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VeCTOR: Vector Climate Threat Online Resource

C3S DATA DRIVEN PLATFORM FOR VECTOR-BORNE DISEASE RISK ASSESSMENT

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The VeCTOR project aims to develop an online prognostic platform for climate-driven risk assessment of vector presence and vector-borne disease spread by exploiting the potential of the Copernicus Climate Change Service (C3S) infrastructure. Through this project, environment-driven spatio-temporal models of vector presence will be developed to enable daily, monthly, and annual risk prediction and the evaluation of vector control strategies for a growing list of disease vectors including mosquitoes and sand flies. Global surveillance data, collected as part of international collaborative initiatives such as **VectorBase** and **VectorNet**, and regional observations will be integrated, standardised, and exploited for improving predictive capacity and the range of applicability. The models will be curated and updated regularly through expert consultation and against the most recent observations. By integrating climate datasets in essential tools for surveillance and forecast, the VeCTOR demo case aims to facilitate regional (Europe) and global climate-related risk anticipation at multiple temporal and spatial scales. The platform will serve and promote outreach to experts, decision- and policy-makers, and facilitate effective communication with the public.
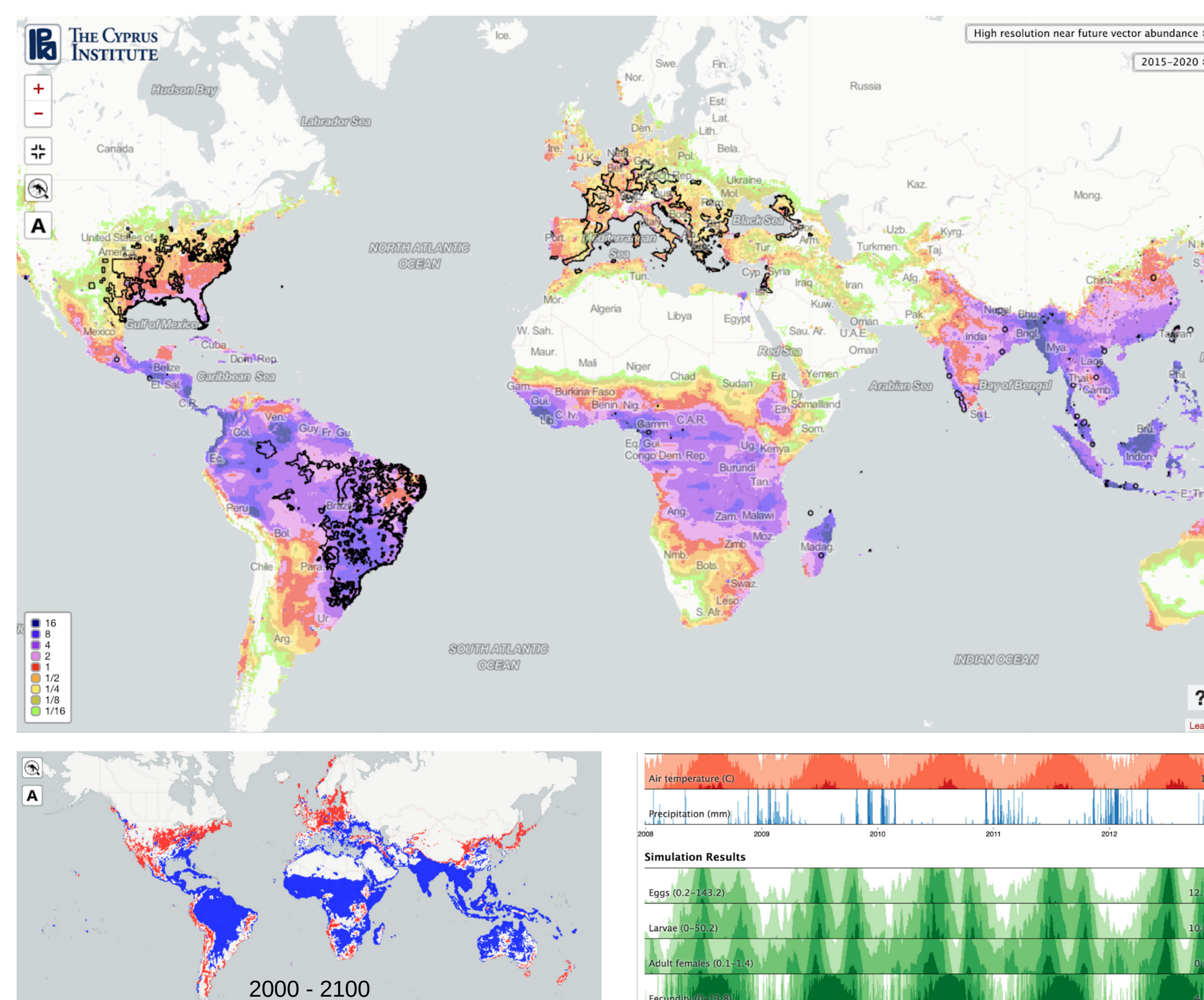
Proof of Concept

The online geographic information platform for vector risk assessment and seasonal profiling is available at **vbd.cyi.ac.cy** as a proof of concept implementation. The web platform displays global vector presence and habitat suitability for the Asian tiger mosquito as predicted by the **FuzzyLoc** and **PopDM** models. The platform enables *ad hoc* simulation of climate-driven mosquito abundance using different climate datasets and present predicted mosquito activity at selected times and scales based on available data and simulations.

