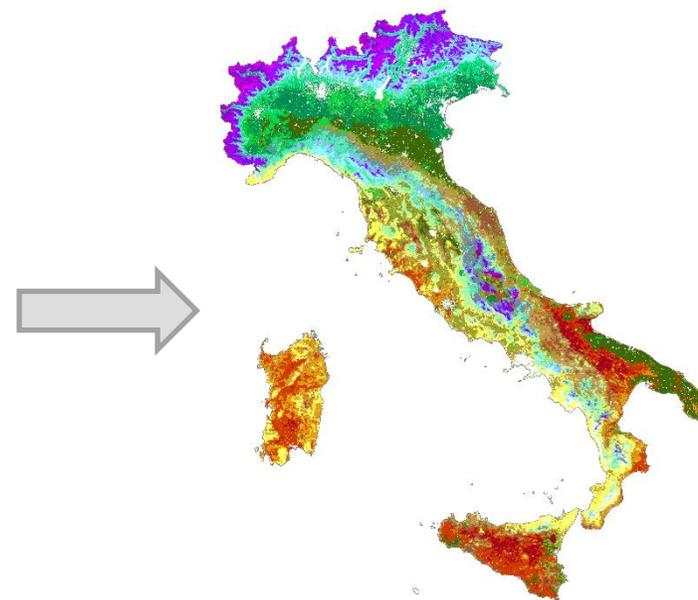
Earth Observation
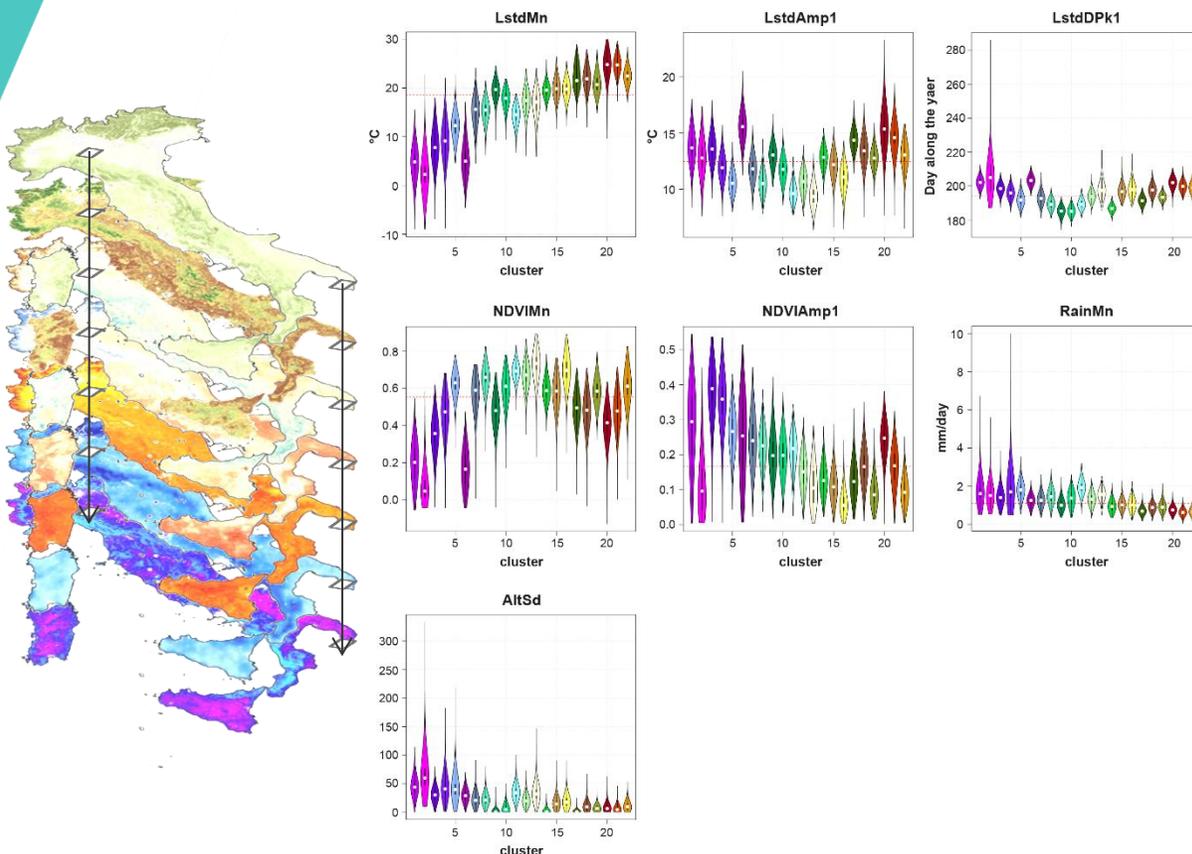
Copernicus programme

