

Ecoprophecies Dataset

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Attachments

Ecoprophecies_Dataset.tar.gz

Introduction

In the frame of the ECOPROPHET project, data was collected from in situ observations, remote-sensing sources and models for 61 sites. The objective of this project was to improve our understanding of ecosystem productivity and the role of vegetation phenology as a key determinant of ecosystem carbon, water and energy balances. More info and publications can be found at <http://ecoprophet.meteo.be>.

This project was part of the research programme for Earth Observation STEREO III funded by the Scientific Belgian Policy BELSPO (www.belspo.be) (Contract SR/00/334 and SR/34/211).

The resulting dataset was centralized and is openly available at <https://pangea.de>. This document describes its content.

Sites

Data from 61 sites was collected. Table 1 gives an overview of the sites and their description. Longer timeseries are available, but the period 2007-2018 was used here to ensure a complete overlap between the observed GPP and all GPP simulations. This list of sites is also given in *EcopropheciesMeta.txt*, along with the geolocation. This is a tab-delimited txt file.

ID	Name	Country	Begin	End	PFT	HCB
AU-ASM	Alice Springs	Australia	2009	2013	ENF	SubTr_W
AU-Cpr	Calperum	Australia	2009	2014	SAV	Trans_W
AU-DaP	Daly River Savanna	Australia	2006	2013	GRA	Trans_E
AU-DaS	Daly River Cleared	Australia	2007	2014	SAV	Trans_E
AU-Dry	Dry River	Australia	2007	2014	SAV	Trans_E
AU-How	Howard Springs	Australia	2000	2014	WSA	Trans_E
AU-Stp	Sturt Plains	Australia	2007	2014	GRA	Trans_E
AU-Tum	Tumbarumba	Australia	2000	2014	EBF	Trans_E
BE-Bra	Brasschaat	Belgium	1995	2018	MF	MidL_T
BE-Lon	Lonzée	Belgium	2003	2018	CRO	MidL_T
BE-Vie	Vielsalm	Belgium	1995	2018	MF	MidL_T
BR-Sa1	Santarém-Km67	Brazil	2002	2012	EBF	Tropic
CA-Gro	Ontario - Groundhog River	Canada	2003	2015	MF	Bor_T
CH-Lae	Lägeren	Switzerland	2003	2018	MF	MidL_T
CZ-BK1	Bílý Kříž forest	Czech Republic	2003	2018	ENF	MidL_T
CZ-Lnz	Lanžhot	Czech Republic	2014	2018	MF	MidL_T
CZ-RAJ	Rájec	Czech Republic	2011	2018	ENF	MidL_T
CZ-Stn	Štítná	Czech Republic	2009	2018	DBF	MidL_T
DE-Geb	Gebesee	Germany	2000	2018	CRO	MidL_T
DE-Hai	Hainich	Germany	1999	2018	DBF	MidL_T
DE-Hte	Hütelmoor	Germany	2008	2018	WET	MidL_T
DE-Kli	Klingenberg	Germany	2003	2018	CRO	MidL_T
DE-Obe	Oberbärenburg	Germany	2007	2018	ENF	MidL_T
DE-RuS	Selhausen Jülich	Germany	2010	2018	CRO	MidL_T
DE-RuW	Wustebach	Germany	2009	2018	ENF	MidL_T
DE-Seh	Selhausen	Germany	2006	2010	CRO	MidL_T
DE-Spw	Spreewald	Germany	2009	2014	WET	MidL_T
DE-Tha	Tharandt	Germany	1995	2018	ENF	MidL_T
DK-Sor	Sorø	Denmark	1995	2018	DBF	MidL_T
ES-Abr	Albuera	Spain	2014	2018	SAV	Trans_E
ES-LM1	Majadas del Tietar North	Spain	2013	2018	SAV	Trans_E
ES-LM2	Majadas del Tietar South	Spain	2013	2018	SAV	Trans_E
FI-Hyy	Hyytiälä	Finland	1995	2018	ENF	Bor_WT
FI-Let	Lettosuo	Finland	2008	2018	ENF	Bor_WT
FI-Var	Värriö	Finland	2015	2018	ENF	Bor_E
FR-Fon	Fontainebleau-Barbeau	France	2004	2014	DBF	MidL_T
FR-Hes	Hesse	France	2013	2018	DBF	MidL_T
FR-Pue	Puéchabon	France	1999	2014	EBF	Trans_E
GF-Guy	Guyaflux (French Guiana)	French Guiana	2004	2015	EBF	Tropic
IT-Cp2	Castelporziano2	Italy	2011	2018	EBF	Trans_E
IT-SR2	San Rossore 2	Italy	2012	2018	ENF	Trans_E
IT-SRo	San Rossore	Italy	1998	2012	ENF	Trans_E
NL-Loo	Loobos	Netherlands	1995	2018	ENF	MidL_T
RU-Fy2	Fyodorovskoye dry spruce	Russia	2014	2018	ENF	Bor_WT
RU-Fyo	Fyodorovskoye	Russia	1997	2018	ENF	Bor_WT
SE-Deg	Degerö	Sweden	2000	2018	WET	Bor_WT
SE-Htm	Hyltemossa	Sweden	2014	2018	ENF	MidL_T
SE-Lnn	Lanna	Sweden	2013	2018	CRO	MidL_T
SE-Nor	Norunda	Sweden	2013	2018	ENF	MidL_T
SE-Ros	Rosinedal-3	Sweden	2013	2018	ENF	Bor_WT
SE-Svb	Svartberget	Sweden	2013	2018	ENF	Bor_WT
US-ARM	Southern Great Plains	United States	2003	2013	CRO	MidL_W
US-Ha1	Harvard Forest EMS (HFR1)	United States	1991	2013	DBF	MidL_W
US-Me6	Metolius Young Pine Burn	United States	2010	2015	ENF	Trans_E
US-MMS	Morgan Monroe State Forest	United States	1999	2015	DBF	MidL_W
US-SRC	Santa Rita Creosote	United States	2008	2015	OSH	Trans_E
US-SRG	Santa Rita Grassland	United States	2008	2015	GRA	Trans_E
US-SRM	Santa Rita Mesquite	United States	2004	2015	WSA	Trans_E
US-UMB	UMich Biological Station	United States	2000	2015	DBF	Bor_T
US-UMd	UMBS Disturbance	United States	2007	2015	DBF	Bor_T
ZA-Kru	Skukuza	South Africa	1999	2013	SAV	Trans_W

