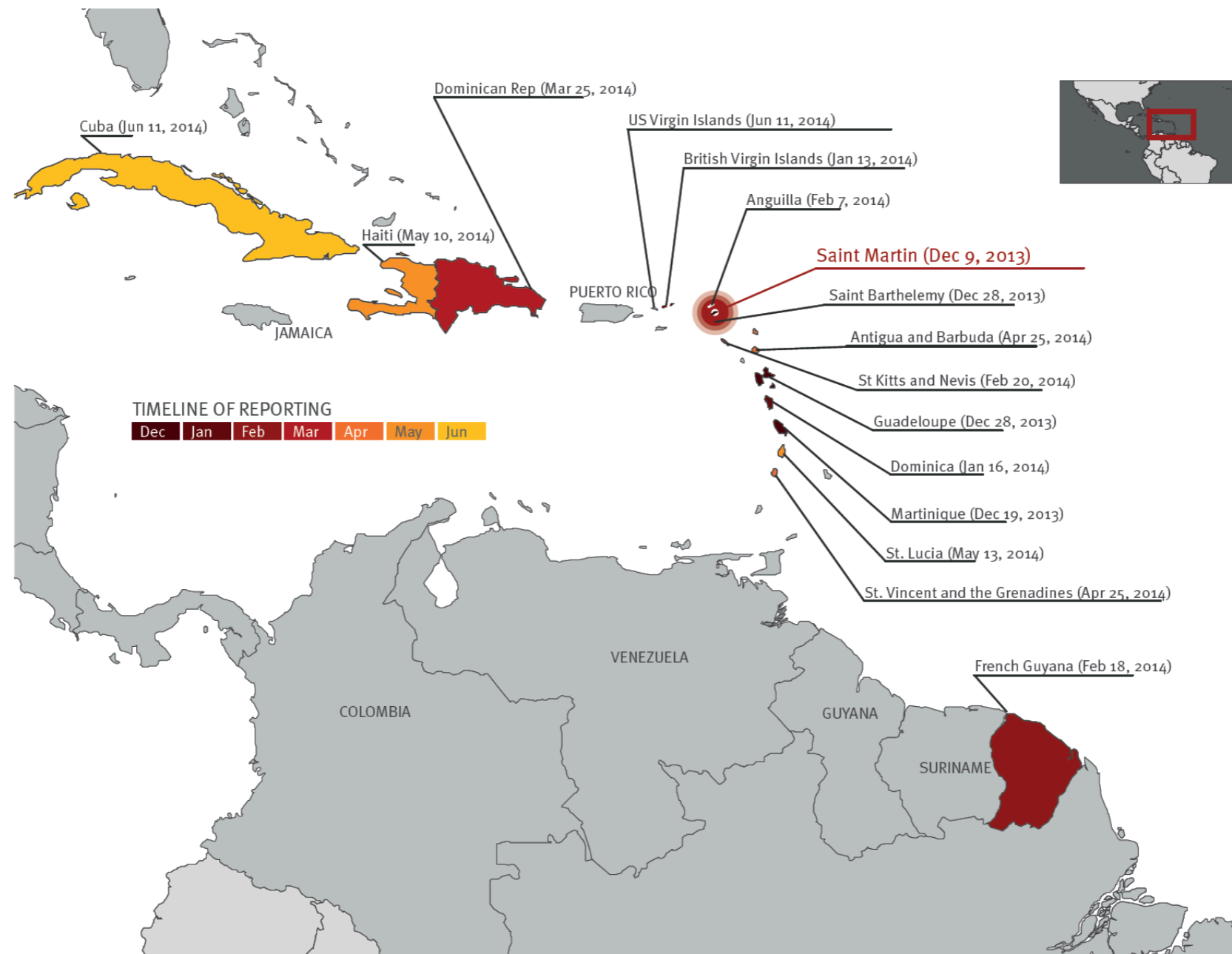


Chikungunya outbreak in
Caribbean island: drivers of
spatio-temporal dynamics and
consequences for epidemics
probability in metropolitan France

Benjamin Roche

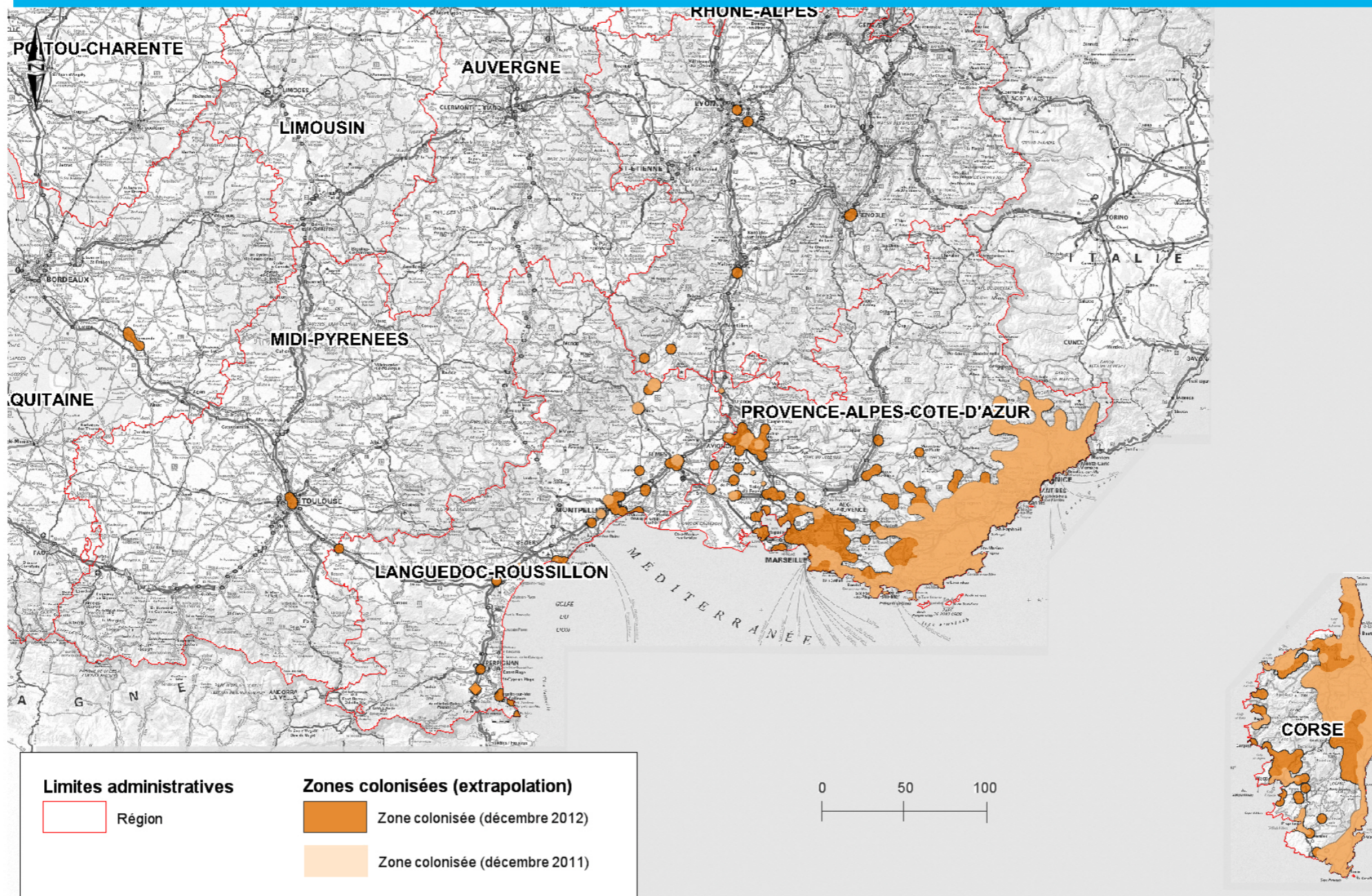
Chikungunya outbreak(s) in Caribbean islands



