Global Ecology and Biogeography

**SUPPORTING INFORMATION**

**Climatic and biogeographic drivers of functional diversity in the flora of the Canary Islands**

**APPENDIX S1.** Details on species distribution models

We interpolated species’ occurrences using species distribution models (SDMs; Calabrese, Certain, Kraan & Dormann, 2014) which were parameterised following Irl. et al. (2020). SDMs were implemented using generalised linear models with a binomial distribution, logit-link function, and polynomial terms of second-order, but did not include interaction terms among explanatory variables (*y ~ x + x²*). Potential explanatory variables were elevation, aspect (calculated as the cosines of the radian measure (aspect north) and the sines of the radian measure (aspect east)) and slope. We chose these variables to reduce potential circularity problems associated with using variables later used to test the hypotheses. Stepwise variable selection in both directions (i.e., forward and backward) was applied using the Akaike Information Criterion. Pseudo-absence points were generated by random selection of grid cells that were not occupied by the species. If possible, we selected as many pseudo-absence points as there were presences for each species. Models were trained using occurrence records from the Canary Islands; species occurrences on islands where species are naturally absent were not included. Species with fewer than 25 occurrences (294 species, ~ 15 %) in the database were excluded from the analysis. The trained GLMs were validated using 10-fold cross-validation to avoid over-fitting when using small sample sizes. For each species, a probability of occurrence in each 500 m × 500 m grid cell was assigned by the SDM. For model validation, all presence and pseudo-absence points were split into training and testing data samples with a ratio of 80:20 percent using random stratified sampling. Predicted probability values that were greater than the species’ prevalence (proportion of presences relative to the number of grid cells) were categorised as “present”. Those values that were smaller than the species’ prevalence were categorised as “absent” (Cramer, 2003). To check whether using modelled species distributions created an artificial relationship between the predictor variables and functional diversity, we performed all statistical analyses with the original occurrence data and the modelled species distribution data.

**References**

Calabrese, J.M., Certain, G., Kraan, C. & Dormann, C.F. (2014) Stacking species distribution models and adjusting bias by linking them to macroecological models. *Global Ecology and Biogeography*, **23**, 99–112.

Cramer, J. S. (2003) *Logit models from economics and other fields*. Cambridge University Press.

Irl, S.D.H., Obermeier, A., Beierkuhnlein, C. & Steinbauer, M.J. (2020) Climate controls plant life form patterns on a high-elevation oceanic island. *Journal of Biogeography*, **47**, 2261–2273.