Table 1: Selection of 61 FLUXNET/ICOS sites used in this study. Classification by plant functional type (PFT; evergreen broadleaf forest: EBF, evergreen needle-leaf forest: ENF, deciduous broadleaf forest: DBF, mixed forest: MF, wetland: WET, grassland: GRA, open shrubland: OSH, savanna: SAV, woody savanna: WSA, cropland: CRO) and hydroclimatic biome (HCB; Boreal / Mid-Latitude / Transitional / Subtropical / Tropical + Energy / Water / Temperature-driven). Note: only data beginning from 2007 was used in this study. All sites with data until 2018 are taken from the ICOS 2018 drought initiative, data for the other sites was collected from the FLUXNET2015 dataset.

Variables

The main dataset is found in *EcopropheniciesDataset.txt*, a tab-delimited txt file. The dataset is comprised of the following variables:

Site Site ID, linked to the metadata in *EcopropheniciesMeta.txt*

Date DD/MM/YYYY

TA_F_MDS Air temperature ($^{\circ}\text{C}$); Tower

VPD_F_MDS Vapor pressure deficit (Pa); Tower

SW_IN_F_MDS Downwelling shortwave radiation (W m^{-2}); Tower

SWC_F_MDS_1 Observed Soil water content 1 ($\text{m}^3 \text{m}^{-3}$); Tower; Depth depending on the test site (see ICOS Ecosystem Station Labelling Report)

SWC_F_MDS_2 Observed Soil water content 2 ($\text{m}^3 \text{m}^{-3}$); Tower; Depth depending on the test site (see ICOS Ecosystem Station Labelling Report)

SWC_F_MDS_3 Observed Soil water content 3 ($\text{m}^3 \text{m}^{-3}$); Tower; Depth depending on the test site (see ICOS Ecosystem Station Labelling Report)

