

El-Gabbas A. & Dormann C. F.: *Wrong, but useful: regional species distribution models may not be improved by range-wide data under biased sampling*. Ecology & Evolution.

## Supporting information

### Appendix 1: List of literature resources used for extracting Egyptian bat records.

For the full list of literature used to extract records used in the global models, see Appendix 2 in El-Gabbas & Dormann (2017)

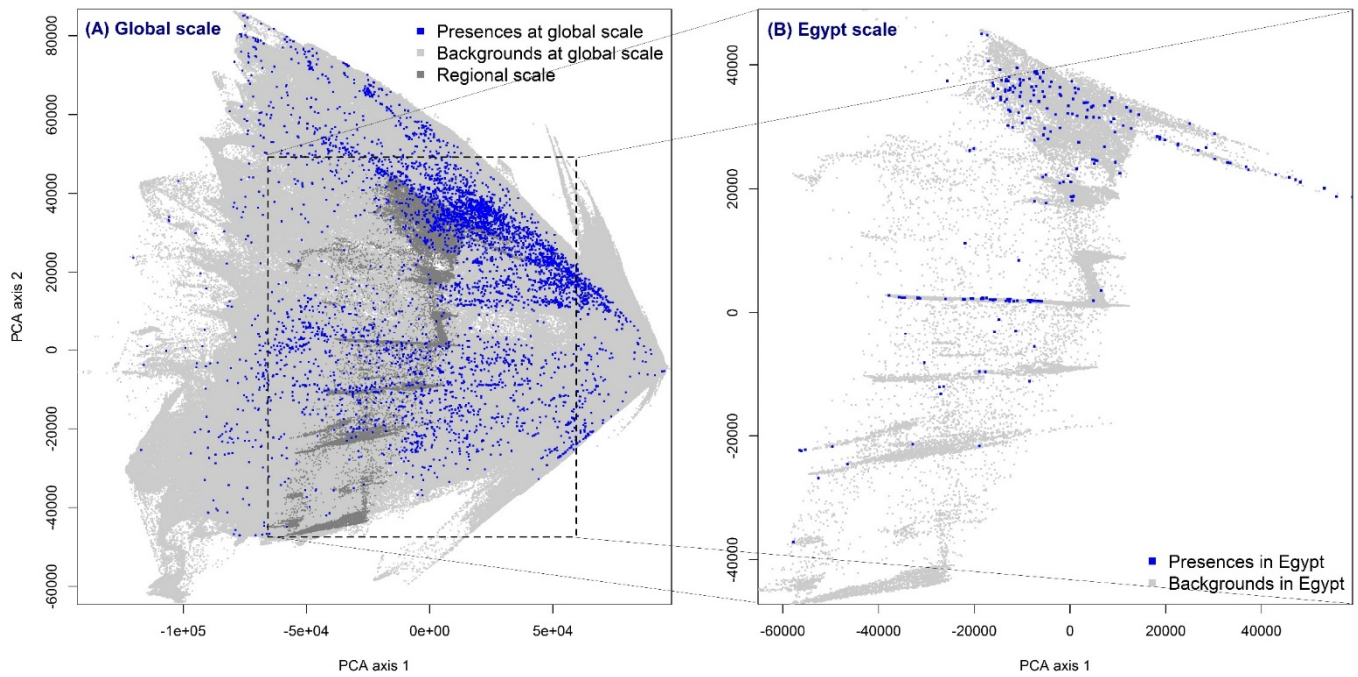
Please note that many records were cross-cited in many references, and such records were merged as one record to avoid spurious indication of predicted intensity when the same sighting is used many times.