NDWI

Moisture index

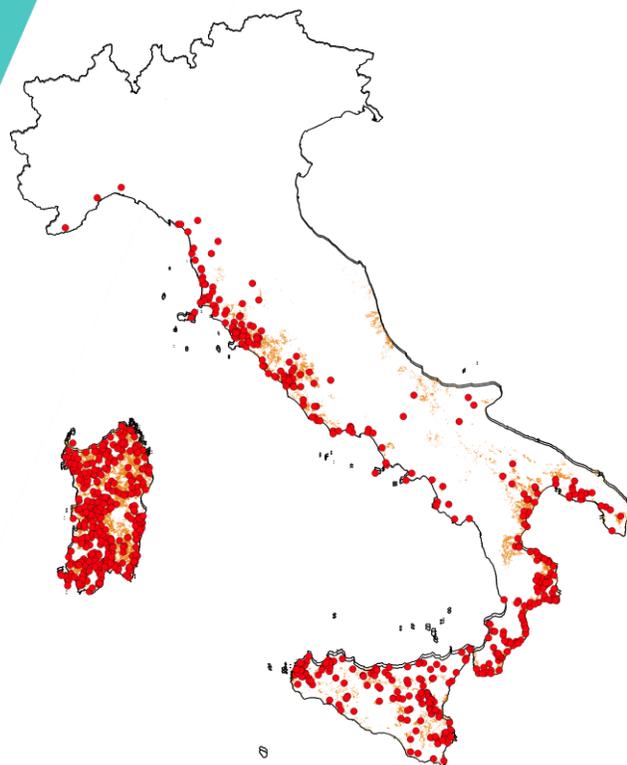True color

ECOREGIONALIZATION and vector-borne disease

Is the process through which a territory is classified into similar areas according to specific environmental and climatic factors (e.g., elevation, vegetation, rainfall, temperature)
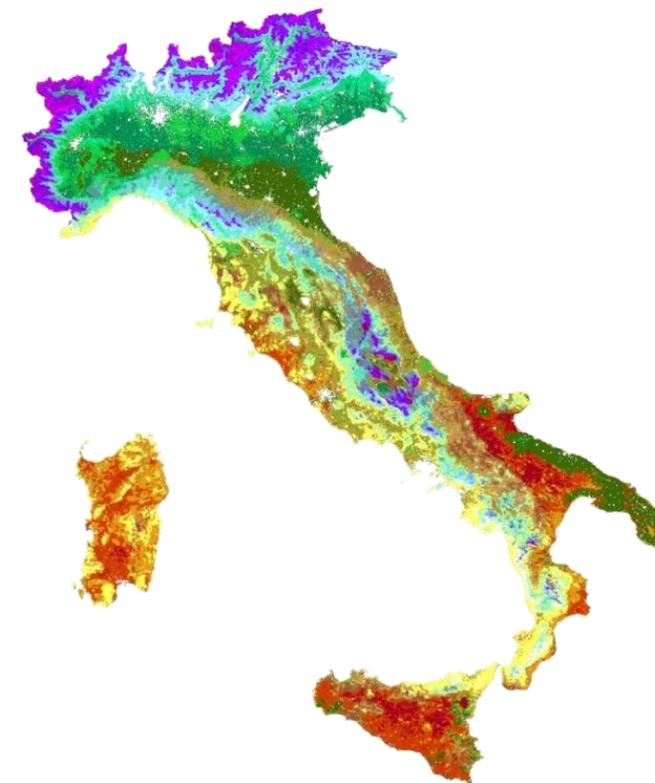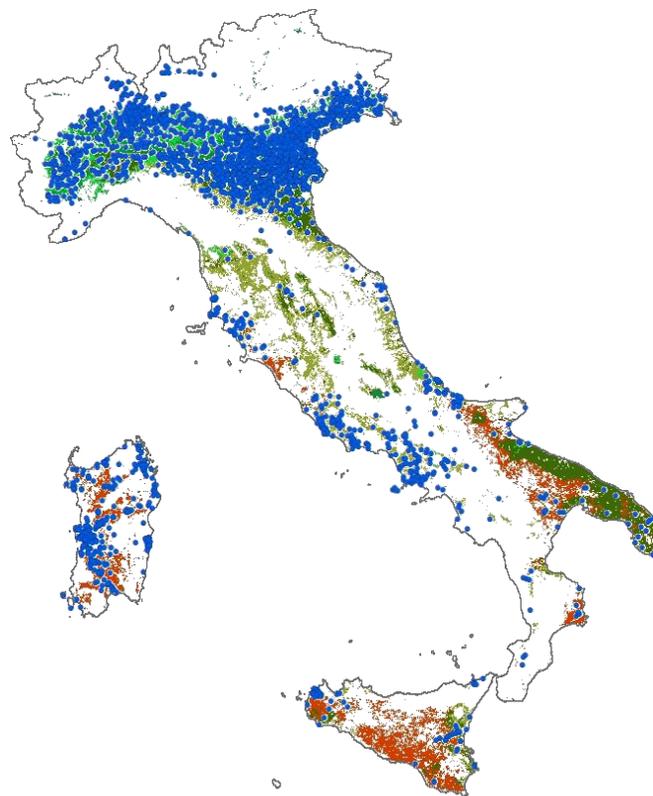

