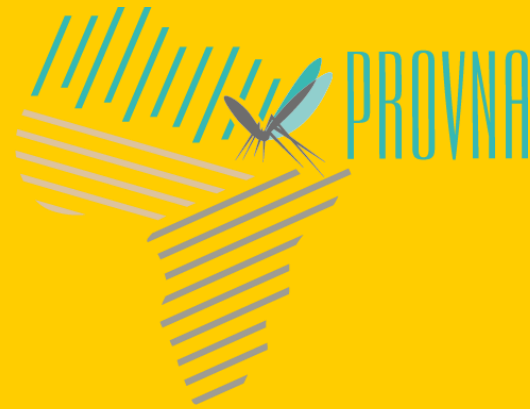


ECOREGIONS in North Africa



Annamaria CONTE

Closing Workshop Phase 2 PROVNA project
Tunis, 21-22 April 2026



PROVNA projects



World Organisation
for Animal Health
Founded as OIE

PROVNA1 2022



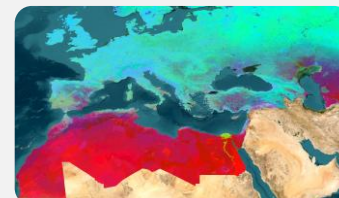
Identification of
ecoregions in NA

PROVNA2 2024



In field activity
for validation

PROVBAC 2025



Identification of
ecoregions in
Balkans +NA

Ecoregions

Main objective: 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.

Climate and environment strongly influence the presence and distribution of vectors responsible for VBDs

Given the presence of susceptible hosts and competent vectors it can be assumed that areas with similar climatic and environmental conditions (in space and/or time) are *potentially* exposed to similar diseases



Why Ecoregions?

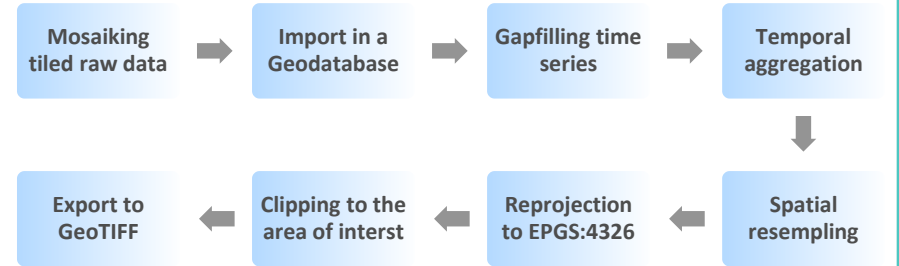
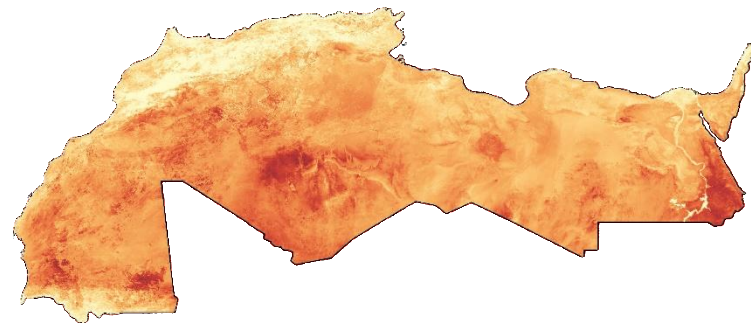
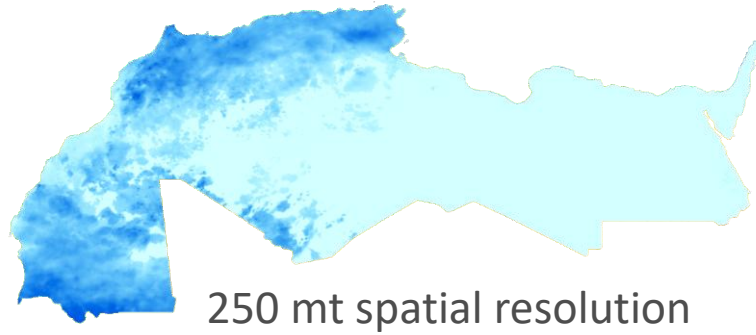
Identifying **similar** areas does not aim to establish an association between specific vectors and specific environmental conditions, but it seeks to highlight areas **sharing** similar characteristics, in order to *a priori* identify regions where vectors may establish and where vector-borne diseases (VBDs) could potentially spread.

However, ecoregion maps (alone)

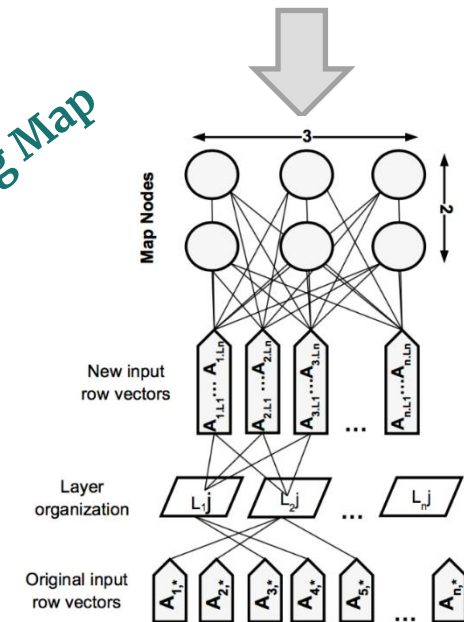
- are NOT a risk model
- are NOT an early detection tool
- are NOT specific for a disease