Consequences in Western Europe?



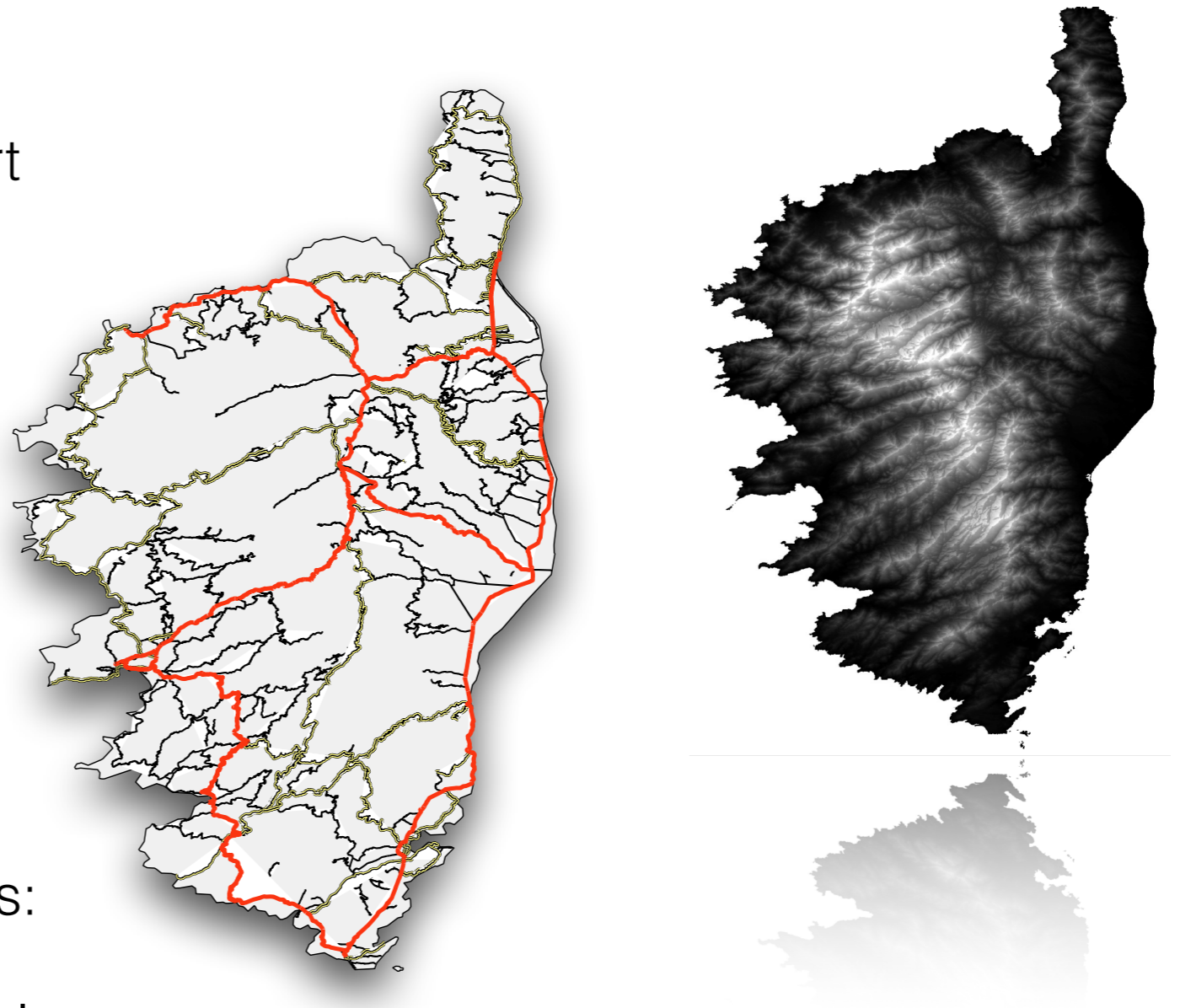
Invasion of *Aedes albopictus* in metropolitan France