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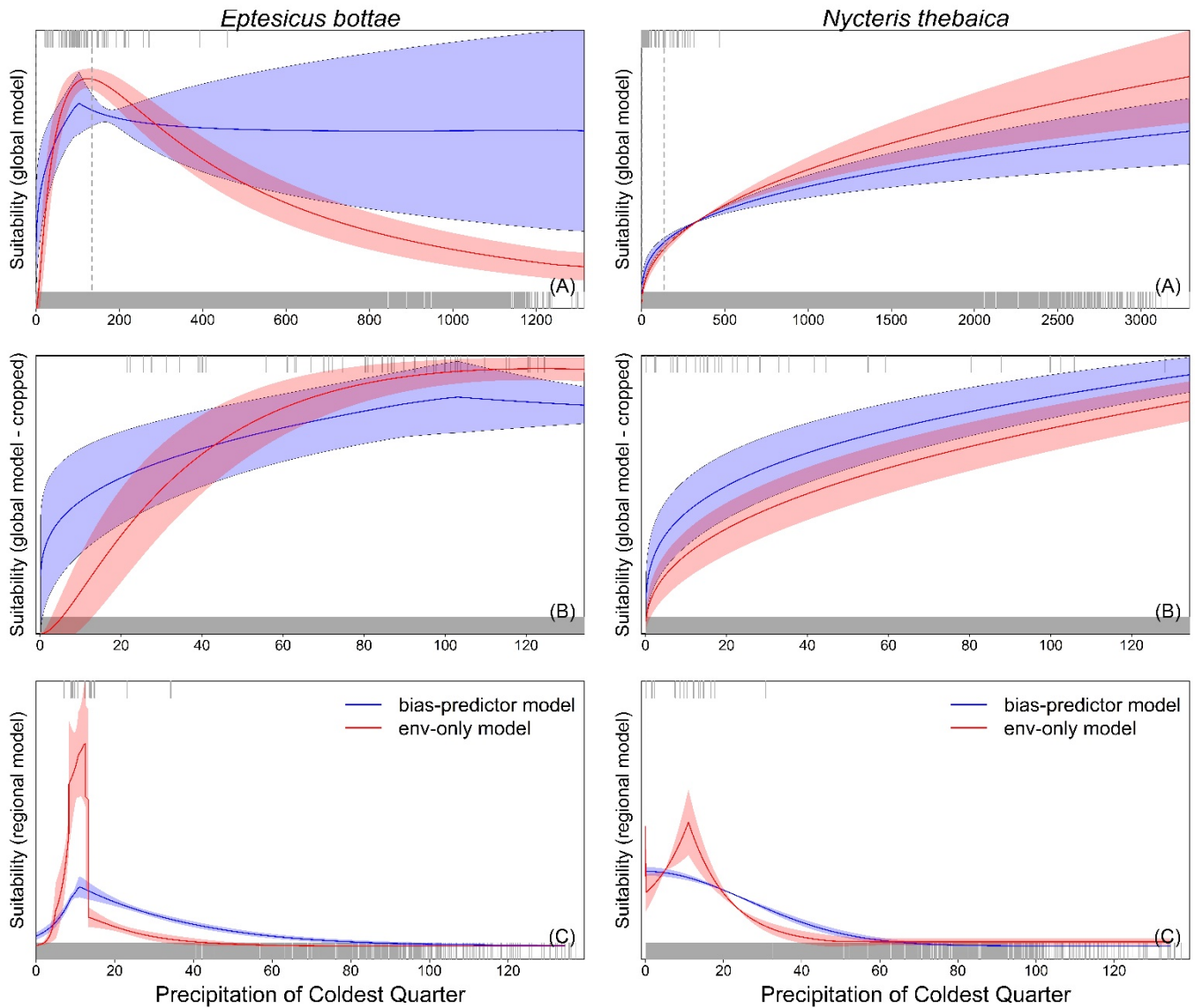
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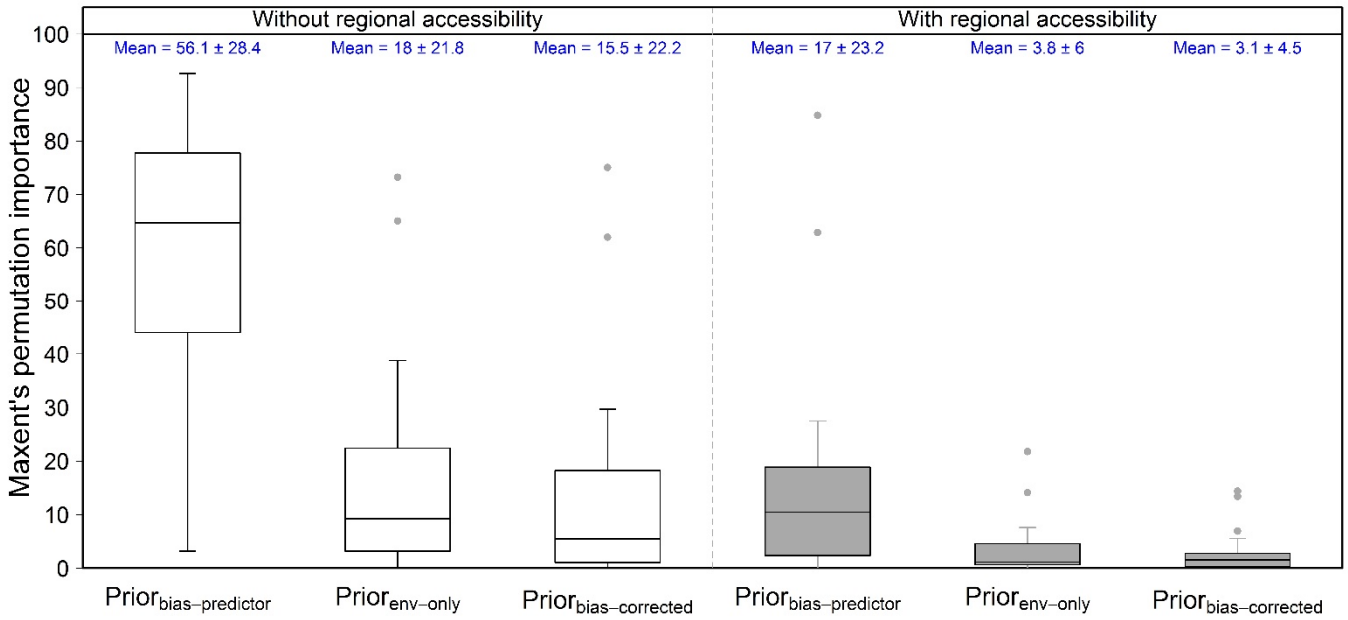
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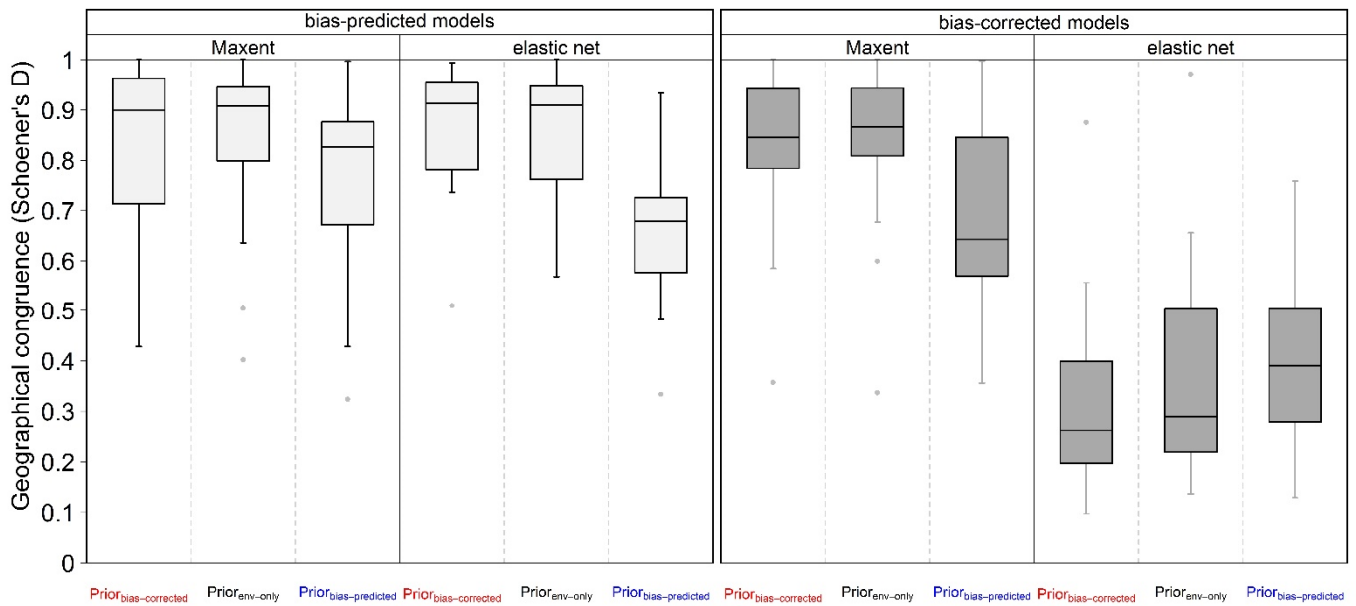
**Fig. S1:** **Left:** scatterplot of the first two PCA axes of all available environmental covariates within the entire study area. The first two axes account for 94.2% of the environmental variation (76.4% and 17.8%, respectively). **Right:** A close-up view of the available environmental space in Egypt (highlighted in dashed rectangle in the left plot). Blue dots represent presence locations for any study species; light grey points represent pixels without any sightings; dark grey points represent the available environmental space in Egypt.