ECOREGIONS IN NORTH AFRICA

rainfall



Super Self-Organising Map



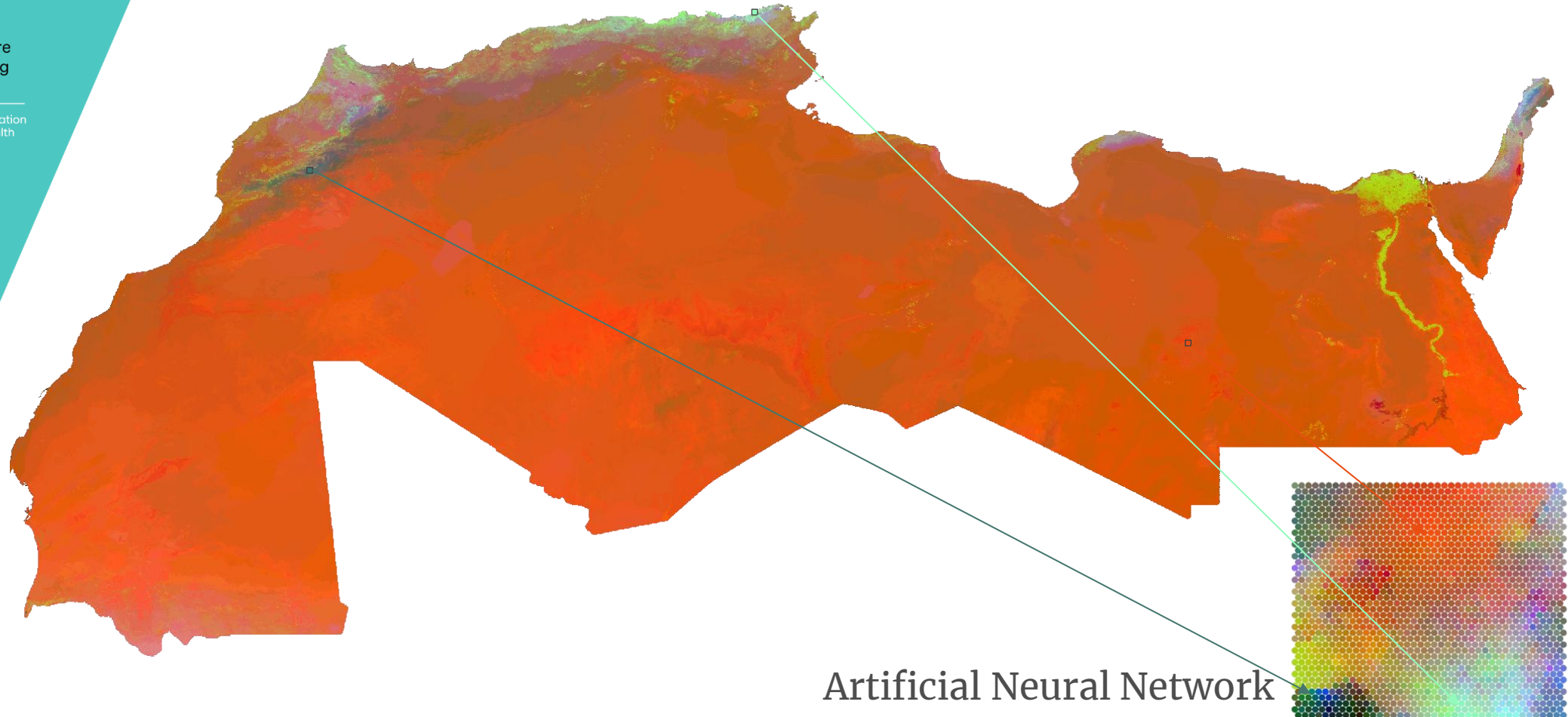
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for epidemiology, modelling
and surveillance



ECOREGIONALIZATION in North Africa 1600 nodes



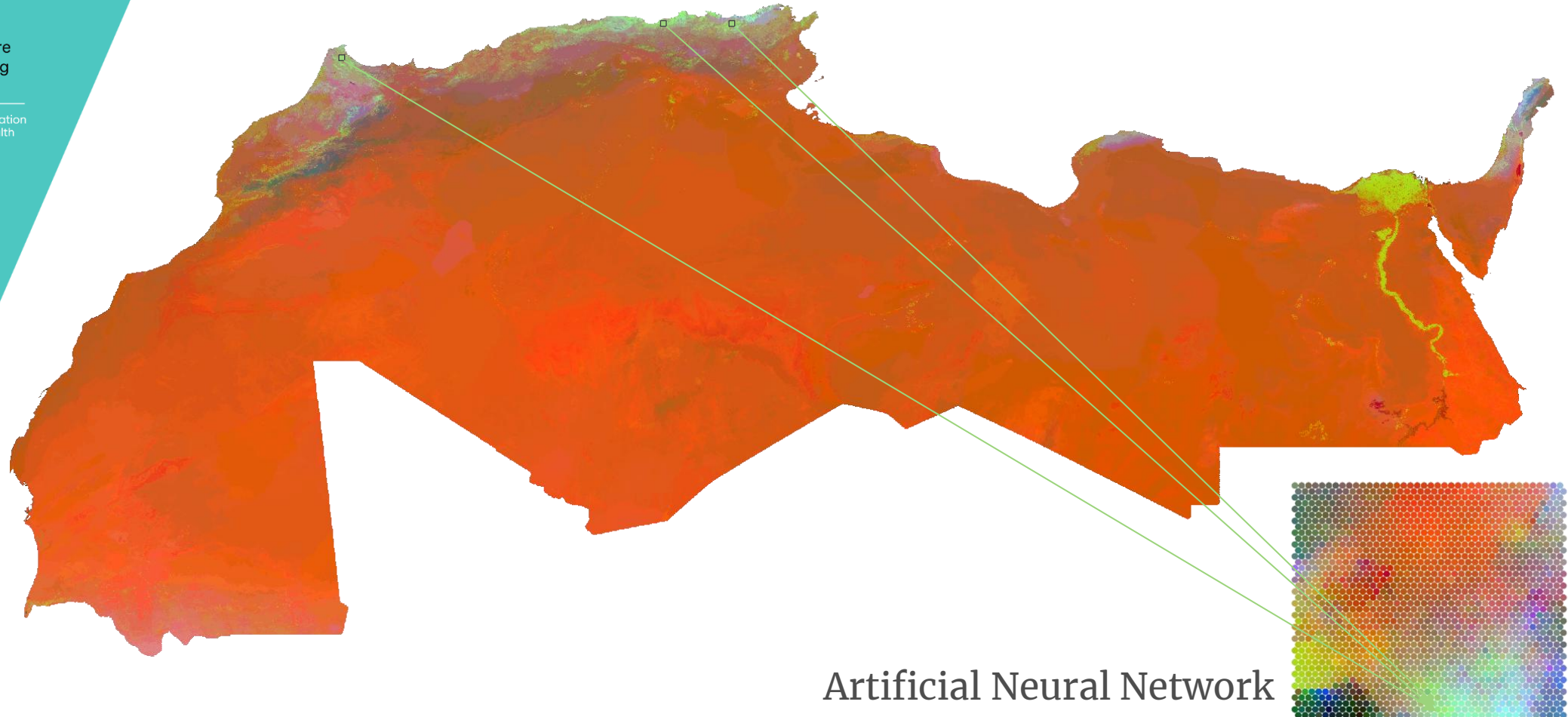
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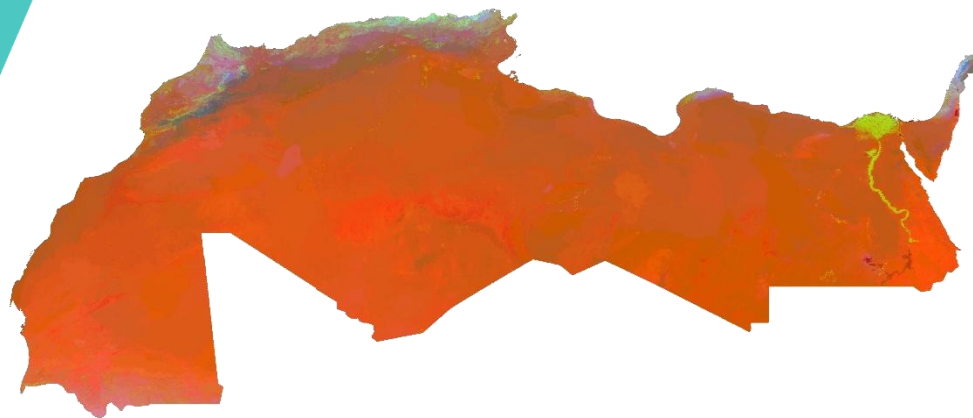