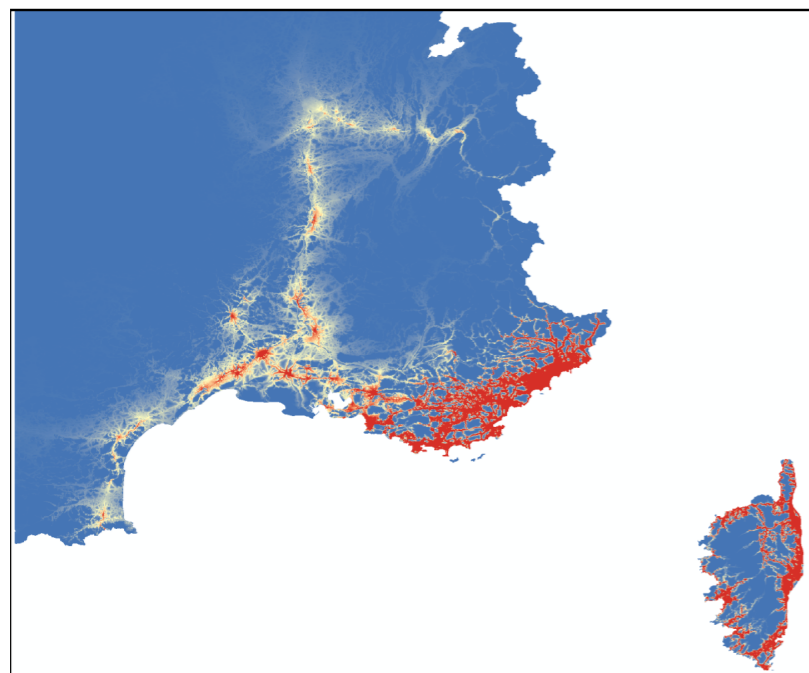
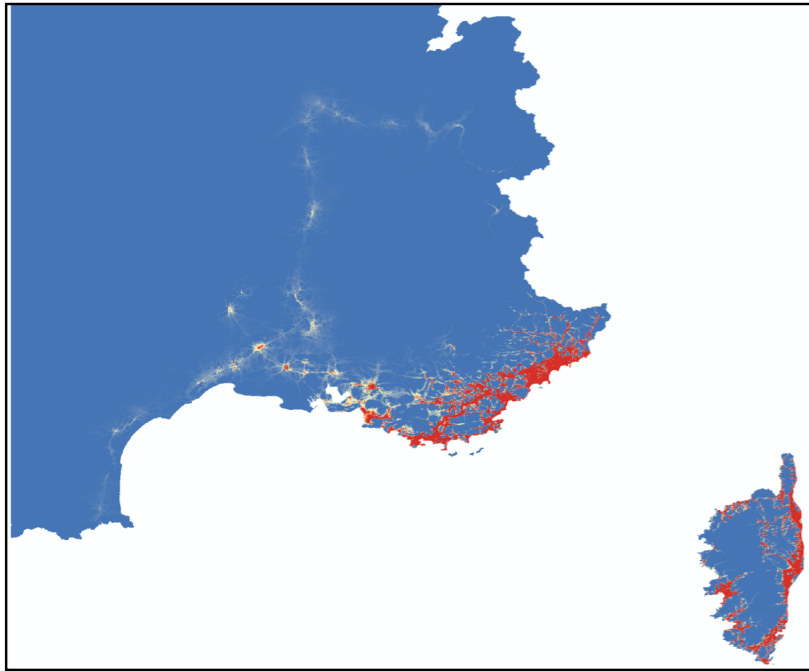
Aedes albopictus invasion in metropolitan France

Statistical framework

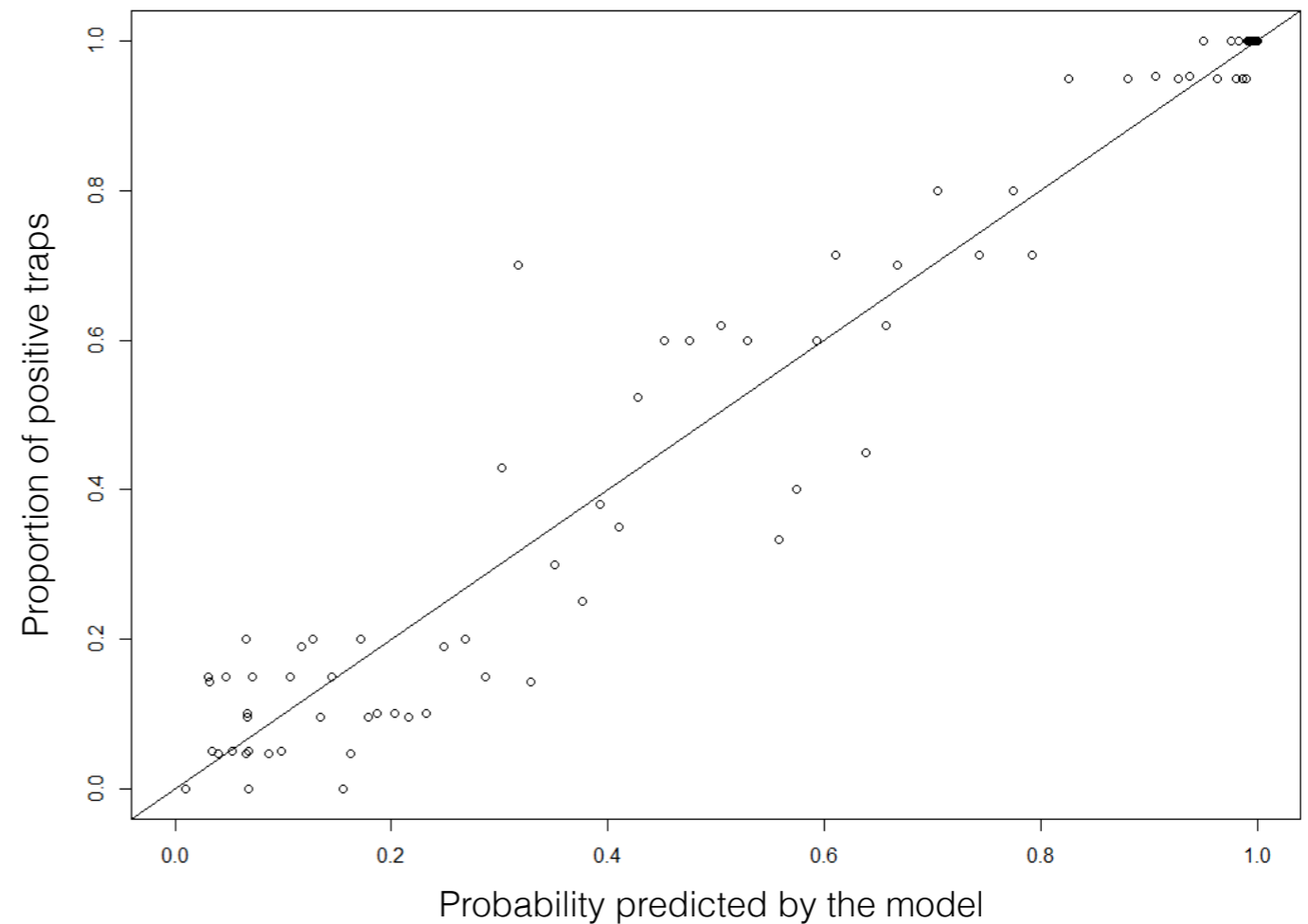
- Spatial data from 1,300 traps distributed in large southeast part of France (including Corsica) collected every month
- For each year:
 - logistic model between colonized area and mosquito presence: estimation of « neutral » dispersion
- Influence of environmental factors:
 - GLM on residuals of this neutral dispersion