Ippoliti et al. PLoS ONE 14(7): e0219072.

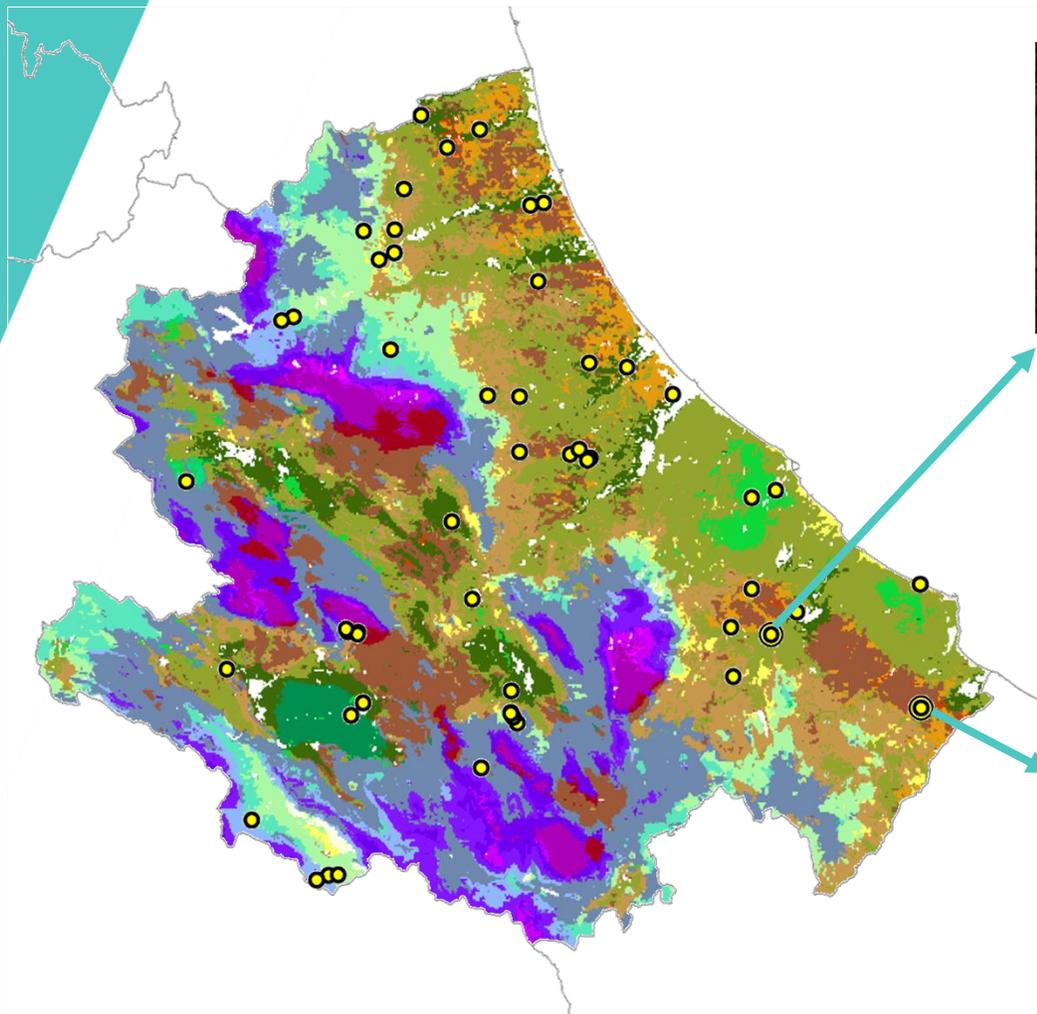**ECOREGIONALIZATION and vector-borne disease**