ECOREGIONALIZATION in North Africa 1600 nodes

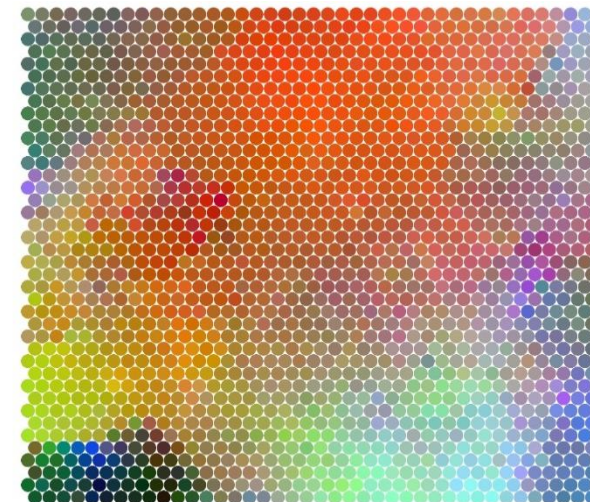
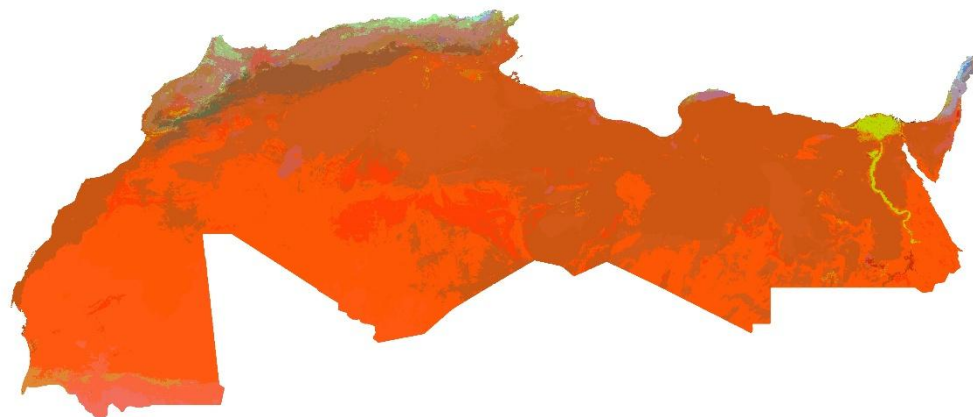


Artificial Neural Network

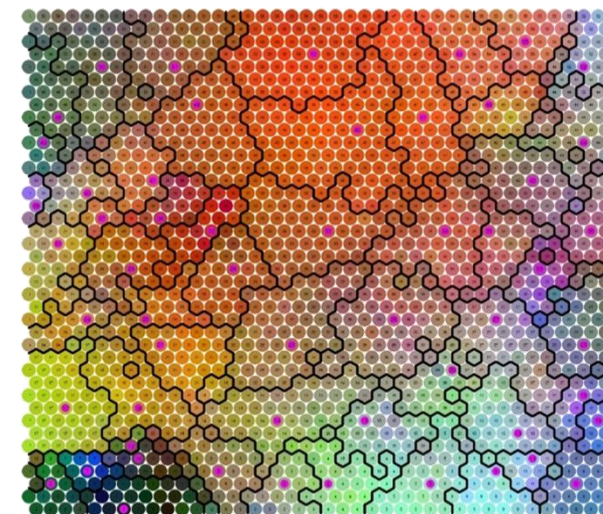
1600 ecoregions



55 ecoregions



Cluster : Affinity propagation



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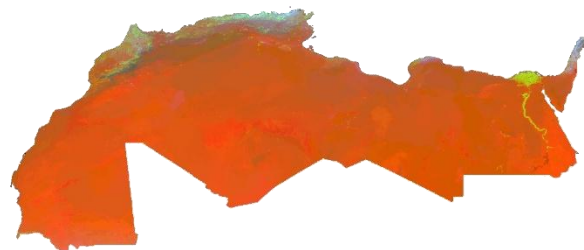
T E R A M O

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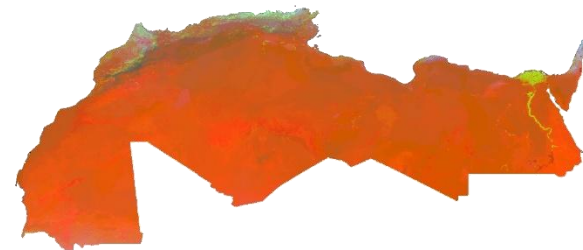


