Supporting Information 1

Descriptions of variable selection procedure used in this study

We had a total of 19 bioclimatic variables (BIO1-19, details see Table S1) and 8 non-climate environmental variables (elevation, aspect, slope, terrain ruggedness, distance to nature reserve, distance to road, distance to residential area, and distance to mining site) that can be used to model bamboo distributions. In addition to these variables, we also considered to include the modelling bamboo distributions in giant panda models.

We adopted a four-step variables selection procedure prior to modeling bamboo and giant panda distributions: (1) We excluded two bioclimatic (i.e. BIO3 and BIO7) because they are calculated from other bioclimatic variables; (2) We conducted VIF test on the remaining 17 bioclimatic variables and removed bioclimatic variables with the highest VIF values until all the VIF values were less than 5 (Shiu 2006). This resulted in 5 bioclimatic variables (Table S1). (3) We considered the 5 bioclimatic variables selected in step 2 and four bio-physical variables (aspect, elevation, slope and terrain ruggedness) and conducted another VIF test on these nine variables. Eight variables with VIF values less than 5 were kept after this step and were used in bamboo modeling (Table S2). (4) We conducted another VIF test on the eight variables selected in step 3, four anthropogenic variables (distance to residential area, road, mining site, and nature reserve), and the modelled bamboo distributions (bamboo-RAC model, see below), and as a result, 13 variables with VIF values less than 5 were kept for the biotic giant panda modeling (Table S2). Note that we did not consider excluding the bamboo distributions in this step. Also note that the 5 bioclimatic variables selected in step 2 were also used in the climate-only giant panda modeling.

Table S1. Bioclimatic variables

Variable	Information
BIO1[#]	Annual Mean Temperature
BIO2	Mean Diurnal Range (Mean of monthly (max temp - min temp))
BIO3*	Isothermality (BIO2/BIO7 * 100)
BIO4	Temperature Seasonality (standard deviation *100)
BIO5	Max Temperature of Warmest Month
BIO6[#]	Min Temperature of Coldest Month
BIO7*	Temperature Annual Range (BIO5-BIO6)
BIO8	Mean Temperature of Wettest Quarter
BIO9	Mean Temperature of Driest Quarter
BIO10	Mean Temperature of Warmest Quarter
BIO11[#]	Mean Temperature of Coldest Quarter
BIO12	Annual Precipitation
BIO13[#]	Precipitation of Wettest Month
BIO14	Precipitation of Driest Month
BIO15[#]	Precipitation Seasonality (Coefficient of Variation)
BIO16	Precipitation of Wettest Quarter
BIO17	Precipitation of Driest Quarter
BIO18	Precipitation of Warmest Quarter
BIO19	Precipitation of Coldest Quarter

* Excluded before Variance Inflation Factor (VIF) test

[#] Covariates that had a VIF <5 included for later analyses in bamboo modelling

Table S2. Variables for giant panda and bamboo modelling and their multi-collinearity. Ten variables that were identified as affecting giant panda or bamboo occupancy probabilities in published literature.

Name	Description	VIF
Aspect*	Categorical (north, east/ west, south)	1.03 (1.03)[&]
Elevation[#]	Numeric (m)	19.69 (excluded)
Slope*	Numeric (°)	1.08 (1.06)
Terrain ruggedness*	Numeric	1.45 (1.41)
Distance to nature reserve[#]	Numeric (m)	1.47 (1.74)
Distance to road	Numeric (m)	1.75 (1.49)
Distance of residential area[#]	Numeric (m)	2.29 (2.25)
Distance of mining site[#]	Numeric (m)	1.44 (1.45)
BIO1*	Numeric (°)	1.05 (1.03)
BIO6*	Numeric (°)	16.28 (3.91)
BIO11*	Numeric (°)	2.11 (2.11)
BIO13*	Numeric (mm)	2.76 (2.13)
BIO15*	Numeric	1.37 (1.26)
Bamboo distribution[$]	Numeric	1.77 (1.78)

* Included in bamboo modelling
[#] Covariates that had a VIF >5 excluded for later analyses in giant panda modelling
[&] Values in brackets indicate the VIF value after excluding other correlated variables
[$] Modelled bamboo distribution from Bamboo-RAC models

Supporting Information 2

Figure legends

Figure S1. Residuals pattern of the ENV model for the arrow bamboo (A) and wood bamboo (B). Both had a significant non-random pattern with clustering of positive (green) and negative (red) values in the study area. Darker shades of each color reflect larger absolute values of model residuals.

Figure S2. Correlograms of spatial autocorrelation for bamboo presence based on ENV and RAC models. As indicated by Moran's I, spatial similarity decreased with distance for both arrow bamboo (A: random forest model; B: boosted regression tree model) and wood bamboo (C: random forest model; D: boosted regression tree model), with declining rates differing for ENV (black) and RAC (red) models.