C. imicola

WND cases

ECOREGIONS and mosquitoes

Altino (CH) 2019-2022
6407 mosquitoes 13 species
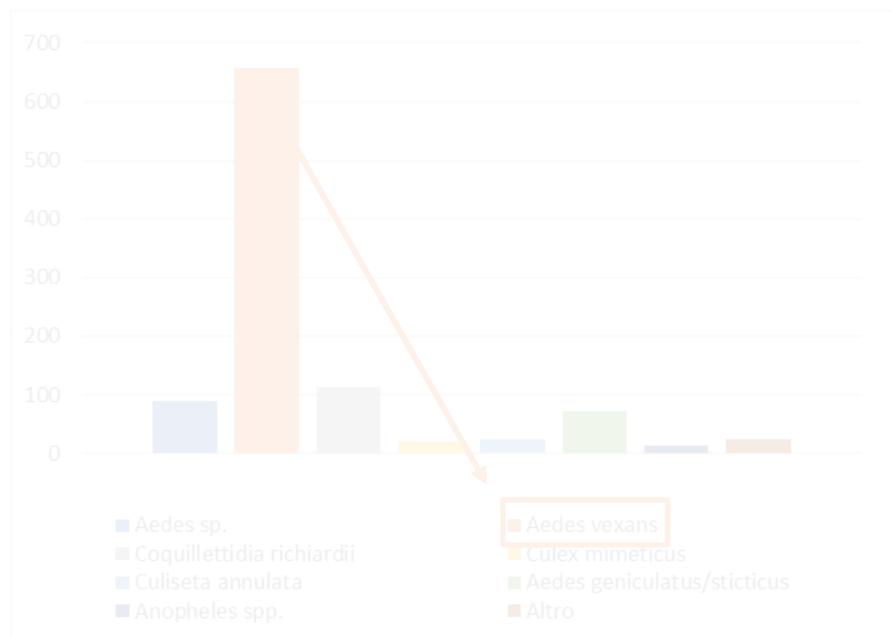**5395 (84,2%)** *Cx. pipiens* s.l.

ecoregion 19

ecoregion 22

Fresagrandinaria (CH) 2019-2022
4478 mosquitoes 16 species
3486 (77,8%) *Cx. pipiens s.l.*
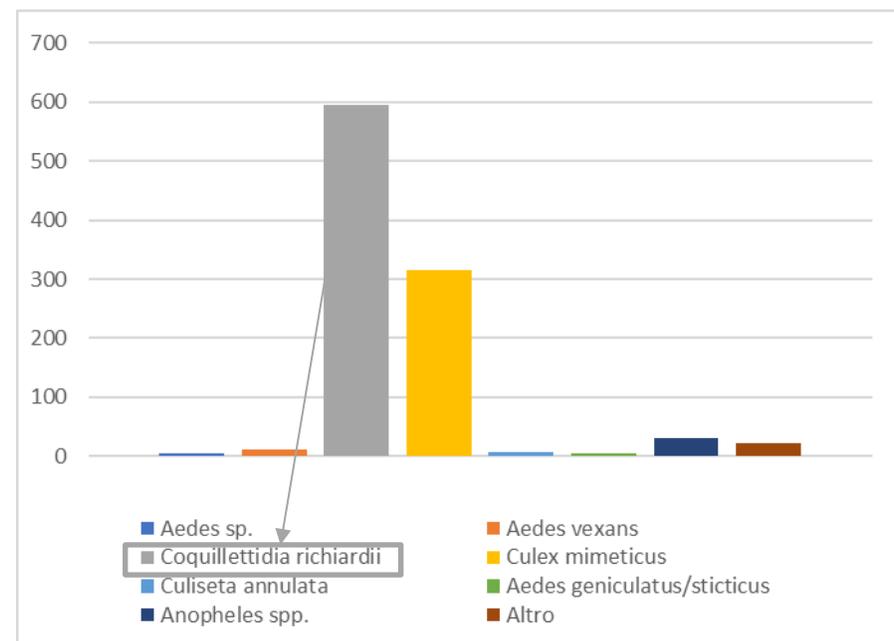
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ECOREGIONALIZATION and vector-borne disease