ECORGINALIZATION in North Africa One map every year

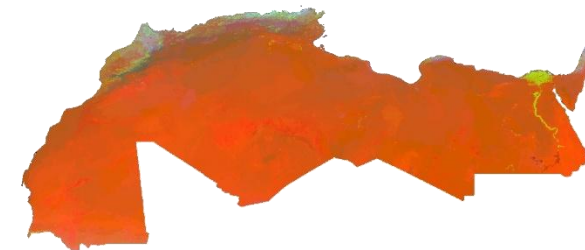
2019



2020



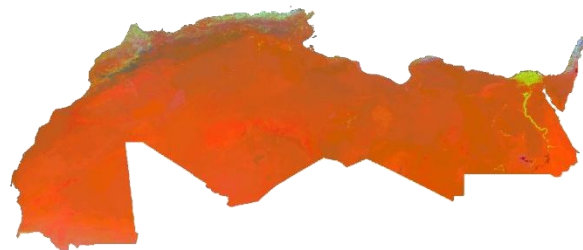
2021



2022



2023



2024



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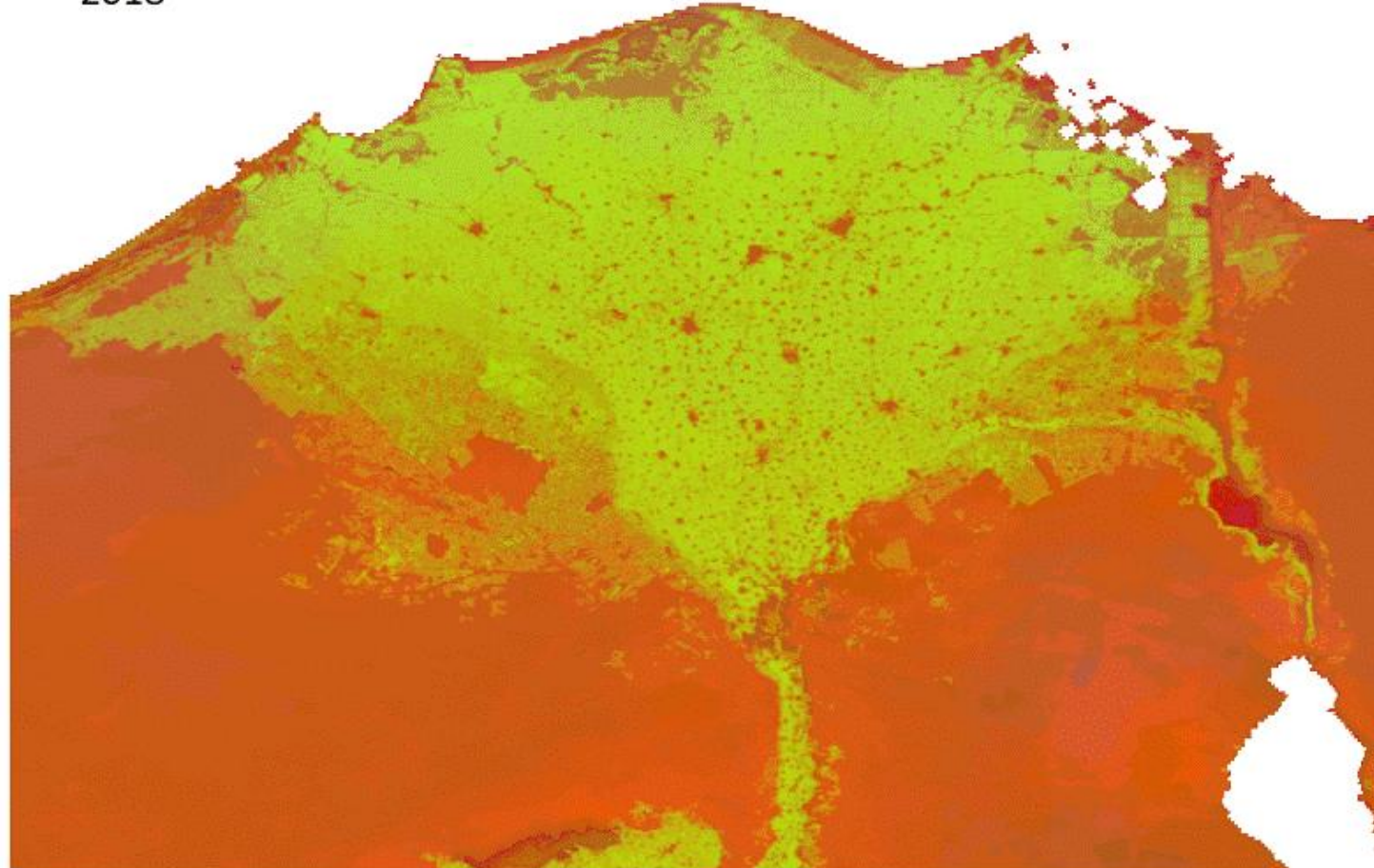
Reference Centre



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ECORREGIONALIZATION in North Africa