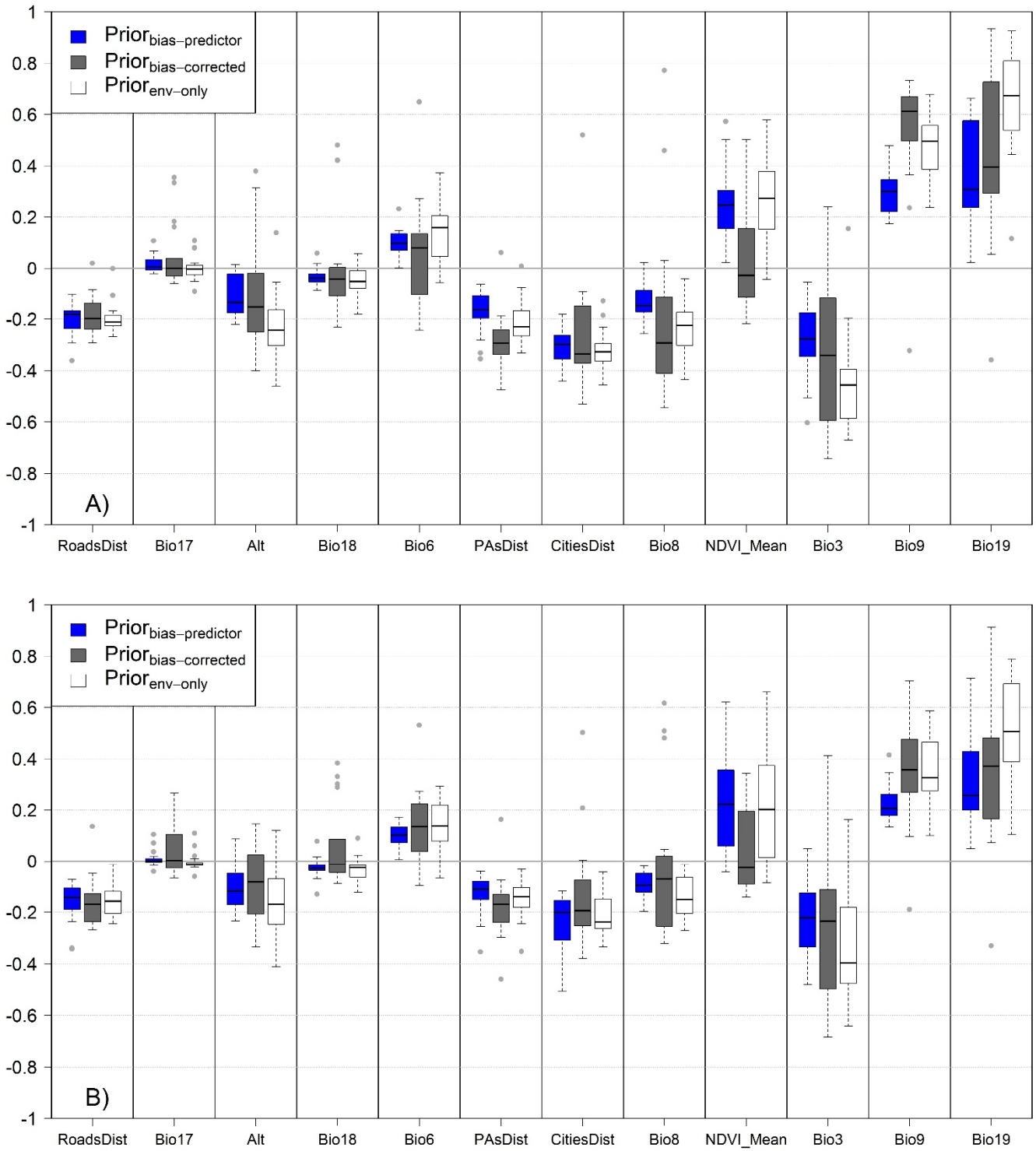
**Fig. S2:** Maxent's response to precipitation of coldest quarter for *Eptesicus bottae* (left) and *Nycteris thebaica* (right) in (A) the global model, (B) the global model cropped to the precipitation range available in Egypt, and (C) the regional model within Egypt. In each plot, the lower rug indicates precipitation values at background locations while the upper rug indicates precipitation values at presence locations. Red and blue lines represent environment-only and Bias-predictor models, respectively. Lines and their shaded areas represent the mean and standard deviation of species response. Note that the predicted values of global (A) or regional (C) models were scaled to sum to one for comparison consistency.