DIFFERENT ECOREGIONS 2019–2022

Cx pipiens 5395

Cx. pipiens 3486
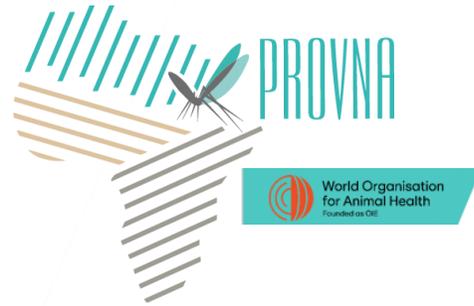
Ecoregion 19 – Site Altino

Ecoregion 22 – Site Fresagrandinaria

DIFFERENT ECOREGIONS means:

1. Different vectors and different vector species
2. Possibility of different viruses and diseases
3. Different seasonality and vector population dynamic
4. Different surveillance strategies to be implemented
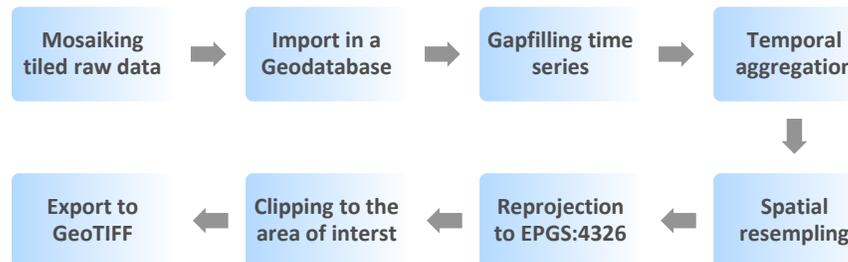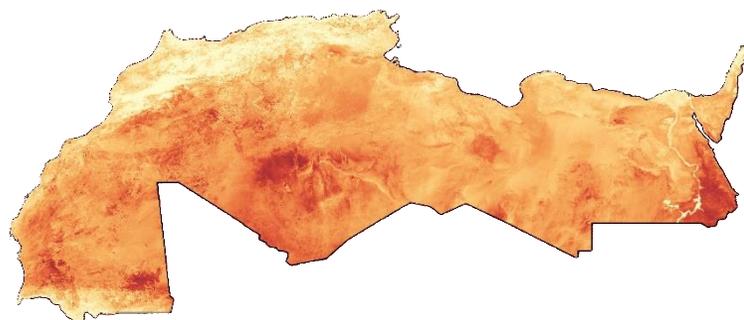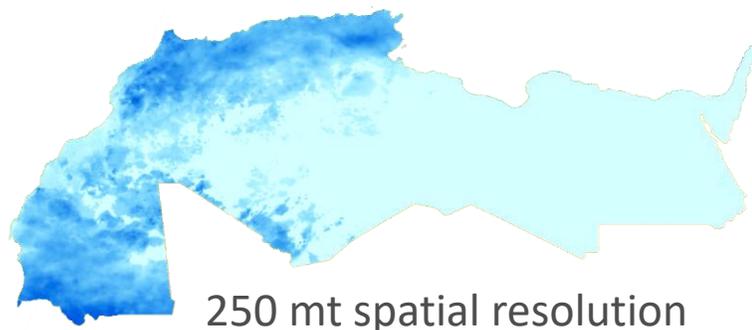5. Different changes in the next decades to be monitored
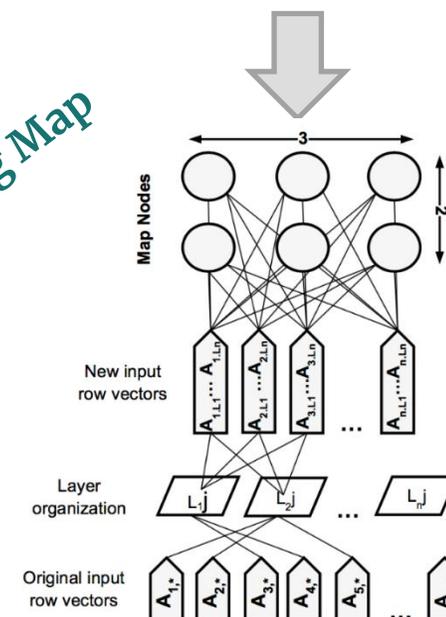
ECOREGIONS IN NORTH AFRICA