ERA5 hourly data on single levels
(1979 – present)
UERRA reanalysis for Europe on single levels
(1961 – present)
Seasonal forecast daily data on single levels
(2017 – present)
CMIP daily data on single levels
(present – 2100)

Climate Datasets (C3S)

Large-Scale Modelling Framework

The models are trained for field conditions by assimilating surveillance data with experimental data and large-scale climate and environment datasets.
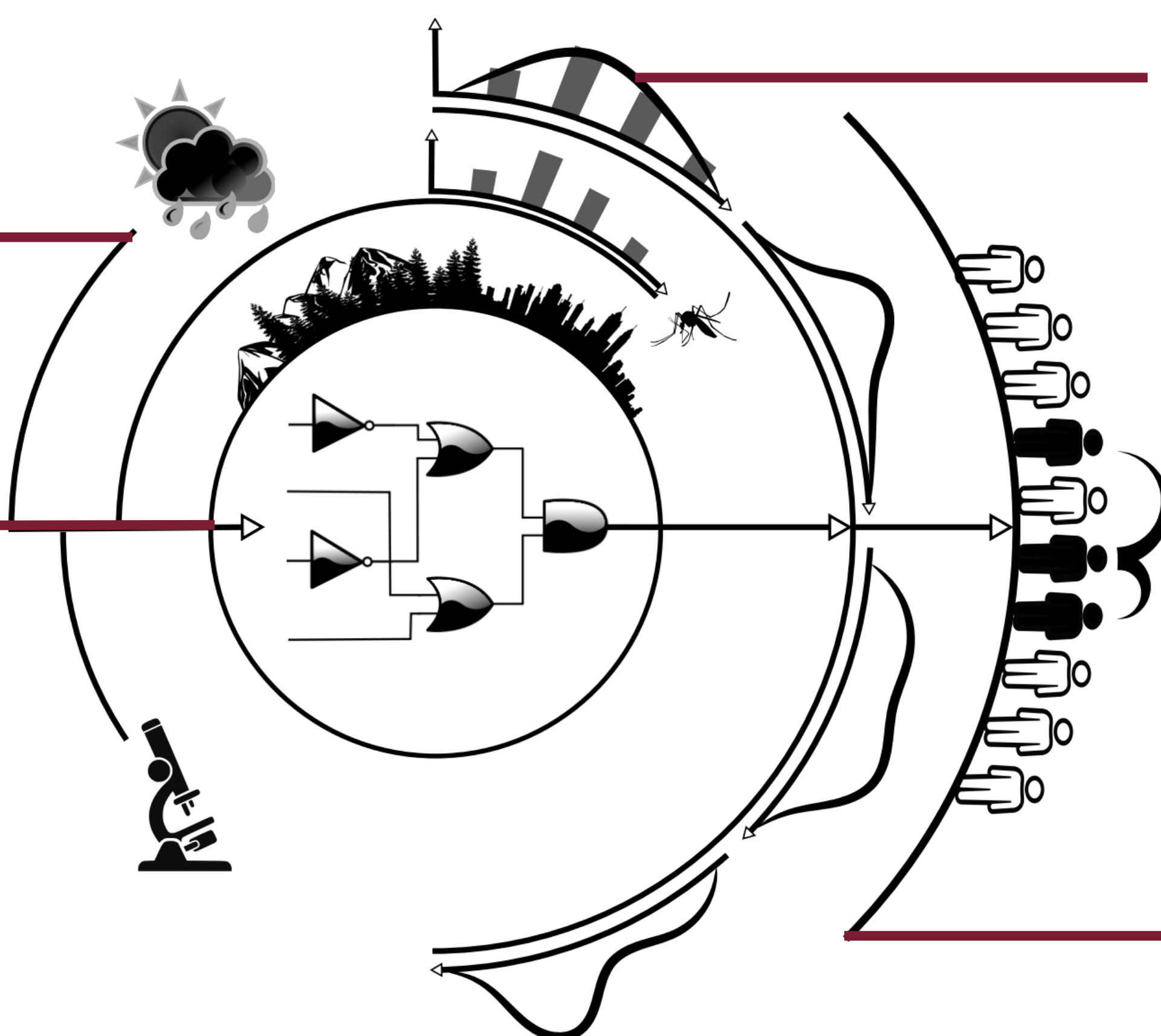
Model Ensemble

FuzzyLoc
A habitat suitability model with a decision support system using fuzzy logic inclusion criteria
VectorAI
An ecological niche model augmented with supervised machine learning and deep learning algorithms.
PopDM
A large-scale climate-driven population dynamics model with stage- and age-structure

Vector-borne disease risk assessment and dynamics of spread over large scales at regional and/or global levels.

Risk Assessment

References

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