

Data structure of the uploaded files

File name: Individual_Characteristics_Capture.csv

- comma separated csv file that contains the individual characteristics of the bats during capture and the weights of the GPS-VHF-units

Column name	Explanation
species	Scientific name of the study species
day	Day of capture as number
month	Month of capture as number
year	Year of capture as a four-digit-number
hour	Hour of capture as number
minute	Minute of capture as number
ring_number	Ring number of the individual
age_class	Age class of the individual (ad - adult, juv – juvenile)
forearm_length	Forearm length of the individual (mm)
weight	Body weight of the individual (g)
GPS_id	ID of the used GPS device
weight_GPSPack	Weight of the GPS-VHF-unit (g)

File name: Model_dataset_RSFFlight_Complete_EPSG25833.csv

- comma separated csv file that contains the complete data set used for the modelling including observed and random points of all seasons and both sexes

Column name	Explanation
case_	Distinguishes between observed and random locations (TRUE=observed; FALSE=random)
x_	X coordinate in the coordinate system UTM33 (EPSG 25833)
y_	Y coordinate in the coordinate system UTM33 (EPSG 25833)
trackid	Unique ID for each flight path of an individual bat; contains the information of the used GPS-ID, an underscore, the date of the flight path in numbers (order: year, month, day), a second underscore and the ring number of the individual; e.g. "21519_2085_A167581")
batid	Ring number of the individual
sex	Sex of the individual (f – female, m – male)
age_class	Age class of the individual (ad – adult, juv – juvenile)
field_period	Field period in which the data have been collected (one – early summer, two – late summer)
move_state	Movement mode assigned to the location (ARM – Area restricted movement, COM – commuting, undefined – undefined)
response_rvso	Response variable used in the modelling approach; distinguishes between observed and random locations as a binomial number (1=observed; 0=random)
mindist_WKA	Distance to the closest wind turbine in m
mindist_WKA_inKm	Distance to the closest wind turbine in km
clc20m	Directly underlying land cover class of the location as a three-digit-number (smallest CORINE land cover class) based on a

	20m raster
focFor	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class forest (0-25)
RatfocFor	Ratio of the number of raster cells that belong to forest divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focWat	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class water (0-25)
RatfocWat	Ratio of the number of raster cells that belong to water divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focWet	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class wetland (0-25)
RatfocWet	Ratio of the number of raster cells that belong to wetland divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focMead	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class meadow (0-25)
RatfocMead	Ratio of the number of raster cells that belong to meadows divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focAgri	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class agriculture (aka farmland) (0-25)
RatfocAgri	Ratio of the number of raster cells that belong to agriculture (aka farmland) divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focShrubs	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class shrubs (0-25)
RatfocShrubs	Ratio of the number of raster cells that belong to shrubs divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focOpenNat	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class open natural areas (0-25)
RatfocOpenNat	Ratio of the number of raster cells that belong to open natural areas divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1

focCitygreen	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class city green (0-25)
RatfocCitygreen	Ratio of the number of raster cells that belong to city green divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
focCityarea	Number of raster cells within a 50m-radius around the location (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class city area (aka sealed surface) (0-25)
RatfocCityarea	Ratio of the number of raster cells that belong to city area (aka sealed surface) divided by the total number of raster cells within a 50m-radius around the location (based on 20m raster; 5x5 raster); ranges from 0 to 1
clc2_20m	Directly underlying land cover class summarizing the three-digit-numbers for CORINE land cover classes based on the 20m raster (agricultural areas – farmland, city area – sealed surface, forest – forest, meadows – meadows, shrubs and bushes - shrubs and herbaceous vegetation, water – water, wetland – wetland)
main_clc2	Land cover class with the highest proportion within a 50m-radius (20m raster cells; 5x5) around the location (Agri – farmland, Cityarea – sealed surface, For – forest, Mead – meadows, Shrubs - shrubs and herbaceous vegetation, Wat – water, Wet – wetland)
main_clc_ratio	The proportion of the main land cover class within a 50m-radius (20m raster cells; 5x5) around the location, between 0 and 1
main_clc2_ratrel	Land cover class with the highest proportion within a 50m-radius (20m raster cells; 5x5) around the location if main_clc_ratio > 0.5; if the highest ratio is below 0.5 it is described as diverse (Agri – farmland, Cityarea – sealed surface, For – forest, Mead – meadows, Shrubs - shrubs and herbaceous vegetation, Wat – water, Wet – wetland, diverse - diverse)
forestornot	Summarized main land cover class within a 50m-radius (20m raster cells; 5x5) around the location (forest – For; others – Agri, Cityarea, Mead, Shrubs, Wat, Wet and diverse)
year	Year of data collection (study year; 19 – 2019; 20 – 2020)
fieldper_season	Unique identifier for the field season ("one_19" – early summer 2019, "one_20" – early summer 2020, "two_19" – late summer 2019, "two_20" – late summer 2020)
DistanceAssumedRoostsInM	Distance between the location and the closest potential roost (m)
DistanceAssumedRoostsInKm	Distance between the location and the closest potential roost (km)
mindist_WKAid	ID of the closest wind turbine
Ostwert_WKA	Easting of the closest wind turbine; UTM 33 (EPSG 25833)
Nordwert_WKA	Northing of the closest wind turbine; UTM 33 (EPSG 25833)
Inbetriebn_WKA	Date of commissioning of the closest wind turbine; e.g. "2016/08/18"

