Metadata Table

Table 1. Description of variables included in the GlobalForestRA_data.csv file.

Variable	Description	Unit	N	Range or Categorical Levels
ID	Unique identification number of each observation in this study	NA	824	1 - 824
Data_paper	If applicable, the associated data paper or dataset	NA	611	Holland et al., 2015, Jia et al., 2016, Martinelli et al., 2017, Neumann et al., 2021, Suzuki et al., 2012
Data_paper_ID	If applicable, the unique identification number of the observation in the associated data paper or dataset	NA	611	2 - 6000038
Site	Site name extracted from the publication/data paper	NA	824	239 unique sites
Subsite	Subsite name extracted from publication/data paper	NA	824	449 unique subsites
Latitude	Latitude extracted from publication/data paper	decimal degrees	824	-41.433 - 65.154
Longitude	Longitude extracted from publication/data paper	decimal degrees	824	-155.317 - 152.754
LatLonAdjusted	Flag for sites where latitude/longitude coordinates were adjusted	NA	824	0 - 1
Country	Country	NA	824	35 unique countries
MAT_C	Mean annual temperature (1970-2000), extracted from WorldClim2 (Fick and Hijmans 2017)	degrees C	824	-4.27 – 28.0
MAP_mm	Mean annual precipitation (1970-2000), extracted from WorldClim2 (Fick and Hijmans 2017)	mm/year	824	199 - 3554
Biome	Forest biome	NA	824	Tropical, Temperate, Boreal
Soil_N	Total soil nitrogen, extracted from SoilGrids2.0 (Poggio et al. 2021)	g/kg	824	0.57 - 4
Soil_pH	Soil pH, extracted from SoilGrids2.0 (Poggio et al. 2021)	pH	824	3.95 - 8.13
Soil_CEC	Soil cation exchange capacity, extracted from SoilGrids2.0 (Poggio et al. 2021)	cmol(c)/kg	824	4 - 44.65
Soil_sand_pct	Soil percent sand, extracted from SoilGrids2.0 (Poggio et al. 2021)	%	824	4.15 - 95.22

Soil_silt_pct	Soil percent silt, extracted from SoilGrids2.0 (Poggio et al. 2021)	%	824	2.4 - 73.28
Soil_clay_pct	Soil percent clay, extracted from SoilGrids2.0 (Poggio et al. 2021)	%	824	1.55 - 78.78
Soil_texture_index	Soil texture index, log (sand%/clay%)	NA	824	-2.43 – 4.12
Forest_age	If available, approximate age of forest stand	years	500	5 - 1000
Successional_stage	If available, description of successional stage	NA	614	old-growth, late-successional, secondary, early-successional, mid-successional
Forest_age_group	Forest age group classification, based on forest age and/or successional stage and biome (see Ward et al., in prep)	NA	824	old, mid, young
Forest_description	If available, description of site extracted from publication or data paper	NA	626	NA
Disturbance_note	If available, description of disturbance regime or events from publication or data paper	NA	415	NA
Dominant_species	If available, description of dominant tree species from publication or data paper	NA	626	NA
Leaf_type	If available, dominant leaf morphology classification, based forest description, dominant species, and additional information from primary references	NA	795	broadleaf, needleleaf, mixed
Sampling_interval	If available, range of years over which litterfall sampling took place	years	824	1950 - 2022
Sampling_duration	Sampling duration in years	years	824	1 - 24
Sampling_area_ha	If available, sampling area	ha	231	0.013 - 100
Sampling_frequency	If available, description of the frequency of litterfall trap collection	NA	575	NA
Trap_area_m2	If available, the sampling area of litterfall traps	m^2	598	0.196 - 4
N_Traps	If available, number of litterfall traps employed for sampling	N traps	600	2 - 319
Leaf_flux_Mghayr	Annual average leaf material flux (including needles and other foliar materials)	Mg/hayr	824	0.044 - 20.747
Repro_flux_Mghayr	Annual average reproductive material flux (including fruits, flowers, seeds, cones, bracts and other reproductive materials)	Mg/hayr	824	0.002 - 3.51

R/(R+L)	Proxy for reproductive allocation, R signifies reproductive and L signifies leaf flux	NA	824	0.001 - 0.546
Primary_Reference	Primary reference for the observation of annual average leaf and reproductive litterfall fluxes	NA	824	NA
Supplementary_References	References providing additional information about the site or subsite	NA	824	NA
Site_soil_total_P	On-site measurement of soil total phosphorus, extracted from publication or data source (Reference_soils)	mg/kg	34	0.18 - 1413
Site_soil_N	On-site measurement of soil total nitrogen, extracted from publication or data source (Reference_soils)	g/kg	81	0.03 - 14.8
Site_soil_pH	On-site measurement of soil pH, extracted from publication or data source (Reference_soils)	pH	113	2.86 - 7.9
Site_soil_CEC	On-site measurement of soil cation exchange capacity, extracted from publication or data source (Reference_soils)	cmol(c)/kg	86	0.134 - 62.35
Site_soil_sand	On-site measurement of soil percent sand, extracted from publication or data source (Reference_soils)	%	90	1.37 - 97.44
Site_soil_clay	On-site measurement of soil percent clay, extracted from publication or data source (Reference_soils)	%	94	0.64 - 80
Site_soil_silt	On-site measurement of soil percent silt, extracted from publication or data source (Reference_soils)	%	90	1.62 - 63
Reference_soils	Reference for on-site measurements of soil characteristics	NA	118	33 unique references

Methods

We conducted a comprehensive search for peer-reviewed publications, data papers, and databases reporting annual reproductive and leaf litterfall fluxes from forested ecosystems, excluding savanna. We searched Google Scholar, Web of Science, and SciELO using predefined search terms (litterfall OR litter fall OR litter-fall OR litter*) AND (fruit OR flower OR seed OR cone OR reproductive*) AND (leaf OR leaves OR foliar OR foliage OR needle) AND (tree OR forest OR ecosystem). We retained only references reporting ecosystem-level reproductive and leaf litterfall components separately from total litterfall for a minimum of one year of sampling. In addition, we obtained unpublished litterfall flux and soil characteristic data from the GEM network (Malhi *et al.* 2021). Duplicate sites were identified and removed. All fluxes were standardized to dry biomass units using site-specific biomass:carbon ratios when reported, or 0.49 otherwise (Ma *et al.* 2018).

To characterize sites by their long-term mean climatic conditions, we extracted estimates from WorldClim2.1. For each unique set of geographic coordinates, we extracted 30-year (1970-2000) mean annual temperature (MAT) and mean annual precipitation (MAP) at 30-arcsec (about 1km) spatial resolution (Fick & Hijmans 2017).

In order to test relationships between RA and soil characteristics across our full range of data, we extracted predictions of soil pH, N, CEC, and texture (sand, silt, clay, %) from SoilGrids250 (Poggio et al. 2021), and computed the depth-weighted average to 30 cm. Estimates to 30 cm depth are consistent with reported soil properties from GEM/RAINFOR sites (Quesada et al. 2010) and were also computed for NEON ecological monitoring network sites (NEON, 2023), which constituted the majority of sites reporting on-site measurements of soil characteristics in our dataset. For analysis of soil texture, we use a soil texture index defined as the additive log ratio, log (% sand / % clay) (Poggio et al. 2021).

Methods and Table 1 References

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