2018



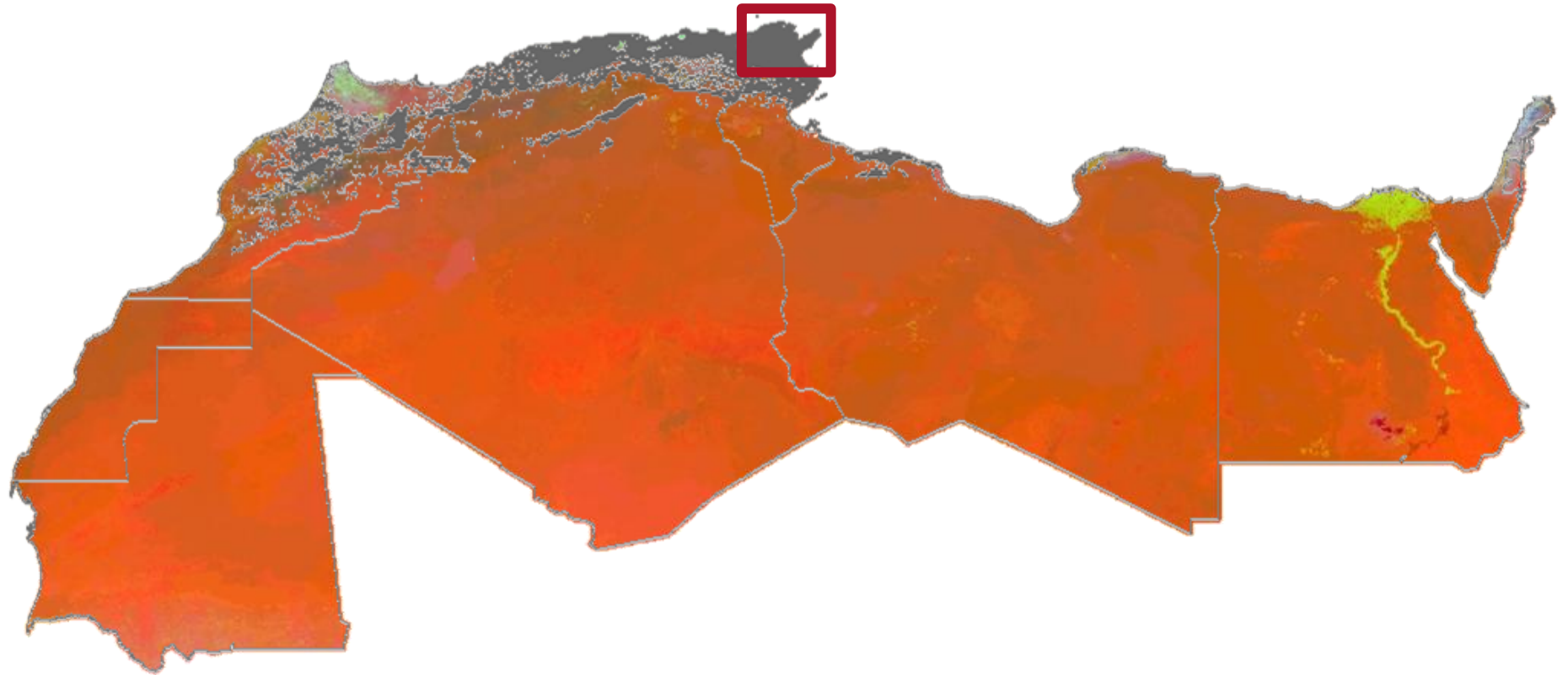
ECOREGIONALIZATION in North Africa

https://mapserver.izs.it/gis_provna_viewer/

The screenshot displays the PROVNA GIS application interface. The main map shows a satellite view of North Africa with a semi-transparent orange overlay representing ecoregionalization data. The interface includes several panels:

- Layer management:** Contains options for Basemap (Satellite, OpenStreetMap, Dark Basemap), Ecoregions (Data and selection layers adjustment), Data opacity (slider from 0 to 100), Selection opacity, and Selection color.
- Data inspector:** Features an 'Image/Year' selector with a dropdown set to 'Pred 55' and a timeline from 2018 to 2024. It also includes an 'Analysis result' section with a 'Click on the map to view the point's cluster and a chart of its values over time' instruction, an 'Ecoregion class' dropdown set to '21', and a 'Values over time' section with a chart showing data points from 2018 to 2024. The chart shows a general upward trend in the 'Ecoregion Class' value over the period.
- Map controls:** Includes a zoom in (+) and zoom out (-) button, a scale bar (500 km and 100 km), and a mouse position display at the bottom: 'Mouse position: 24.97591, 14.98221'.