**Fig. S3:** Boxplots of mean permutation importance (%) of the prior variables, without (left) versus with (right) regional bias variables incorporation, as reported in Maxent.

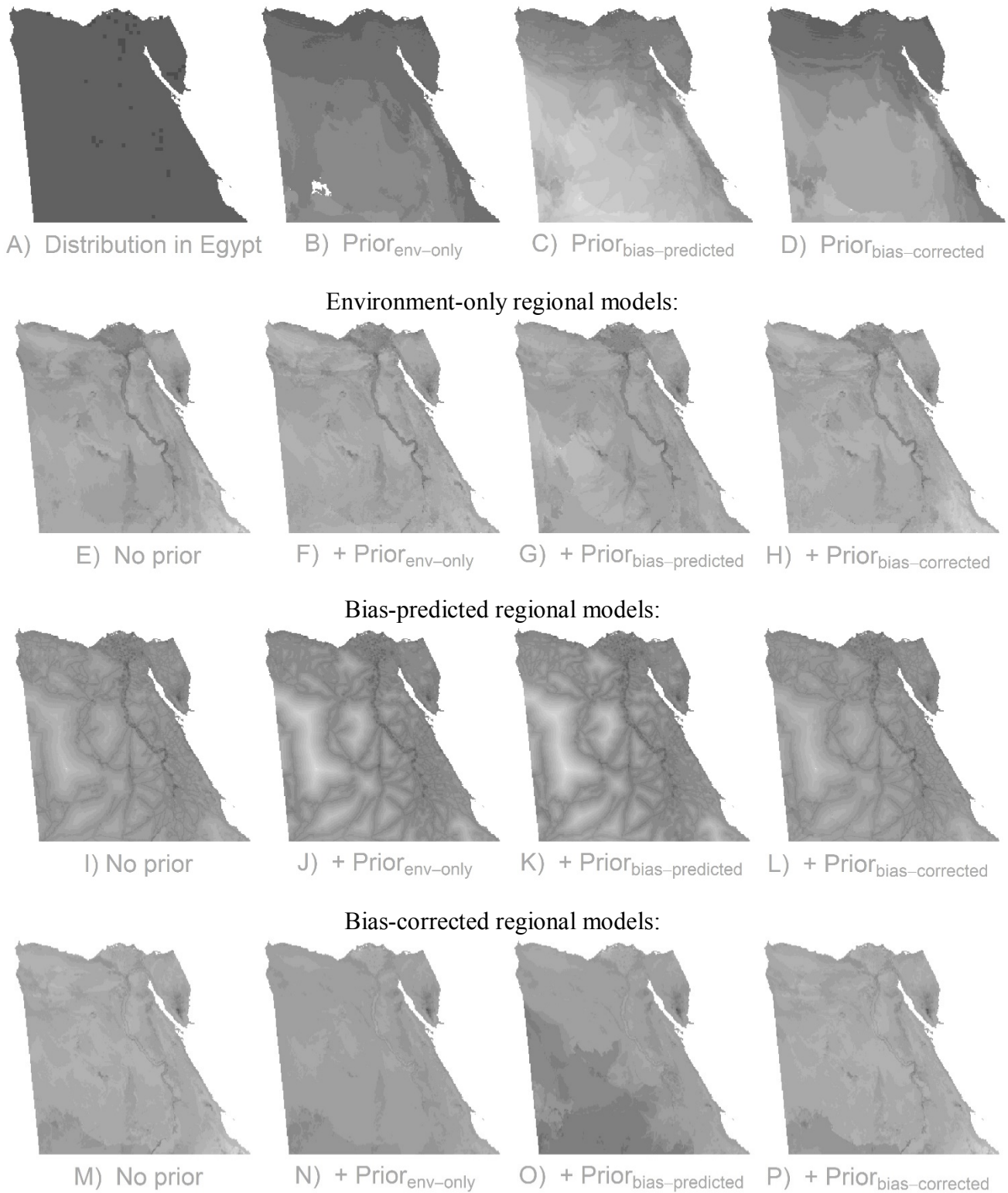


**Fig. S4:** Geographical congruence between the predictions of regional SDMs calibrated without priors and the three versions of regional models that used a prior variable. Here (in contrast to Fig. 5), bias variables were incorporated as predictors in the regional SDMs.