Model accuracy for 2012 (testing sample)

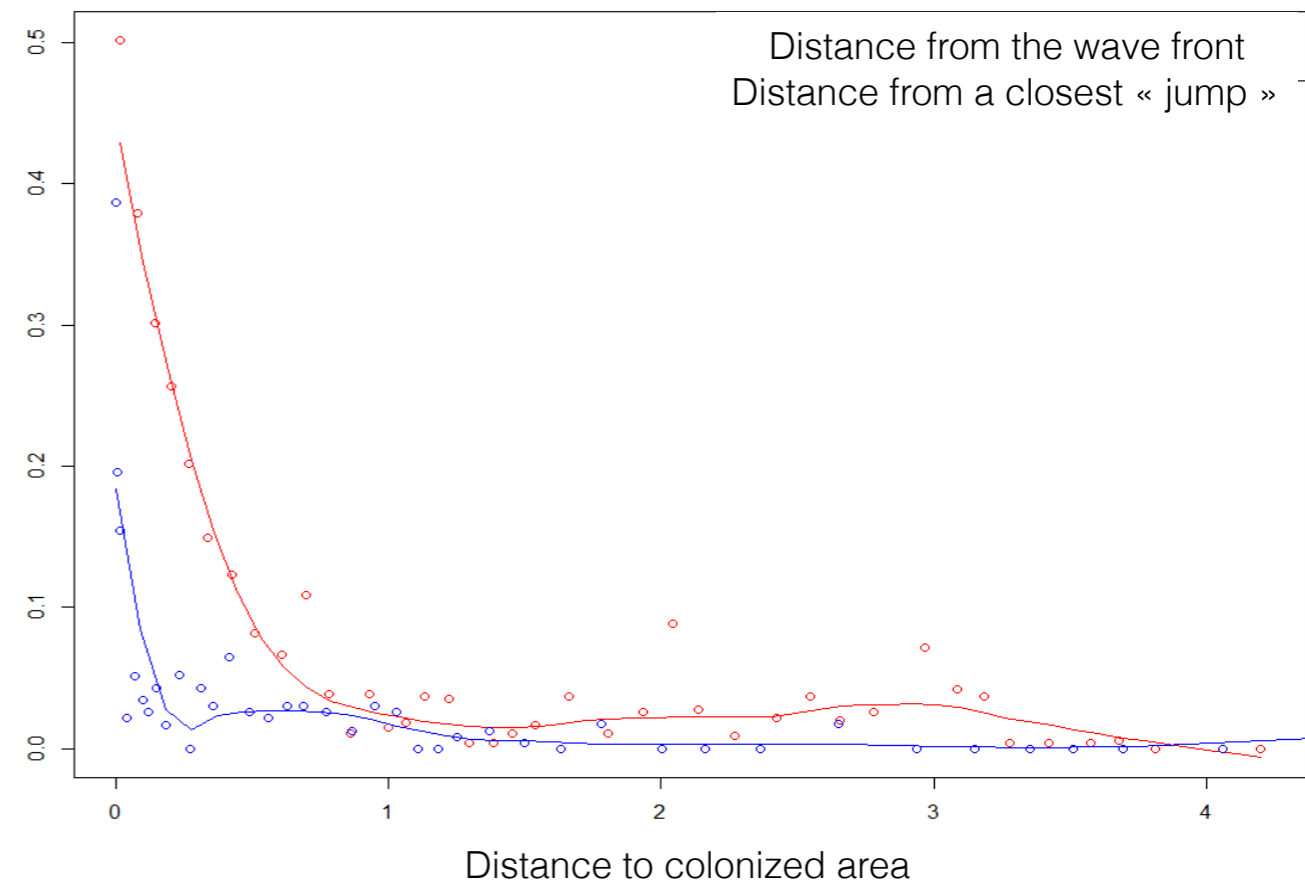


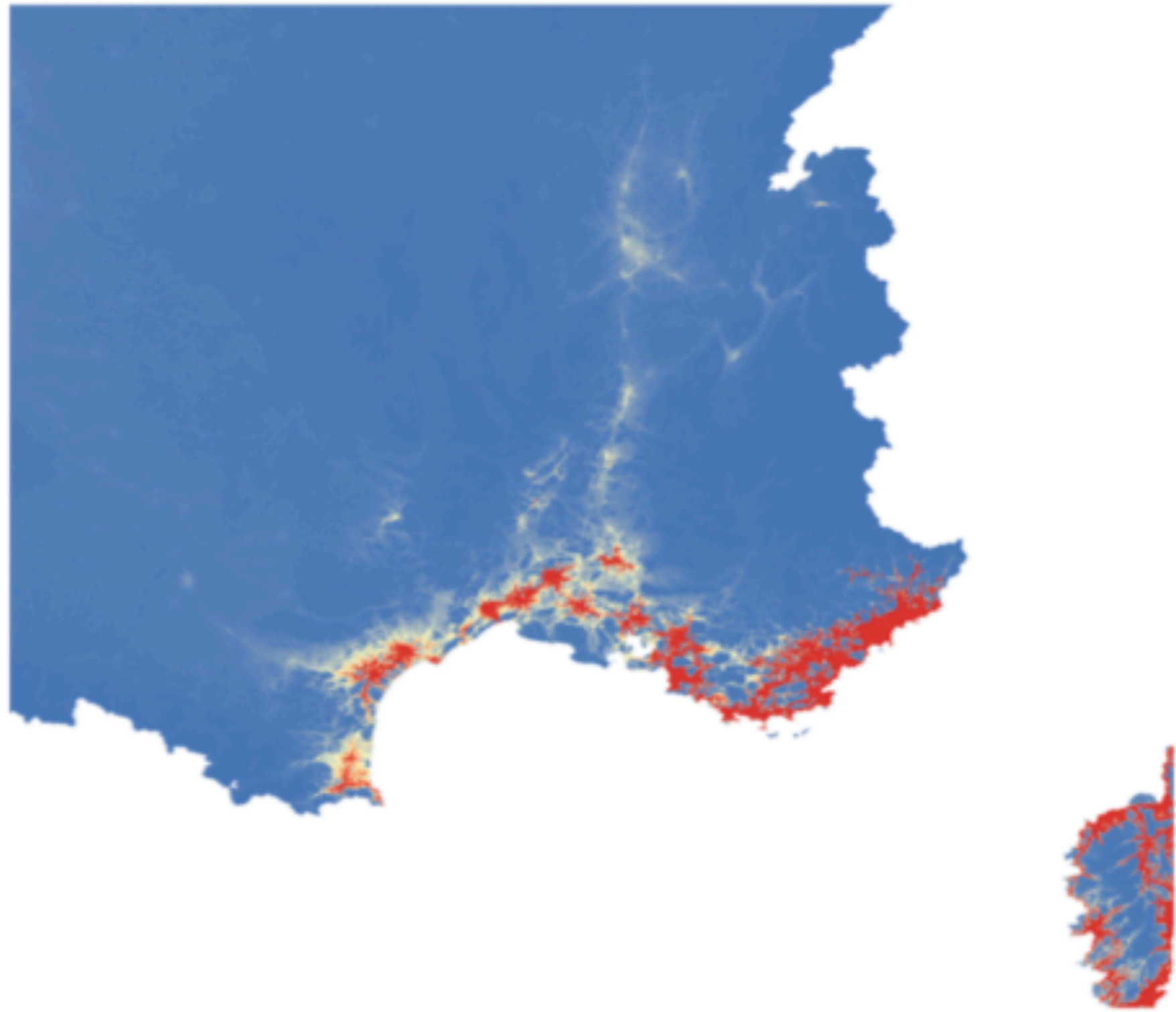
95% of correct classification



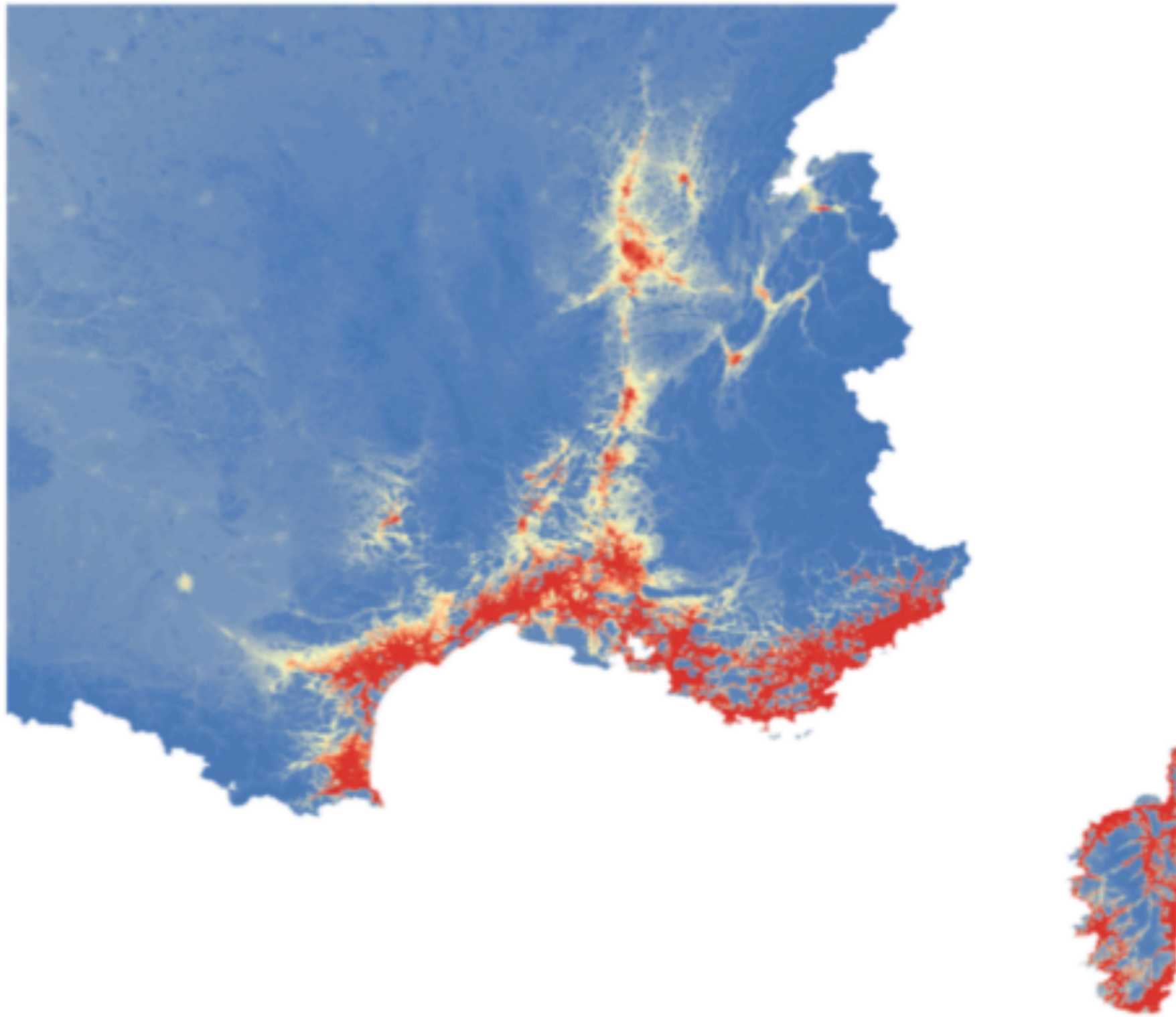
Main environmental factors

- Presence probability is higher in urban areas
- Presence probability decreases with distance to the colonized area
- Colonized area is further and further through time (acceleration of the invasion)
- Invasion follows the main highways