Smilar ecoregions in a defined area



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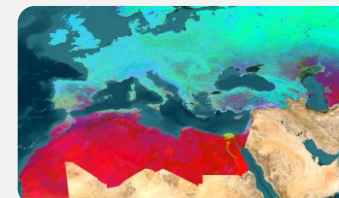
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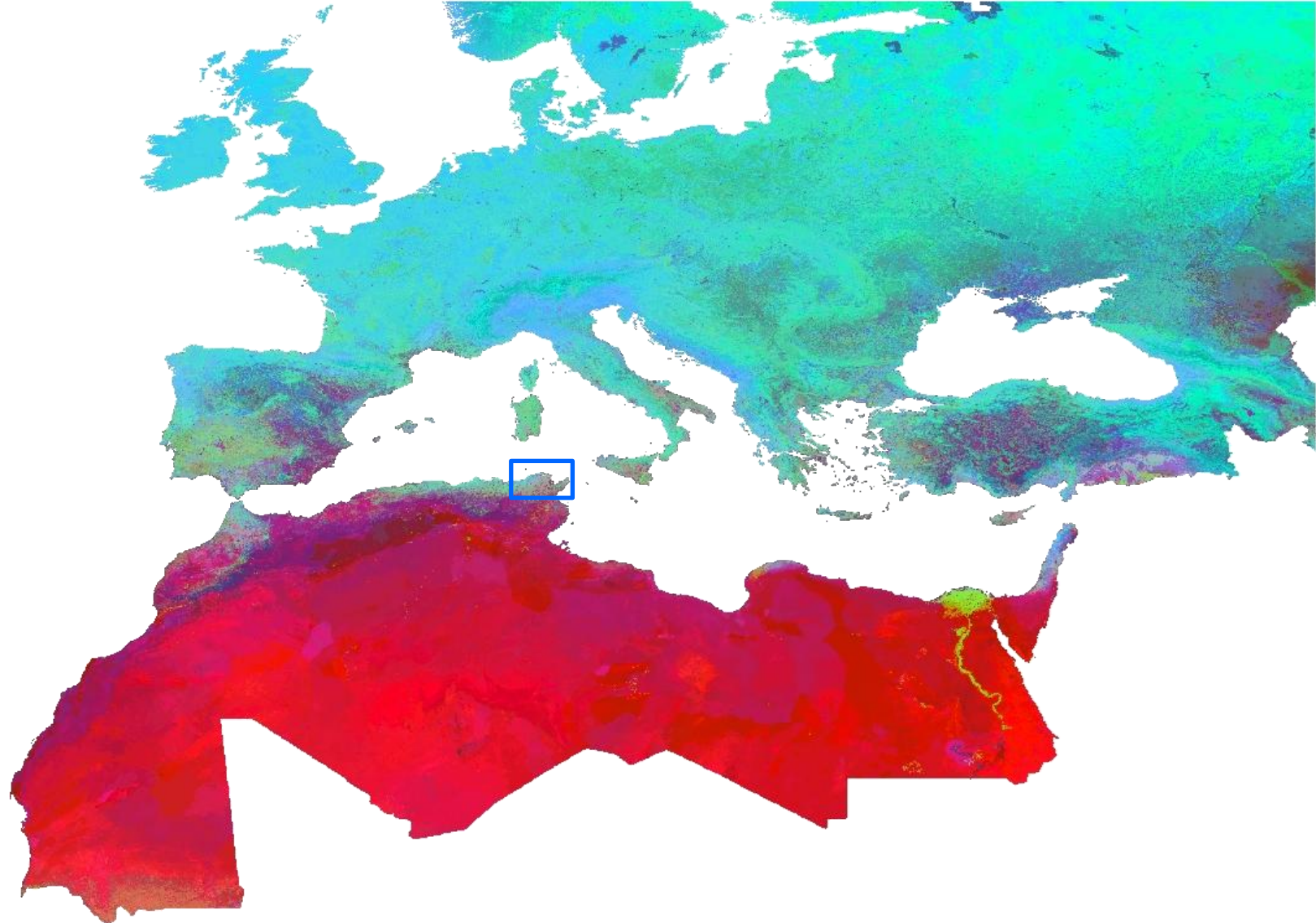
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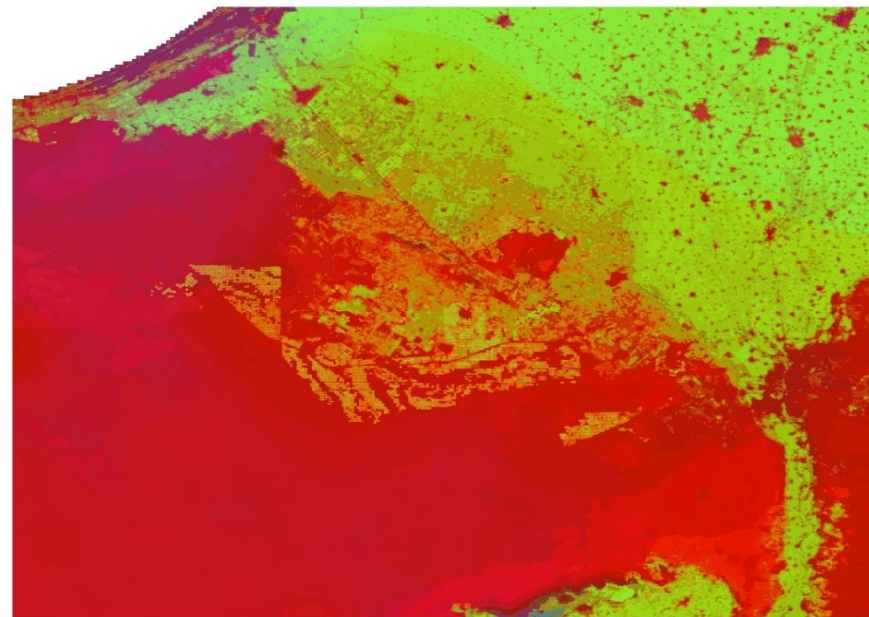
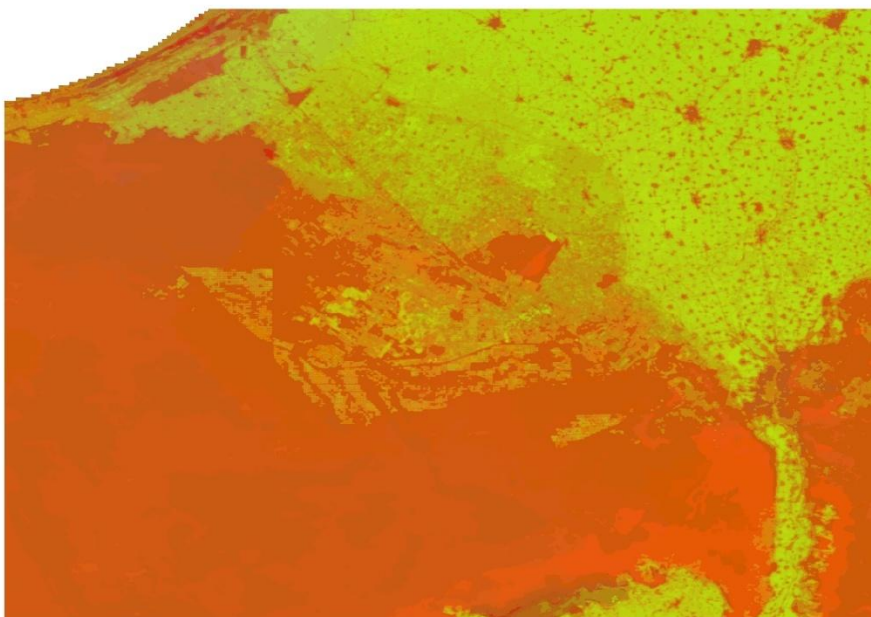
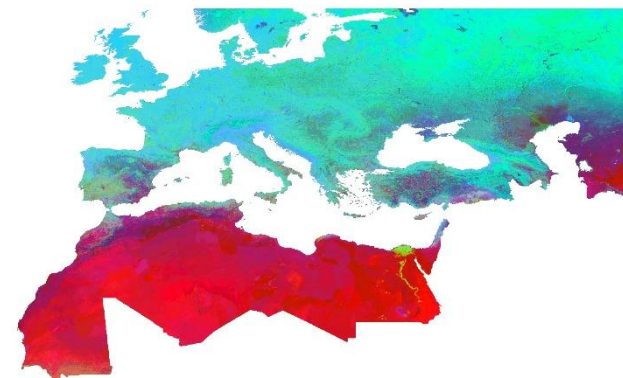