SWC_F_MDS_4 Observed Soil water content 4 ($\text{m}^3 \text{m}^{-3}$); Tower; Depth depending on the test site (see ICOS Ecosystem Station Labelling Report)

swvl1 ERA5 Soil Water Content 1 ($\text{m}^3 \text{m}^{-3}$); ERA5; 0cm-7cm depth

swvl2 ERA5 Soil Water Content 2 ($\text{m}^3 \text{m}^{-3}$); ERA5; 7cm-21cm depth

swvl3 ERA5 Soil Water Content 3 ($\text{m}^3 \text{m}^{-3}$); ERA5; 21cm-72cm depth

swvl4 ERA5 Soil Water Content 4 ($\text{m}^3 \text{m}^{-3}$); ERA5; 72cm-189cm depth

Obs_GPP Eddy Covariance GPP ($\text{gC/m}^2/\text{d}$); Tower

RMI LSA SAF GPP ($\text{gC/m}^2/\text{d}$); LSA-SAF algorithms, atmospheric forcing from Tower and ERA5, LAI and FAPAR from Copernicus GLS

Surfex ISBA GPP ($\text{gC/m}^2/\text{d}$); atmospheric forcing from Tower and ERA5

ORCHIDEE ORCHIDEE GPP ($\text{gC/m}^2/\text{d}$); atmospheric forcing from Tower and ERA5

MODIS_NDVI_VIGPP MODIS NDVI GPP ($\text{gC/m}^2/\text{d}$); MODIS NDVI + percentile regression with Tower GPP

MODIS_EVI_VIGPP MODIS EVI GPP ($\text{gC/m}^2/\text{d}$); MODIS EVI + percentile regression with Tower GPP

MODIS_NIRv_VIGPP MODIS NIRv GPP ($\text{gC/m}^2/\text{d}$); MODIS NIRv + percentile regression with Tower GPP

MODIS_NIRvP_VIGPP MODIS NIRvP GPP ($\text{gC/m}^2/\text{d}$); MODIS NDVI and Tower SWrad + percentile regression with Tower GPP

SPV_NDVI_VIGPP SPV NDVI GPP ($\text{gC}/\text{m}^2/\text{d}$); SPOT Vegetation/PROBA V NDVI + percentile regression with Tower GPP

SPV_EVI_VIGPP SPV EVI GPP ($\text{gC}/\text{m}^2/\text{d}$); SPOT Vegetation/PROBA V EVI + percentile regression with Tower GPP

SPV_NIRv_VIGPP SPV NIRv GPP ($\text{gC}/\text{m}^2/\text{d}$); SPOT Vegetation/PROBA V NIRv + percentile regression with Tower GPP

SPV_NIRvP_VIGPP SPV NIRvP GPP ($\text{gC}/\text{m}^2/\text{d}$); SPOT Vegetation/PROBA V NIRv + Tower SWrad + percentile regression with Tower GPP

JRC_SIF_JJ_VIGPP SIF GPP ($\text{gC}/\text{m}^2/\text{d}$); Downscaled GOME2 SIF + percentile regression with Tower GPP

MODIS_MOD17 MOD17 GPP ($\text{gC}/\text{m}^2/\text{d}$); MODIS MOD17 product

FluxCom_RS FluxCom RS GPP ($\text{gC}/\text{m}^2/\text{d}$); FluxCom RS product

FluxCom_RSMet FluxCom RS+Meteo GPP ($\text{gC}/\text{m}^2/\text{d}$); FluxCom RS+Meteo (ERA5) product

The data is derived from the following sources:

Tower Test-sites were selected from the FLUXNET2015 dataset (Pastorello et al., 2020) and the ICOS '2018 drought initiative' dataset (Drought 2018 Team and ICOS Ecosystem Thematic Centre, 2019). Original dataset available at <https://fluxnet.org/> and <https://www.icos-cp.eu/data-products/YVR0-4898>

ERA5 Derived from the ERA5 product (Hersbach et al., 2020); Original dataset available at <https://cds.climate.copernicus.eu/>

MODIS Original dataset available at <https://modis.gsfc.nasa.gov/data/>

SPOT Vegetation/PROBA V Original dataset available at <https://land.copernicus.eu/global/>

Downscaled GOME2 SIF Derived from the downscaled SIF product by Duveiller et al. (2020). Original dataset available at <https://doi.org/10.2905/21935FFC-B797-4BEE-94DA-8FEC85B3F9E1>

FluxCom Derived from FluxCom product ensemble (Jung et al., 2020). Original dataset available at <http://fluxcom.org/>

For more details concerning the land surface models, see (De Pue et al., 2022)

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