

Global attributes

Category	Metadata Field	Description
Dataset Description	Title	input_max_SMI_dataset.csv, tmp_anomally.aut.csv, species_traits_weight_paper1.csv
	Description	These data allow replication of the analysis in Temporal changes to migratory fuel-load in migratory birds across Europe
	Keywords	Max SMI, migrant passerines, ringing
	Taxonomic Scope	Passerine and near passerine Afro-Palearctic migrant birds
	Taxonomic Authority	The data and species names follow International Ornithological Congress World Bird List v13.2
	Version number	1.0
	Licence	CC-BY-NC .
	Acknowledgement	Cite associated paper
	Usage	For purposes of replicating the analyses in the paper: Temporal changes to migratory fuel-load in migratory birds across Europe
Dataset Author	Name	Jennifer Border
	Email	Jennifer.border@bto.org
	Organisation	British trust for Ornithology
	Organisation address	The Nunnery, Thetford, Norfolk IP24 2PU
Dataset Geospatial Range	Min Longitude	-10
	Min Latitude	35
	Max Longitude	30
	Max Latitude	65
	Geospatial extent-description	Western Europe
Dataset Temporal Range	Date Description	1980 - 2022
	Single Date	NA
	Start Range	7 th April 1980
	End Range	2 nd December 2022
Dataset Parent Project	Project title	Temporal changes to migratory fuel-load in migratory birds across Europe
	Project geospatial range	Western Europe
	Project description	Climate change is a major threat to biodiversity, and migratory animals are particularly vulnerable, due partly to their reliance upon good resource availability across a network of sites at specific times. Migrants perform vital ecosystem functions, transferring significant resources across large spatial scales but the impacts of climate change on the ability of individuals to complete these journeys are poorly studied. Collecting the large-scale and long-term data on the condition of individuals during migration to address this is challenging, but in migratory birds, we have a model organism for which a large network of ringers (banders) collect individual data on body size and mass, enabling variation in body condition to be tracked. We used long-term ringing data on 33 Afro-Palearctic migratory bird species at 286 sites across Europe to demonstrate a large-scale decrease in migratory fuel-loads during autumn over the last 40-years, but not in spring. Declines were strongest across southern Europe and linked to rising temperatures. The timing of autumn fuelling has also shifted, occurring earlier at northern sites and later at southern sites. These relationships varied depending on diet and breeding cycle length. Obligate insectivores were more constrained by temperature in the

		timing and magnitude of fuelling than frugivores. Species with short breeding cycles departing later at southern sites in warmer years, likely reflecting an extended breeding season. Altogether, these latitudinally varying findings suggest a trade-off between maximising productivity or maximising adult-survival as climate drives changing constraints on breeding season length and resource availability. Similar climate-induced trade-offs may be happening in other migratory taxa with the potential to influence population trends.
	Project contact name	Jennifer Border
	Project contact email	Jennifer.border@bto.org
	Project contact organisation	British Trust for Ornithology
	Project citation	Please cite associated paper
	Quality Assurance	The data were thoroughly checked and validated
Dataset Analysis	Analytical methods	Details in associated code file
	Analytical model	GLMMs
	Model variables	Northing, temperature anomaly, species, 10 km square, year
	Model validation	Diagnostic plots
	Analytical software	R

Information on the individual dataset variables

input_max_SMI_dataset.csv

Field Name	Description	Units	Field Type
Northing_10km	Northing in European grid (EPSG: 3035)	meters	numeric
Easting_10km	Easting in European grid (EPSG: 3035)	meters	numeric
Northing_10km_scal	Northing centred and scaled	NA	numeric
km10	Grid reference of 10 km square in EPSG: 3035	NA	character
week	week of the year with 1 = 1st-7th January	weeks	Numeric
year	year	NA	Numeric
Season	Spring (weeks 5 to 20), Autumn (weeks 30 to 48)	NA	Character
Eng_Name	Species English Name	NA	Character
SMI	The max SMI value	NA	Numeric

tmp_anomaly.aut.csv

Field Name	Description	Units	Field Type
Northing_10km	Northing in European grid (EPSG: 3035)	meters	numeric
Easting_10km	Easting in European grid (EPSG: 3035)	meters	numeric
km10	Grid reference of 10 km square in EPSG: 3035	NA	character
Y1980-Y2022	Site autumn temperature anomaly (mean over 1 st August – 31 st October) annual deviation from the	Degrees C	numeric

	1980 – 2022 average for the site		
Over_all_years_mean	The mean autumn temperature per site over all years, 1980 to 2022.	Degrees C	numeric

Reference: derived from the 0.1 degree resolution E-OBS dataset

(<https://www.ecad.eu/download/ensembles/download.php>; Cornes, R., G. van der Schrier, E.J.M. van den Besselaar, and P.D. Jones. 2018: An Ensemble Version of the E-OBS Temperature and Precipitation Datasets, *J. Geophys. Res. Atmos.*, 123. doi:10.1029/2017JD028200

species_traits_weight_paper1.csv

Field Name	Description	Units	Field Type
sci_name	Species scientific name	NA	character
Eng_Name	Species English name	NA	character
diet	diet category (Frugivore, aerial insectivore, other obligate insectivore from Storchová, & Horak 2017)	NA	factor
distance	long or short distance migrant (Hewson & Noble 2009 and Vickery et al. 2014)	NA	factor
breeding_cycle	breeding cycle length (length of nestling and fledgling period, Storchová, & Horak 2017)	Days	numeric
brood_num	mean number of broods (Storchová, & Horak 2017)	NA	numeric

References:

Storchová, L., & Hořák, D. (2018). Life-history characteristics of European birds. *Glob. Ecol. Biogeogr.*, **27**, 400–406.

Hewson, C. M., & Noble, D. G. (2009). Population trends of breeding birds in British woodlands over a 32-year period: relationships with food, habitat use and migratory behaviour. *Ibis* **151**(3), 464-486.

Vickery, J. A., Mallord, J. W., Adams, W. M., Beresford, A. E., Both, C., Cresswell, W., ...Hewson, C. M. (2023). The conservation of Afro-Palaeartic migrants: What we are learning and what we need to know? *Ibis* **165**, 717-738.