The climate and the environment strongly influence the presence and distribution of vectors responsible for significant human and animal diseases worldwide. It is then useful to develop a map of similar eco-climatic regions adopting a data-driven spatial clustering approach using recent and detailed spatial data on climatic and environmental factors.
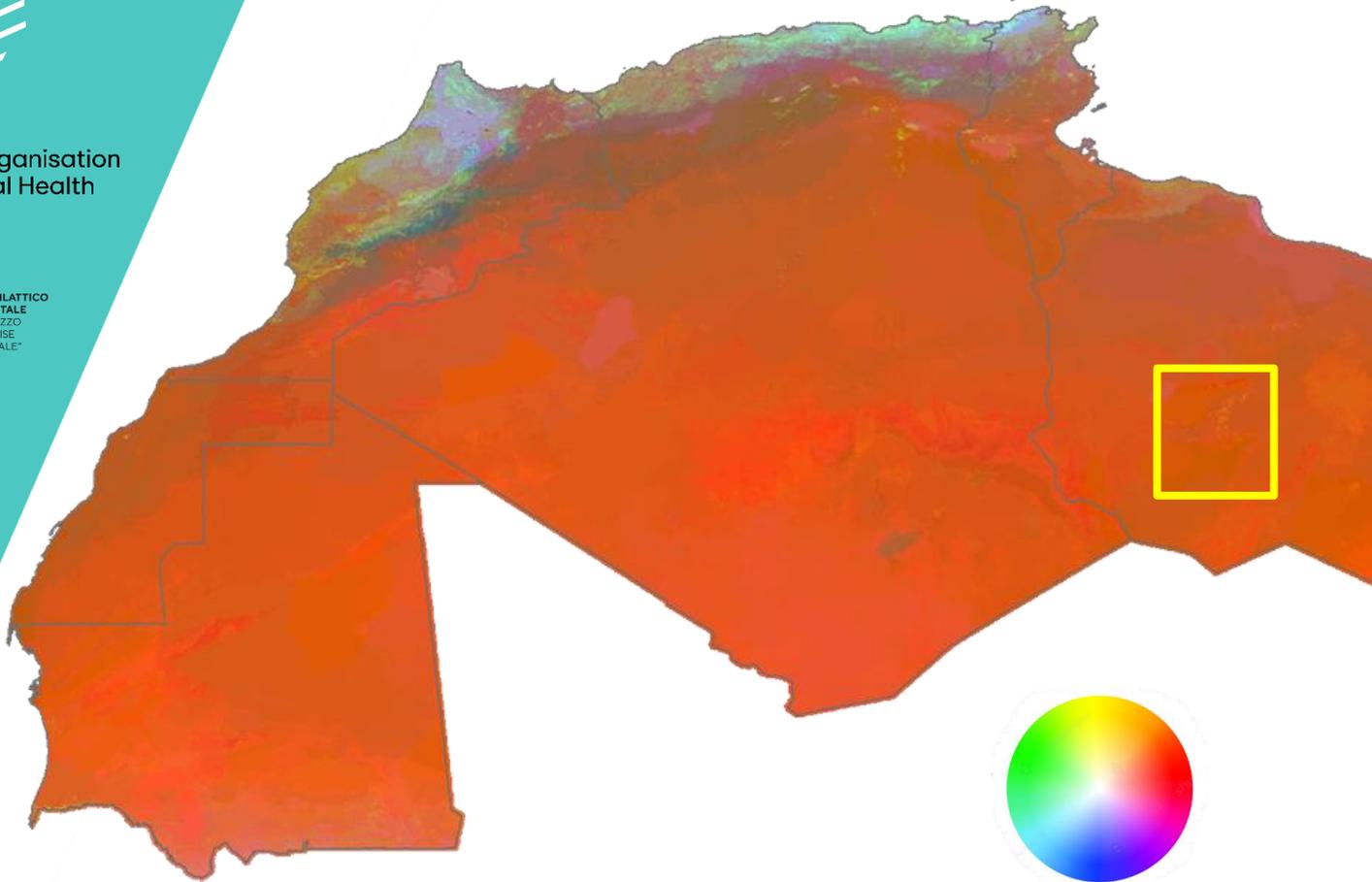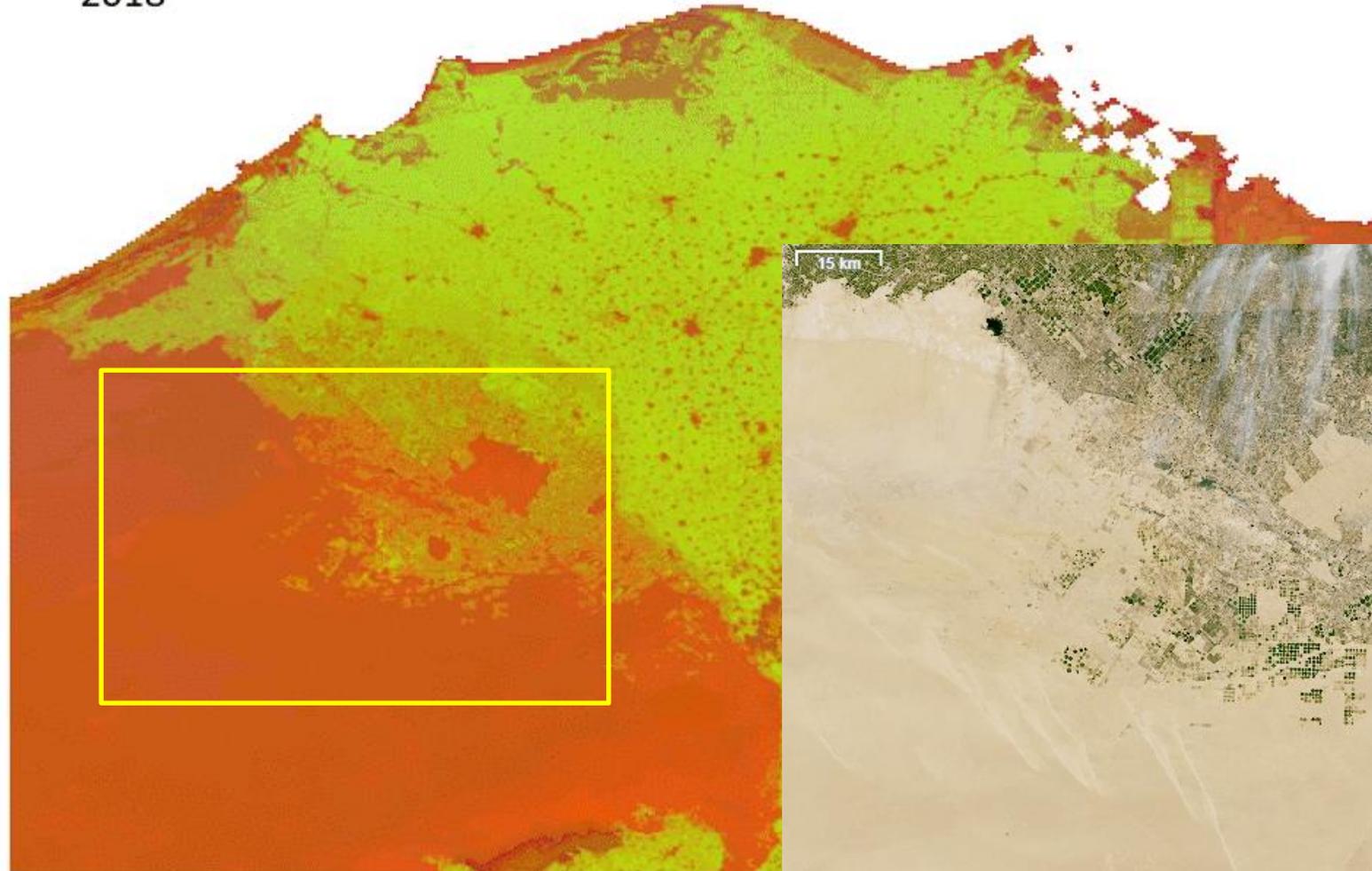
ECOREGIONS IN NORTH AFRICA