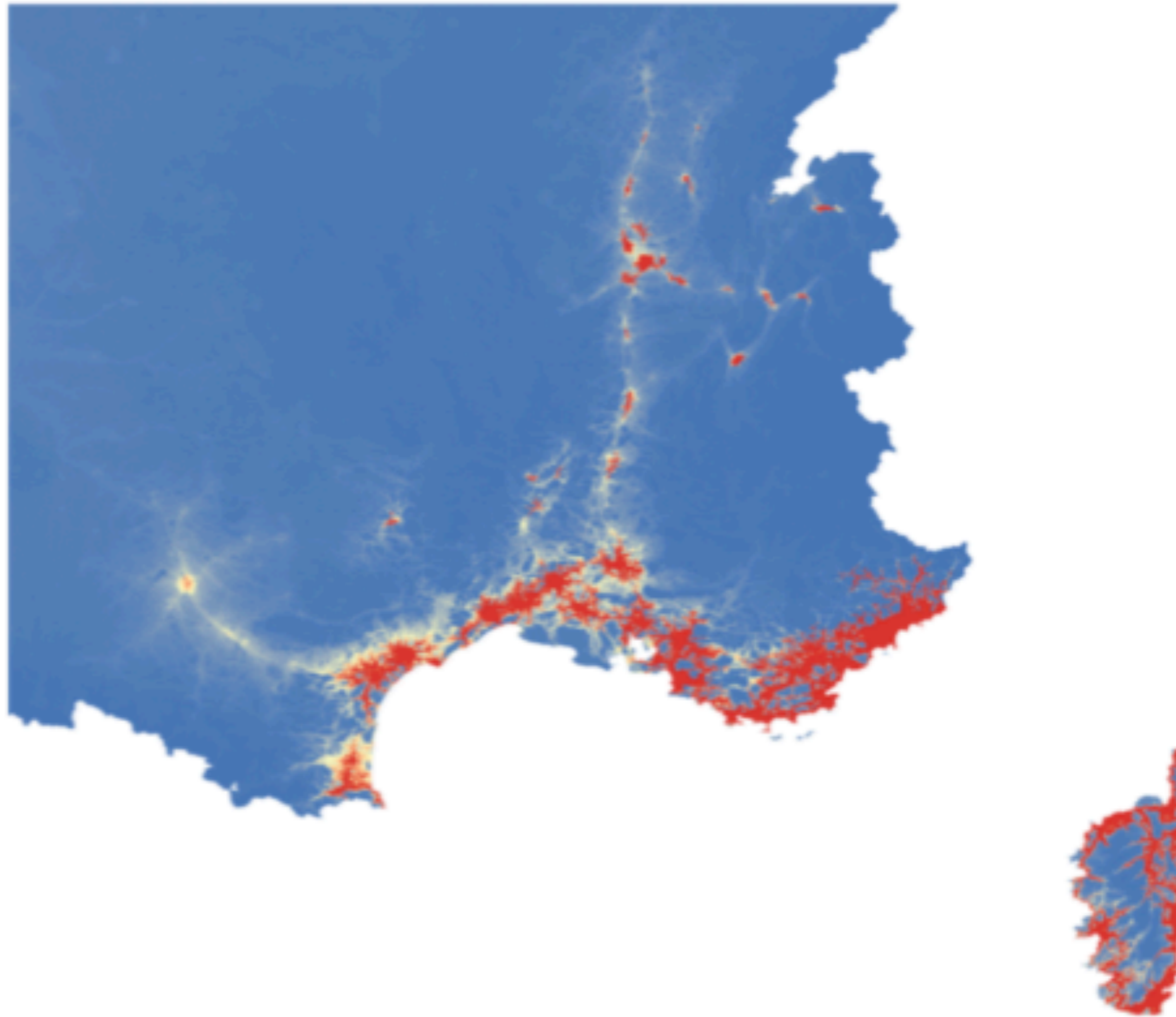




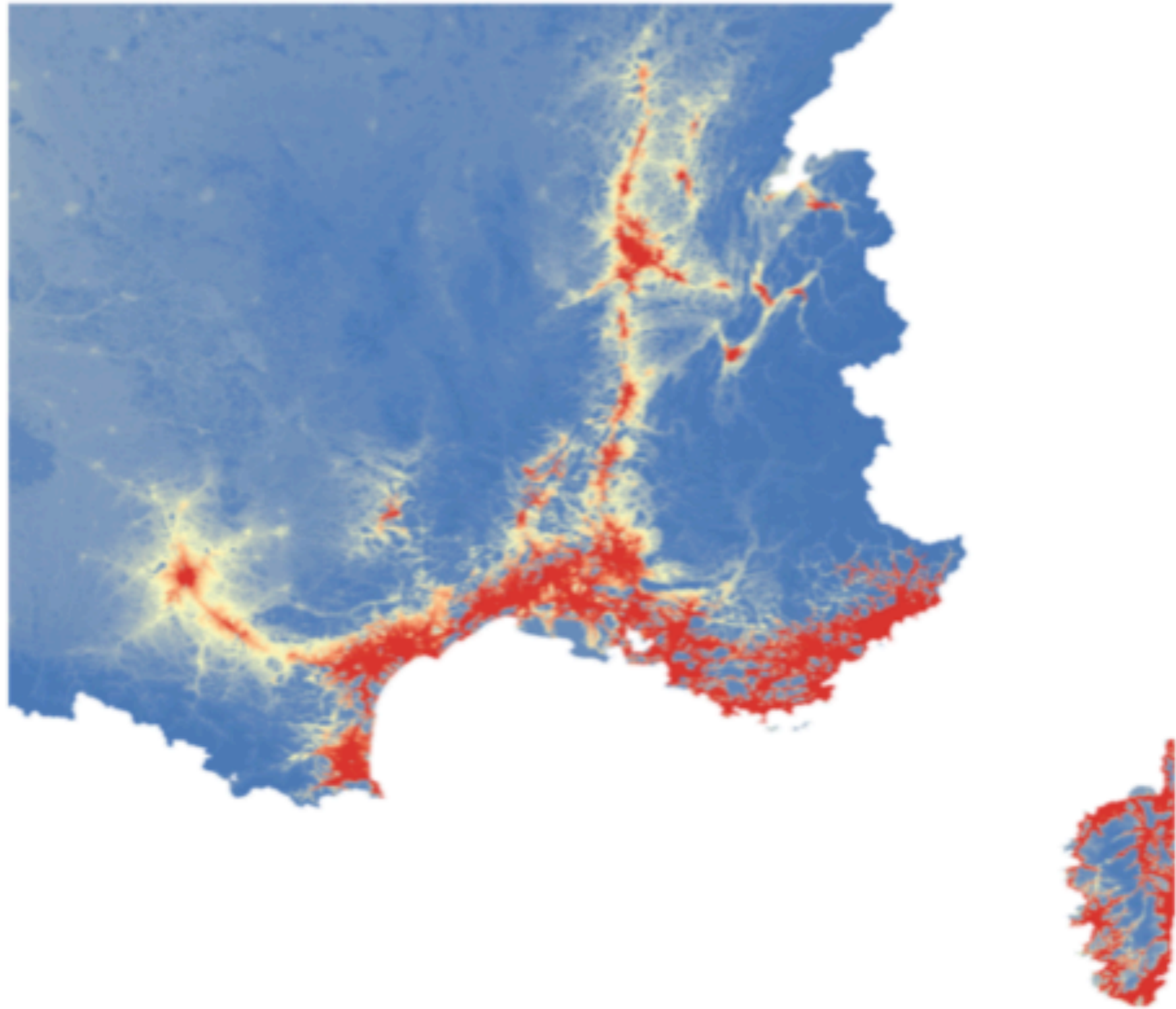
Model forecasting for 2013 (S1)



