# Modelling for the global management of vector-borne diseases

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NATIVE AND NON-NATIVE VECTOR MANAGEMENT "HE EASTERN MEDITERRANEAN AND THE MIDDLE EAST (EMME) 18-20 April 2018 Akrotiri Environmental Education and Information Centre. Cyprus





#### Global vector and disease modelling





#### The Asian tiger mosquito: Aedes albopictus





## Climate-driven Aedes albopictus population dynamics model

#### Ovitrap data



Albieri, A. *et.al.* 2010. Bull. Insectol. (Summary data kindly provided by Romeo Bellini)

#### Grid points



Erguler, K. et.al. 2016. PLOS ONE.





#### Climate-driven Aedes albopictus population dynamics model

















































#### Goodness of fit over Emilia-Romagna





## Predicting vector dynamics over Europe

Bologna



#### http://vbd.cyi.ac.cy



## Predicting vector dynamics over Europe

Nicosia



http://vbd.cyi.ac.cy



#### Global environmental suitability for the tiger mosquito



http://vbd.cyi.ac.cy



#### Future environmental suitability for the tiger mosquito



http://vbd.cyi.ac.cy



#### Global vector and disease modelling





#### Modelling Aedes albopictus-borne chikungunya





#### Time-dependent outbreak probability and impact in Ravenna









#### Environmentally-driven sand fly model





## Surveillance data from Greece, Cyprus, and Turkey





### Model fit to calibration data





## Model validation



Longitudinal data from Crete and Cyprus were informative:

- Environmental dependency
- Sand fly dynamics in Adana





## Daily abundance of Ph. papatasi in Cyprus





#### Daily abundance of Ph. papatasi in Cyprus





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