ECOREGIONALIZATION in North Africa and Europe

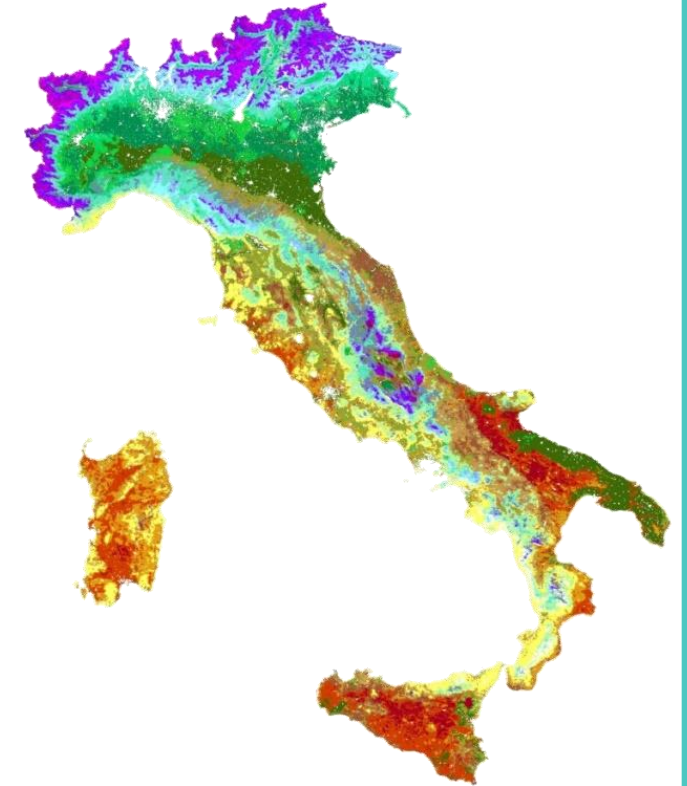
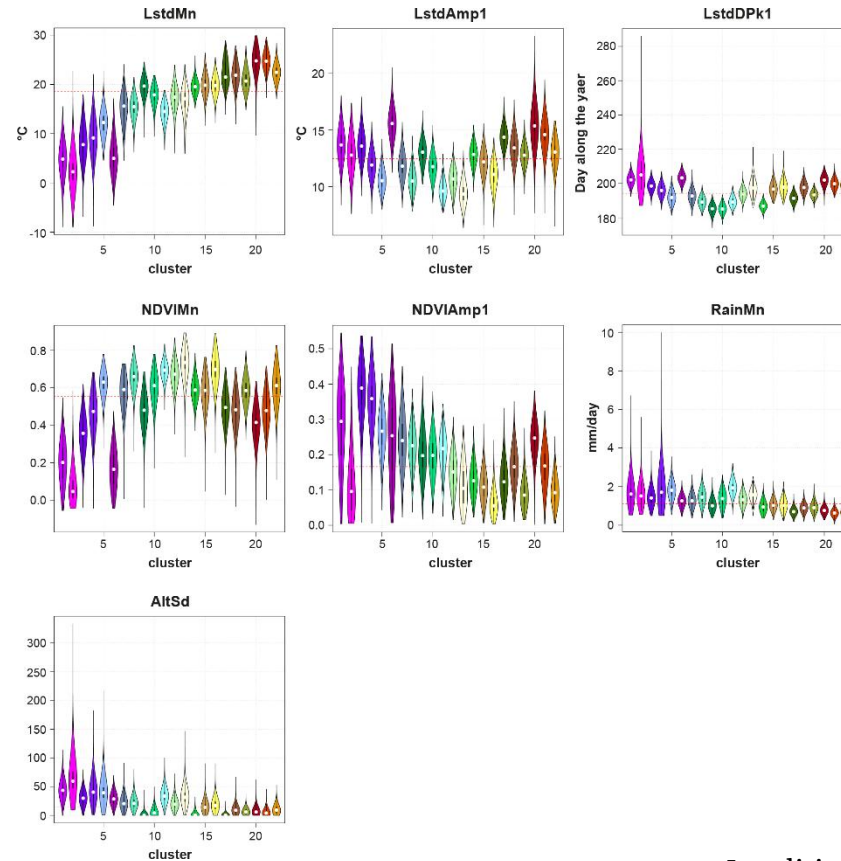
Ecoregions v1.0



Ecoregions v2.0



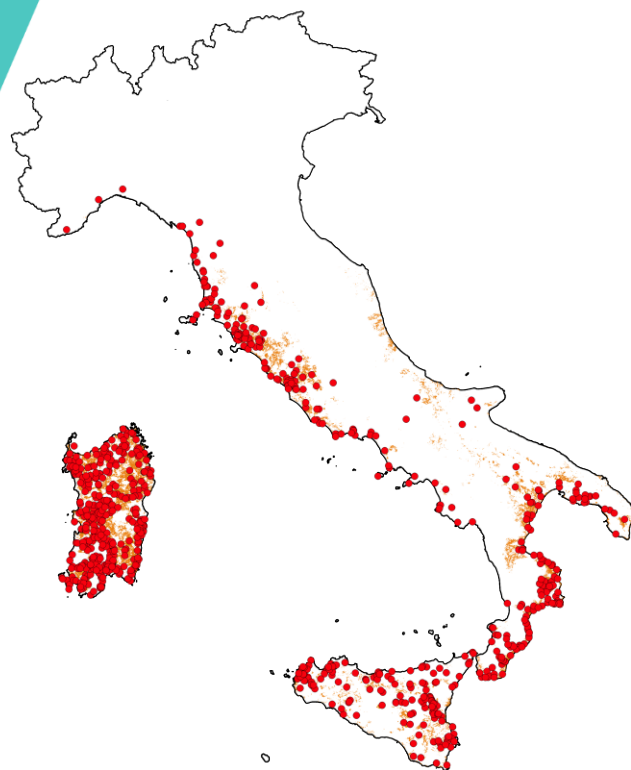
Where everything started from



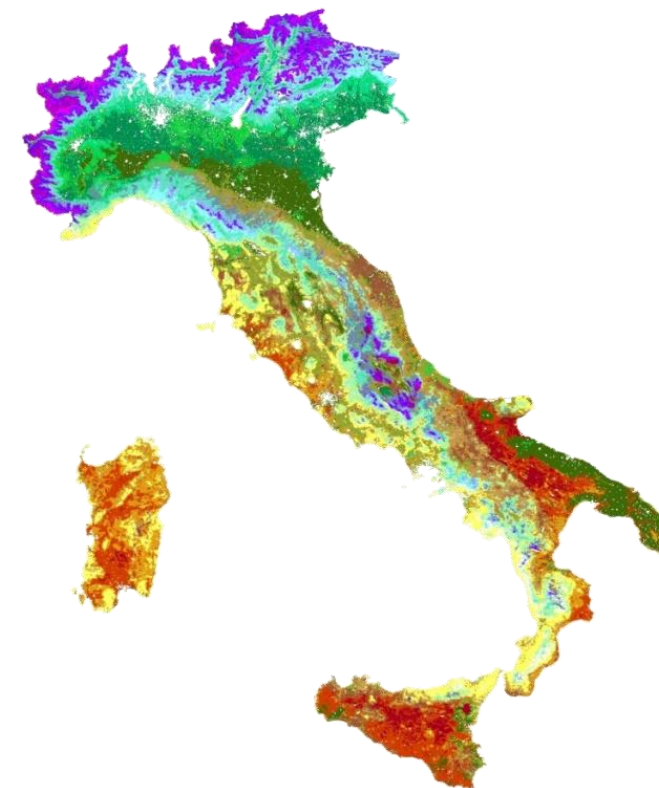
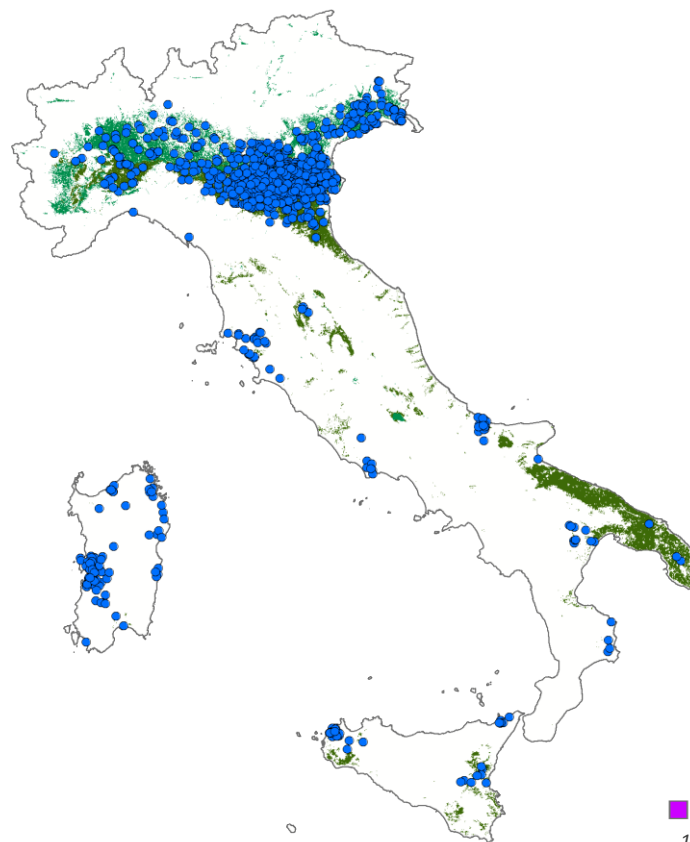
Ippoliti et al. PLoS ONE 14(7): e0219072. <https://doi.org/10.1371/journal.pone.0219072>