Model forecasting for 2013 (S2)

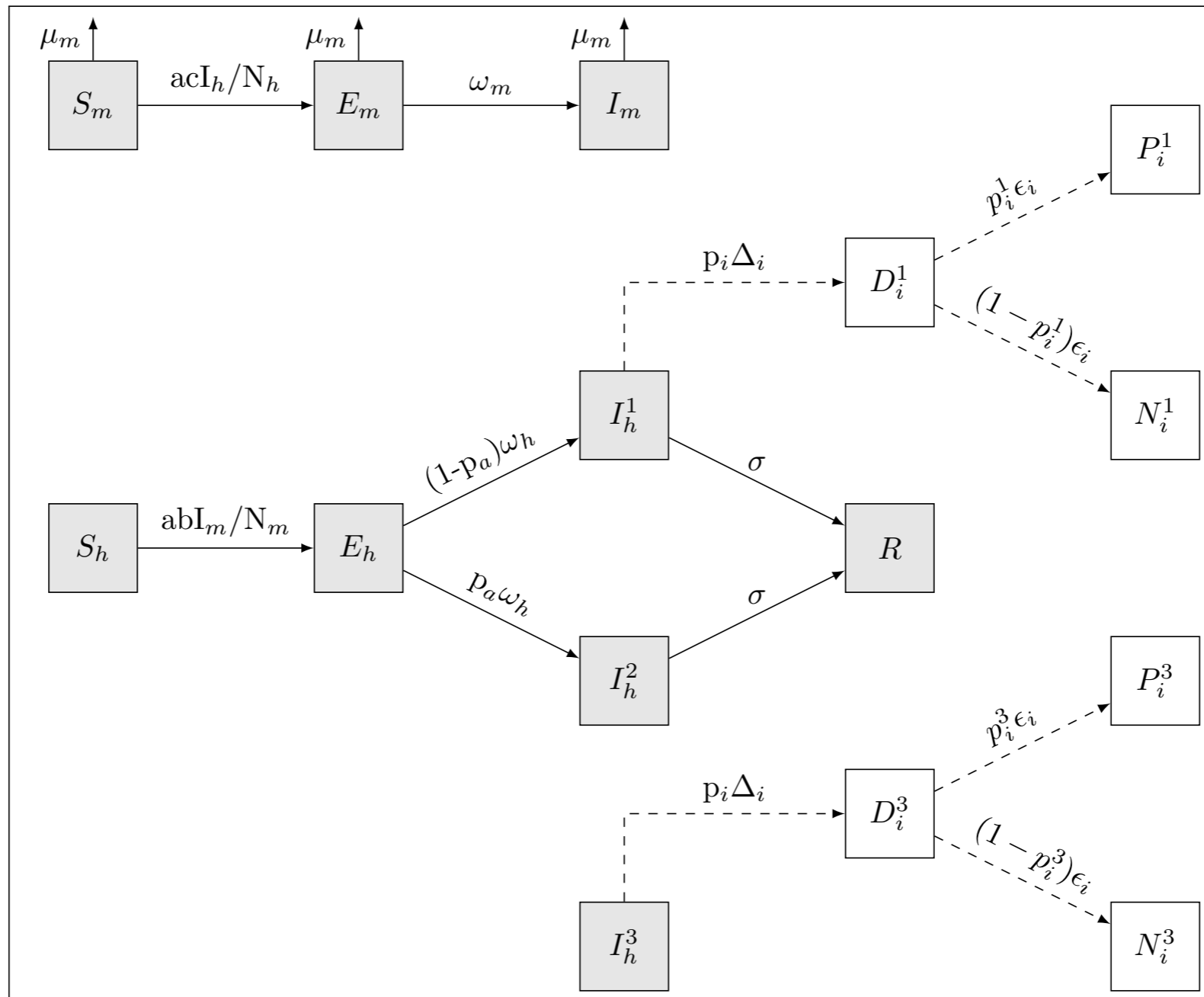


Model forecasting for 2014 (S1)



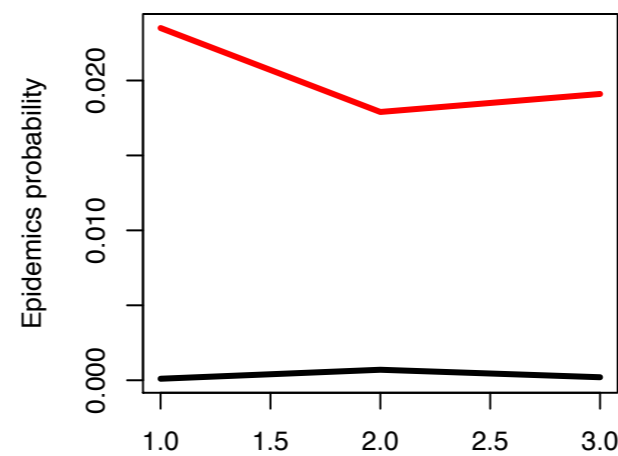
Model forecasting for 2014 (S2)

What can we do?

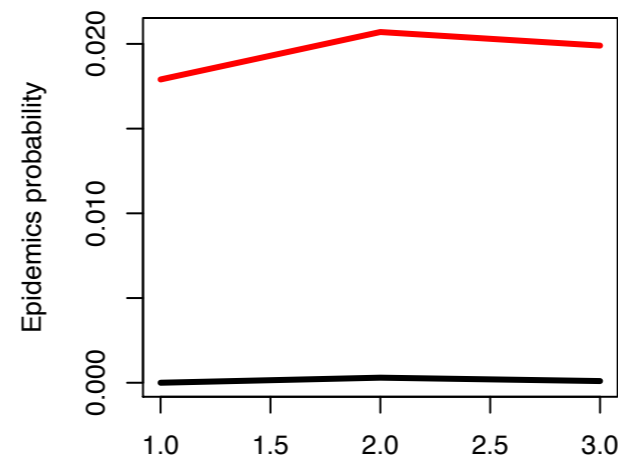
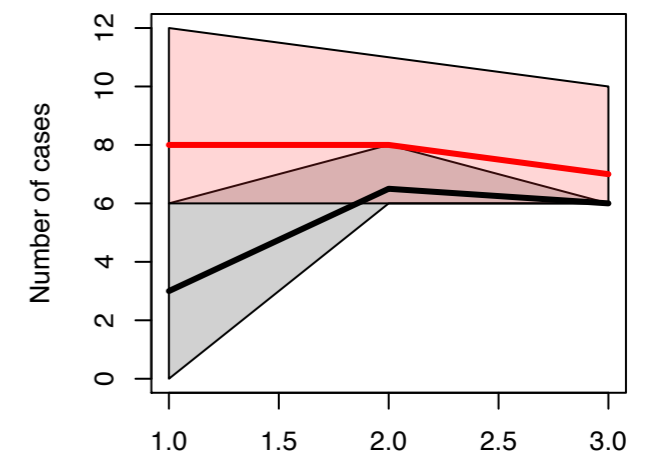