Nabenhoehe_WKA	Hub height of the closest wind turbine (m)
Rotordurch_WKA	Rotor diameter of the closest wind turbine (m)
clc20m_WKA	Directly underlying land cover class of the closest wind turbine as a three-digit-number (smallest CORINE land cover class) based on a 20m raster
focFor_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class forest (0-25)
RatfocFor_WKA	Ratio of the number of raster cells that belong to forest divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focWat_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class water (0-25)
RatfocWat_WKA	Ratio of the number of raster cells that belong to water divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focWet_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class wetland (0-25)
RatfocWet_WKA	Ratio of the number of raster cells that belong to wetland divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focMead_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class meadow (0-25)
RatfocMead_WKA	Ratio of the number of raster cells that belong to meadow divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focAgri_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to the land cover class agriculture (aka farmland) (0-25)
RatfocAgri_WKA	Ratio of the number of raster cells that belong to agriculture (aka farmland) divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focShrubs_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class shrubs (0-25)
RatfocShrubs_WKA	Ratio of the number of raster cells that belong to shrubs divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focOpenNat_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class open natural areas (0-25)

RatfocOpenNat_WKA	Ratio of the number of raster cells that belong to open natural areas divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focCitygreen_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class city green (0-25)
RatfocCitygreen_WKA	Ratio of the number of raster cells that belong to city green divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
focCityarea_WKA	Number of raster cells within a 50m-radius around the closest wind turbine (raster of 5x5 raster cells with the focal cell in the center) that belong to land cover class city area (aka sealed surface) (0-25)
RatfocCityarea_WKA	Ratio of the number of raster cells that belong to city area (aka sealed surface) divided by the total number of raster cells within a 50m-radius around the closest wind turbine (based on 20m raster; 5x5 raster); ranges from 0 to 1
main_clc2_WKA	Land cover class with the highest proportion within a 50m-radius (20m raster cells; 5x5) around the closest wind turbine (Agri – farmland, Cityarea – sealed surface, For – forest, Mead – meadows, Shrubs - shrubs and herbaceous vegetation, Wat – water, Wet – wetland)
main_clc_ratio_WKA	The proportion of the main land cover class within a 50m-radius (20m raster cells; 5x5) around the closest wind turbine, between 0 and 1
main_clc2_ratrel_WKA	Land cover class with the highest proportion within a 50m-radius (20m raster cells; 5x5) around the closest wind turbine if main_clc_ratio > 0.5; if the highest ratio is below 0.5 it is described as diverse (Agri – farmland, Cityarea – sealed surface, For – forest, Mead – meadows, Shrubs - shrubs and herbaceous vegetation, Wat – water, Wet – wetland, diverse - diverse)
nrWKA_w1km_WKA	Number of wind turbines within 1 km of the closest wind turbine (aka centrality of wind turbine)
DistanceAssumedRoostsInM_WKA	Distance of the closest wind turbine to its nearest potential roost (m)
DistanceAssumedRoostsInKm_WKA	Distance of the closest wind turbine to its nearest potential roost (km)
forestornot_WKA	Summarized main land cover class within a 50m-radius (20m raster cells; 5x5) around the closest wind turbine (forest – For; others – Agri, Cityarea, Mead, Shrubs, Wat, Wet and diverse)