ECOREGIONALIZATION and vector-borne disease

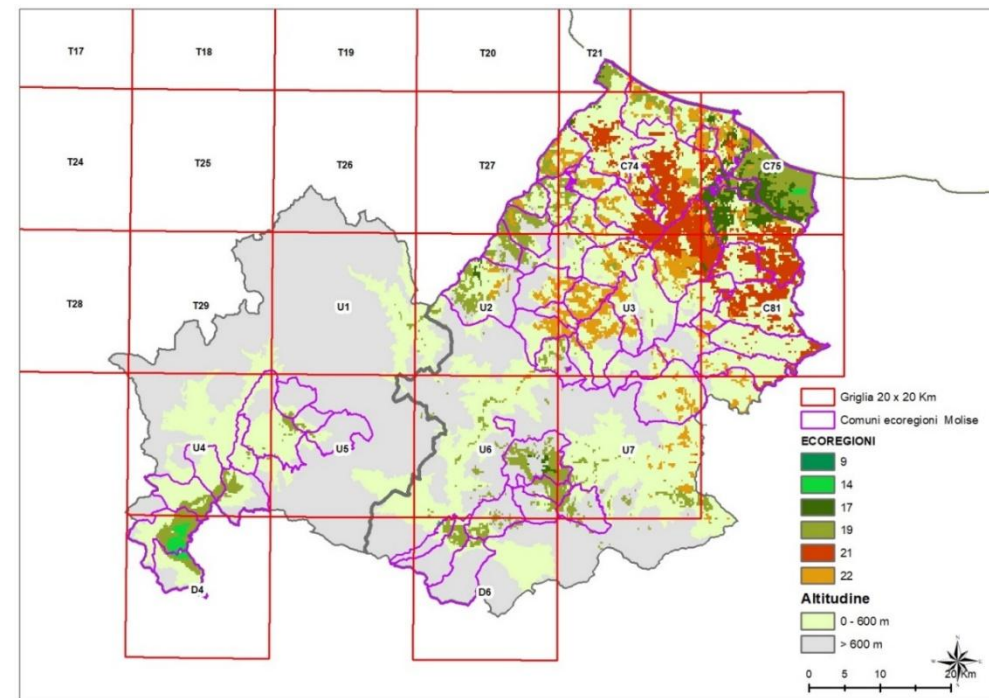
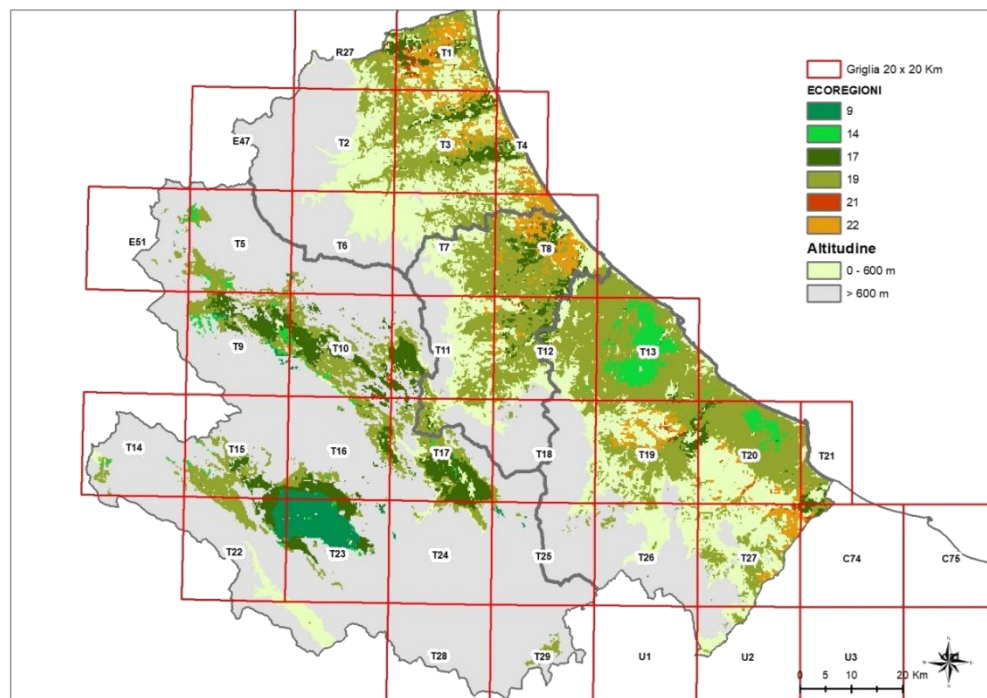
C. imicola



WND cases



Ecoregions in the Entomological surveillance in the National Vet Surveillance plan



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Thank you