Chikungunya: basic expectations without vector control

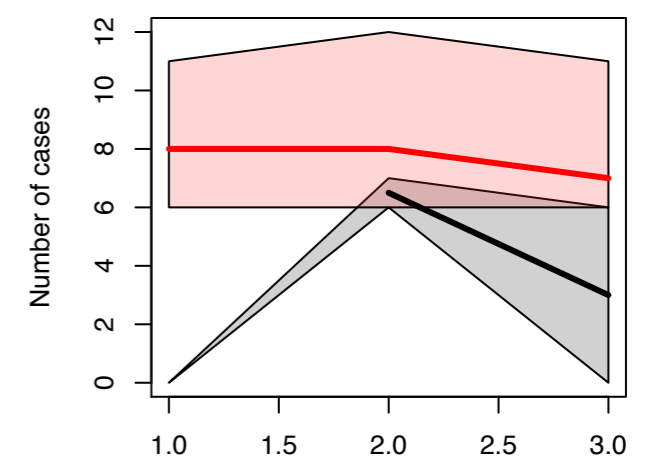
- More vectors is associated with higher outbreak probability
- Higher human density does not necessarily implies larger outbreak



Mpl

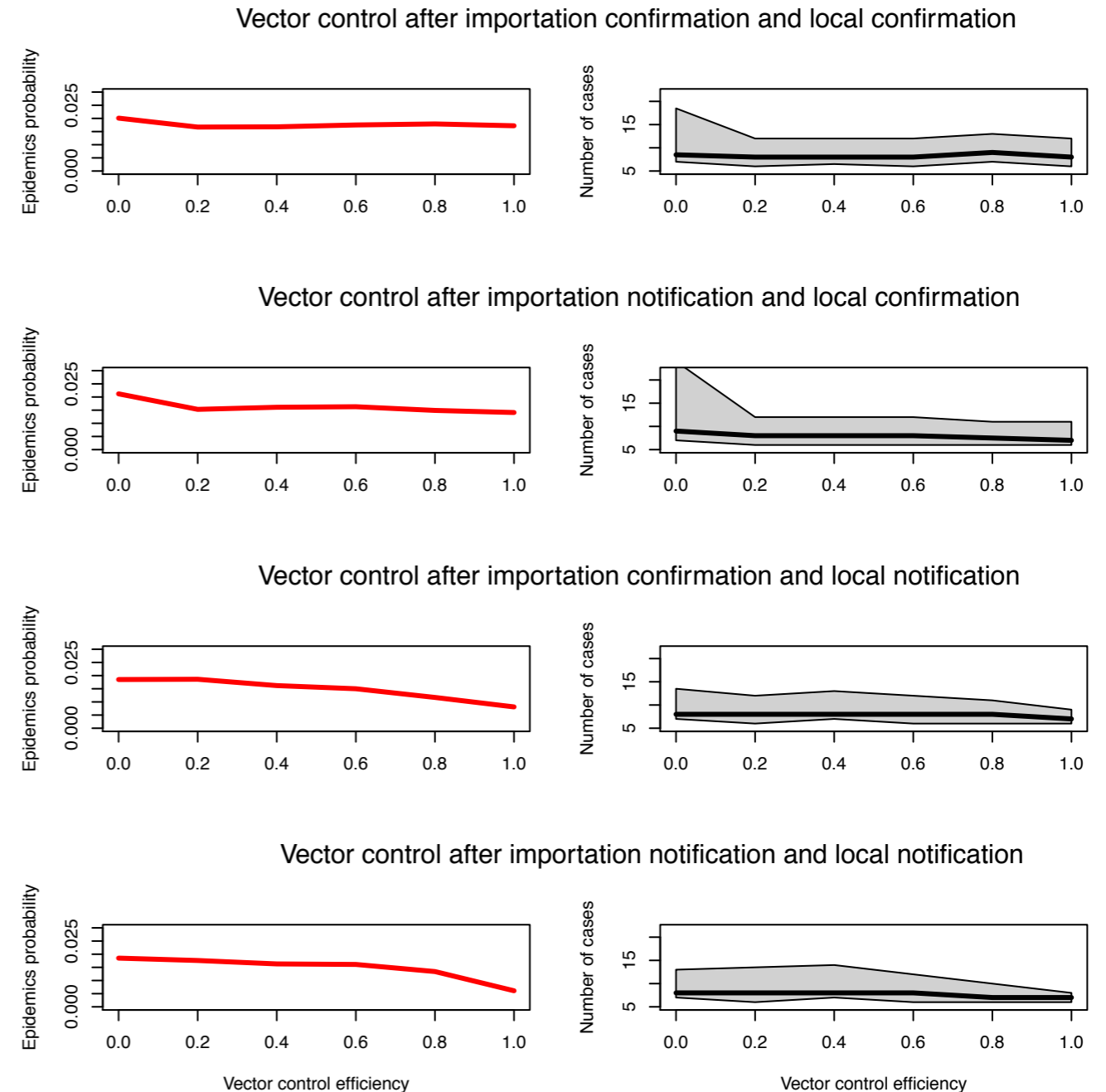


Lyon



Chikungunya situation

- To be efficient, vector control has to be started after notification of local cases (which could be modulated by a proof of local transmission)
- A possible way to improve vector control is to reduce the notification delay by a factor 2



Acknowledgments

- REACTING
- ANRS
- Direction Générale de la Santé (DGS)
- Conseil général de la Martinique (CG972)
 - André Yebakima
 - Renélise Moutenda
- Institut National de Veille Sanitaire (INVS)
 - DMI
 - Martine Ledrans
 - Alain Bateau
- IRD
 - Lucas Léger
 - Béatrice Gaillard
- Salathé group (University of Lausanne)



MINISTÈRE DU TRAVAIL,
DE L'EMPLOI
ET DE LA SANTÉ



Conseil Général
de la Martinique