**Fig. S5:** Boxplots for the Pearson's correlation between the three priors and environmental variables used to run regional models, for (A) Maxent and (B) elastic net.





**Fig. S6: Example maps**

- **A:** presence locations of the Egyptian fruit bat (*Rousettus aegyptiacus*) in Egypt, used to calibrate regional SDMs in Egypt.
- **B, C, D:** predictions from the global models in Egypt [priors].
- **E, I, M:** predictions from regional models in Egypt, with no priors incorporated into the models. **E:** prediction from environment-only regional model; **I:** prediction from bias-predicted regional models; **M:** prediction from bias-corrected regional models.
- **F, G, H:** similar to **E**, with priors (**B, C, D**) incorporated to the model, respectively.
- **J, K, L:** similar to **I**, with priors (**B, C, D**) incorporated to the model, respectively
- **M, N, O:** similar to **M**, with priors (**B, C, D**) incorporated to the model, respectively.

In all maps, the darker the colour, the higher the relative suitability (log-scaled).

**Table S1:** List of species used or excluded in this study

**A. selected species**

*Asellia tridens* (trident leaf-nosed bat)  
*Eptesicus bottae* (Botta's serotine bat)  
*Hypsugo ariel* (fairy pipistrelle)  
*Nycteris thebaica* (Egyptian slit-faced bat)  
*Otonycteris hemprichii* (Hemprich's long-eared bat)  
*Pipistrellus kuhlii* (Kuhl's pipistrelle)  
*Pipistrellus rueppellii* (Rueppell's pipistrelle)  
*Plecotus christii* (desert long-eared bat)  
*Rhinolophus clivosus* (Arabian horseshoe bat)  
*Rhinolophus mehelyi* (Mehely's horseshoe bat)  
*Rhinopoma cystops* (lesser mouse-tailed bat)  
*Rhinopoma microphyllum* (greater mouse-tailed bat)  
*Rousettus aegyptiacus* (Egyptian fruit bat)  
*Tadarida aegyptiaca* (Egyptian free-tailed bat)  
*Tadarida teniotis* (European free-tailed bat)  
*Taphozous nudiventris* (naked-bellied tomb bat)  
*Taphozous perforatus* (tomb bat)

**B. excluded species**

*Barbastella leucomelas* (Sinai barbastelle)  
*Nycticeinops schlieffeni* (Schlieffen's bat)  
*Pipistrellus deserti* (desert pipistrelle)  
*Rhinolophus hipposideros* (lesser horseshoe bat)

**Table S2:** List of environmental predictors used either at global or regional scale

Variable	Global scale	Regional scale
Altitude	YES	YES
<b>Bio1:</b> Annual mean temperature		
<b>Bio2:</b> Mean diurnal range (mean of monthly (max temp - min temp))	YES	
<b>Bio3:</b> Isothermality (Bio2/Bio7) (* 100)		YES
<b>Bio4:</b> Temperature seasonality (standard deviation *100)	YES	
<b>Bio5:</b> Maximum temperature of warmest month		
<b>Bio6:</b> Minimum temperature of coldest month		YES
<b>Bio7:</b> Temperature annual range (Bio5-Bio6)		
<b>Bio8:</b> Mean temperature of wettest quarter	YES	YES
<b>Bio9:</b> Mean temperature of driest quarter	YES	YES
<b>Bio10:</b> Mean temperature of warmest quarter		
<b>Bio11:</b> Mean temperature of coldest quarter		
<b>Bio12:</b> Annual precipitation		
<b>Bio13:</b> Precipitation of wettest month		
<b>Bio14:</b> Precipitation of driest month	YES	
<b>Bio15:</b> Precipitation seasonality (coefficient of variation)	YES	
<b>Bio16:</b> Precipitation of wettest quarter		
<b>Bio17:</b> Precipitation of driest quarter		YES
<b>Bio18:</b> Precipitation of warmest quarter		YES
<b>Bio19:</b> Precipitation of coldest quarter	YES	YES
Potential evapotranspiration		
Actual evapotranspiration		
Aridity index		
Soil-Water balance		
Minimum NDVI	YES	
Standard deviation of NDVI	YES	