rainfall

250 mt spatial resolution

16 days temporal resolution

Mosaiking tiled raw data → Import in a Geodatabase → Gapfilling time series → Temporal aggregation

Export to GeoTIFF ← Clipping to the area of interst ← Reprojection to EPGS:4326 ← Spatial resempling

Super Self-Organising Map
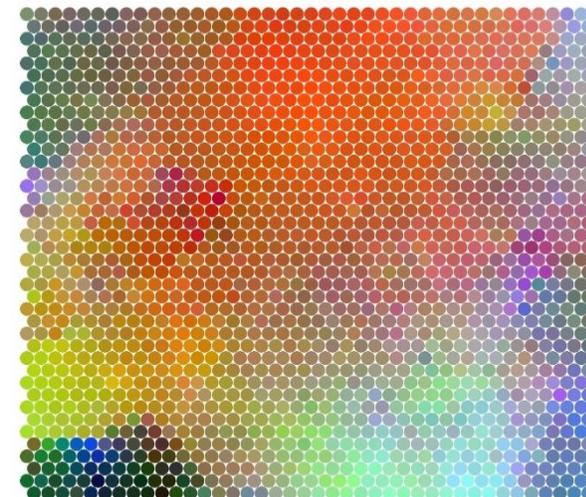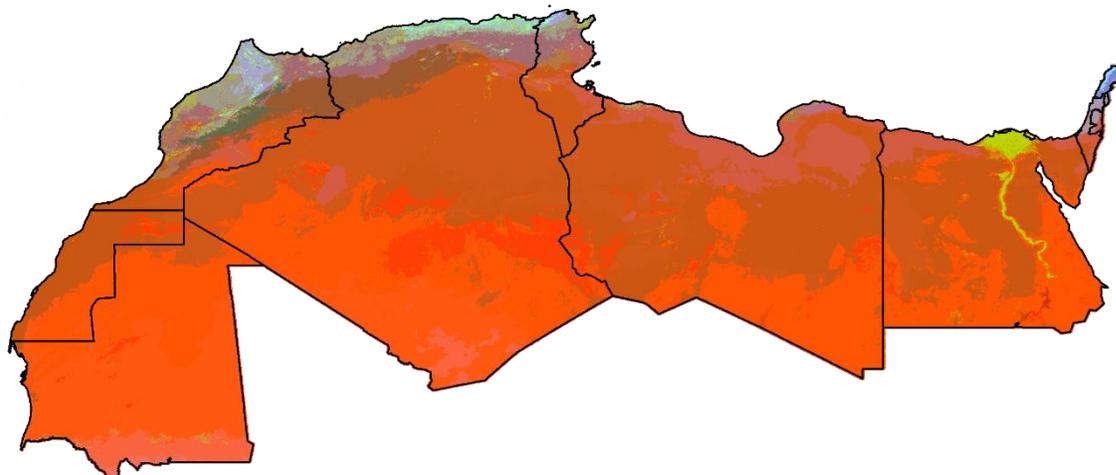
ECOREGIONALIZATION in North Africa
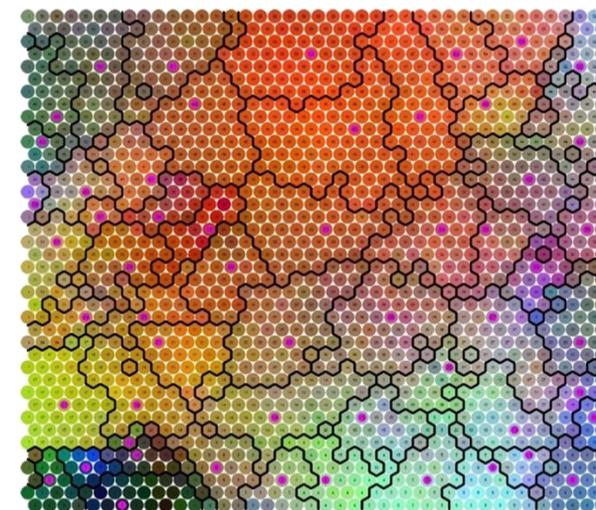
2018

2018-03-13

15 km
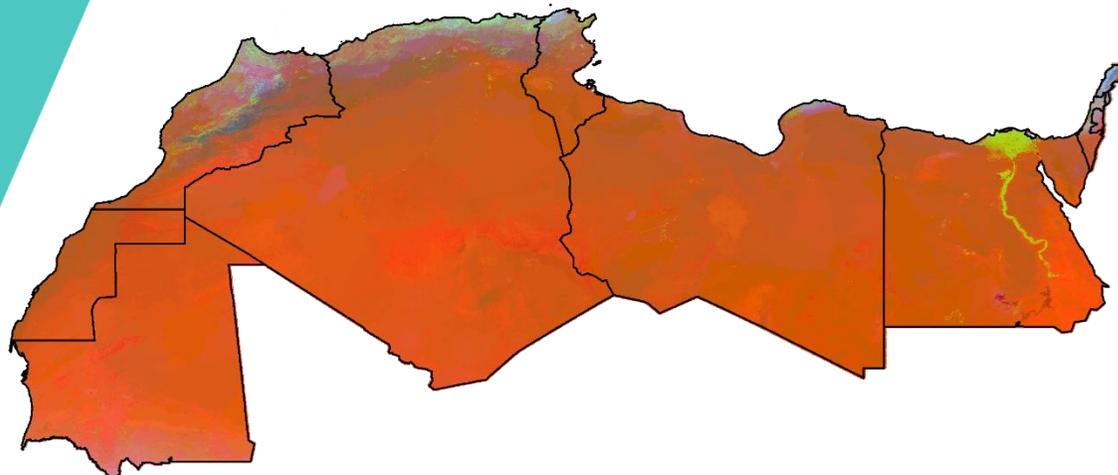
1600 ecoregions

55 ecoregions

Cluster : Affinity propagation

Thank you