

Data files

Large variability in response to projected climate and land-use changes among European bumblebee species

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IAP-CORINE-Projections.csv			CORINE classes included	IAP2 land-use projections mapped to CORINE land-cover for baseline conditions (~2010) and seven RCP-SSP scenario combinations (RCP2.6-SSP1; RCP2.6-SSP4; RCP4.5-SSP1; RCP4.5-SSP3; RCP4.5-SSP5; RCP8.5-SSP3; RCP8.5-SSP5). Please see 'Materials and methods', Table 1 and Table 2 of the associated paper for further details.
Acronym	Label			
IWB	Inland waters	511, 512		Unit: Percent of grid cell area Spatial extent: EU27 (+UK) Spatial resolution: 10 km x 10 km Temporal resolution: Baseline (~2010), 2050, 2080.
IW	Inland wetlands	411, 412		
BW	Salt marshes	421		
DUF	Discontinuous urban fabric	112		
GUS	Green urban areas	141, 142		
BF	Broad-leaved forest	311		
CF	Coniferous forest	312		
MF	Mixed forest	313		
AL	Arable land	211, 212, 213		
PC	Permanent crops	221, 222, 223		
AGNV	Agriculture with natural vegetation	243		
HAG	Heterogeneous agricultural areas	241, 242, 244		
PA	Pastures	231		
NG	Natural grasslands	321		
SMH	Scrub vegetation associations	322, 323, 324		
BDSV	Sparsely vegetated areas, including beaches and dunes	331, 333		

Bumblebee-Projections-Probability.csv	
Scenario naming convention: <Experiment>-<RCP-(SSP)>	
Experiment	
CLIM	Dynamic climate; Land use constant at baseline conditions.
LU	Dynamic land use; Climate constant at baseline conditions.
COMB	Dynamic climate; Dynamic land use

Projections of the distribution of 47 bumblebee species for the years 2050 and 2080, three experiments (CLIM, LU, COMB) and seven RCP-SSP scenario combinations (RCP2.6-SSP1; RCP2.6-SSP4; RCP4.5-SSP1; RCP4.5-SSP3; RCP4.5-SSP5; RCP8.5-SSP3; RCP8.5-SSP5), based on the application of MaxEnt models from Polce *et al.* [2018]. Predictor variables for 2050 and 2080 are based on WorldClim v1.4 (www.worldclim.org) and IAP2 land-use projections. Please see 'Materials and methods', Tables 1-4 of the associated paper for further details.

Unit: Probability of occurrence [0-1]
 Spatial extent: EU27 (+UK)
 Spatial resolution: 10 km x 10 km
 Temporal resolution: Baseline (~2010), 2050, 2080.

Bumblebee-Projections-Binary.csv	
Scenario naming convention: <Experiment>-<RCP-(SSP)>	
Experiment	
CLIM	Dynamic climate; Land use constant at baseline conditions.
LU	Dynamic land use; Climate constant at baseline conditions.
COMB	Dynamic climate; Dynamic land use

Projections of the distribution of 47 bumblebee species for the years 2050 and 2080, three experiments (CLIM, LU, COMB) and seven RCP-SSP scenario combinations (RCP2.6-SSP1; RCP2.6-SSP4; RCP4.5-SSP1; RCP4.5-SSP3; RCP4.5-SSP5; RCP8.5-SSP3; RCP8.5-SSP5), based on the application of MaxEnt models from Polce *et al.* [2018]. Predictor variables for 2050 and 2080 are based on WorldClim v1.4 (www.worldclim.org) and IAP2 land-use projections. Probabilities are converted to presence/absence based on the 'Minimum Training Presence' in the baseline models. Please see 'Materials and methods', Tables 1-4 of the associated paper for further details.

Unit: Presence (1), Absence (0)
 Spatial extent: EU27 (+UK)
 Spatial resolution: 10 km x 10 km
 Temporal resolution: Baseline (~2010), 2050, 2080.

Bumblebee-Projections-EU-Habitat.Change.csv Scenario naming convention: <Experiment>-<RCP-(SSP)>.	
Experiment	
CLIM	Dynamic climate; Land use constant at baseline conditions.
LU	Dynamic land use; Climate constant at baseline conditions.
COMB	Dynamic climate; Dynamic land use

Net changes of habitat extent for 47 European bumblebee species in 2050 and 2080 compared to baseline distribution (~2010) under three experiments (CLIM, LU, COMB) and seven RCP-SSP scenario combinations (RCP2.6-SSP1; RCP2.6-SSP4; RCP4.5-SSP1; RCP4.5-SSP3; RCP4.5-SSP5; RCP8.5-SSP3; RCP8.5-SSP5), based on the application of MaxEnt models from Polce *et al.* [2018]. Predictor variables for 2050 and 2080 are based on WorldClim v1.4 (www.worldclim.org) and IAP2 land-use projections. Net habitat changes per species are calculated as the difference between suitable habitat area in the future maps and suitable habitat area in the baseline map. Please see 'Materials and methods' of the associated paper for further details.

Unit: Percentage of baseline (~2010) habitat
 Spatial extent: EU27 (+UK)
 Spatial resolution: EU27 (+UK)
 Temporal resolution: 2050, 2080.

References

Polce, C., Maes, J., Rotllan-Puig, X., Michez, D., Castro, L., Cederberg, B., Dvorak, L., Fitzpatrick, Ú., Francis, F., Neumayer, J., Manino, A., Paukkunen, J., Pawlikowski, T., Roberts, S., Straka, J. & Rasmont, P. (2018) Distribution of bumblebees across Europe. *One Ecosystem*, **3**, e28143.