File name: Observed_GPS_locations.csv

- comma separated csv file that contains the observed GPS locations

Column name	Explanation
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Day	Day of the recorded GPS location as numeric
Month	Month of the recorded GPS location as numeric
Year	Year of the recorded GPS location as a two-digit-numeric
Hour	Hour of the recorded GPS location as numeric in the time format UTC
Min	Minutes of the recorded GPS location as numeric in the time format UTC
Sec	Seconds of the recorded GPS location as numeric in the time format UTC
utc	Combination of the former six columns as a character in date format (UTC, e.g. "2019-08-13 18:31:24")
InSeconds	The date and time of the recorded GPS location as a numeric in seconds (e.g. 66684.54)
SVs_tracked	Number of satellites contributing to the GPS location estimation; ranges from 4 to 10
Latitude	Latitude of the recorded GPS location as numeric (WGS84; EPSG 4326)
Longitude	Longitude of the recorded GPS location as numeric (WGS84; EPSG 4326)
x	X coordinate of the recorded GPS location in the coordinate system UTM 33 (EPSG 25833)
y	Y coordinate of the recorded GPS location in the coordinate system UTM 33 (EPSG 25833)
Height	By the GPS device estimated height above the geoid ("mean sea level")
field_period	Field period in which the data have been collected (one – early summer, two – late summer)
id	ID of the used GPS device
bat_id	Ring number of the individual
sex	Sex of the individual (f – female, m – male)
age_class	Age class of the individual (ad – adult, juv – juvenile)
trackid	Unique ID for each flight path of an individual bat; contains the information of the used GPS-ID, an underscore, the date of the flight path in numbers (year,month,day), a second underscore and the ring number of the individual; e.g. "21519_2085_A167581")
dist_nextrec_km	Distance of the current GPS location to the next GPS location within flight paths (km); the value of the last position of a flight path is set to NA
dist_start	Distance of the current GPS location to the start location of the according flight path (km); the value of the last position of a flight path is set to NA
timediff_nextrec_min	Time difference of the current GPS location to the next GPS location within flight paths (min); the value of the last position of a flight path is set to NA
heightdiff_nextrec	Height difference of the current GPS location to the next GPS location within flight paths (m); the value of the last position of a flight path is set to NA
dist_nextrec_m_height	Distance of the current GPS location to the next GPS location within flight paths under consideration of height difference (m); the value of the last position of a flight path is set to NA
speed_ms	Speed between the current GPS location and the next GPS

	location within flight paths (m/s); the value of the last position of a flight path is set to NA
speed_ms_height	Speed between the current GPS location and the next GPS location within flight paths under consideration of height difference (m/s); the value of the last position of a flight path is set to NA
cap_time_cet	Capture time of the individual (CET; "2019-08-13 18:25:00")
release_cap_time_cet	Release time of the individual (CET; "2019-08-13 18:45:00")
recap_time_cet	Recapture time of the individual (CET; "2019-08-21 20:05:00")
cap_time_utc	Capture time of the individual (UTC; "2019-08-13 16:25:00")
release_cap_time_utc	Release time of the individual (UTC; "2019-08-13 16:45:00")
recap_time_utc	Recapture time of the individual (UTC; "2019-08-21 18:05:00")
angle	Angle between the current GPS location and the subsequent and next GPS location within flight paths; the value of the first and last position of a flight path is set to NA
state1_prob	Estimated probability that the current GPS location belongs to state 1 (ARM)
state2_prob	Estimated probability that the current GPS location belongs to state 2 (COM)
move_state	Movement mode assigned to the location (ARM – Area restricted movement, COM – commuting, undefined – probability for both modes is below 0.75)

Data sources used to extract additional information for the uploaded data sets:

Source of the wind turbine data used in these data sets:

LfU (Landesamt für Umwelt Brandenburg). (2020). Windkraftanlagen des Landes Brandenburg. <https://mlul.brandenburg.de/lu/gis/wka.zip>. Last update 10 January 2020.

Source of the land cover information used in these data sets:

GeoBasis-DE/BKG (Federal Agency for Cartography and Geodesy). (2018). Digitales Landbedeckungsmodell für Deutschland (LBM-DE2018). <https://gdz.bkg.bund.de>.