EEA geospatial data catalogue

Annual above ground vegetation season length time-series 2000-2016 - version 1, Aug. 2018

This data set raster file is the above ground vegetation season length time-series for the period 2000-2016.

The data set addresses trends in the season length of land surface vegetation derived from remote sensing observed time series of vegetation indices. The vegetation index used in the indicator is the Plant Phenology Index (PPI, Jin and Eklundh, 2014). PPI is based on the MODIS Nadir BRDF-Adjusted Reflectance product (MODIS MCD43 NBAR). The product provides reflectance data for the MODIS “land” bands (1 - 7) adjusted using a bi-directional reflectance distribution function. This function models values as if they were collected from a nadir-view to remove so called cross-track illumination effects. The Plant Phenology Index (PPI) is a new vegetation index optimized for efficient monitoring of vegetation phenology. It is derived from radiative transfer solution using reflectance in visible-red (RED) and near-infrared (NIR) spectral domains. PPI is defined to have a linear relationship to the canopy green leaf area index (LAI) and its temporal pattern is strongly similar to the temporal pattern of gross primary productivity (GPP) estimated by flux towers at ground reference stations. PPI is less affected by presence of snow compared to commonly used vegetation indices such as Normalized Difference Vegetation Index (NDVI) or Enhanced Vegetation Index (EVI).

The product is distributed with 500 m pixel size (MODIS Sinusoidal Grid) with 8-days compositing period.

Simple

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Point of contact

No information provided.

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No information provided.

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GEMET - INSPIRE themes, version 1.0	• Habitats and biotopes • Environmental monitoring facilities
Keywords	
Keywords	
GEMET	• vegetation • remote sensing • index
Continents, countries, sea regions of the world.	• EEA39
Spatial scope	• European
Temporal resolution	• Annually

EEA Management Plan	• 2019 1.8.2
EEA topics	• Agriculture and food • Forests and forestry • Land use • Biodiversity
Access constraints	Other restrictions
Other constraints	no limitations to public access
Use constraints	Other restrictions
Other constraints	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge, provided that the source is acknowledged (http://www.eea.europa.eu/legal/copyright). Copyright holder: European Environment Agency (EEA).
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Association Type	Cross reference
Spatial representation type	Grid
Distance	500 m
Language of dataset	English
Topic category	• Environment

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Begin date	2000-01-01
End date	2016-12-31
CRS identifier	EPSG:3035
Distribution format	• BIL (2016)

OnLine resource

No information provided.

Hierarchy level	Dataset

Conformance result

Date (Publication)	2010-12-08
Explanation	See the referenced specification

Statement	The PPI time-series is affected by noise due to e.g. atmosphere and remaining cloud influence, resulting in some spikes and outlier values. Since large spikes and outliers might significantly affect the further function fitting, they first have to be removed from the data. This is done in an initial filtering process, further described in the TIMESAT software manual. After the outlier removal the next step in the analysis is the determination of the number of growing seasons. This is based on a harmonic function fit (sine-cosine functions) to the data. The presence of a second season is established by evaluating the amplitudes of the first and second components of the harmonic fit. Presence of noise in the data complicates the decision on whether the given secondary maximum represents a true growing season or not. Therefore, an amplitude threshold is used to remove seasons that are smaller than the given threshold. A detailed description of the determination of the number of growing season is found in the TIMESAT software manual. After the number of growing seasons have been determined double logistic functions are fitted to the data from each pixel. This is done to generate smooth continuous functions that well describe each individual growing season. It is assumed that most of the noise included in PPI (or any other vegetation index) results in negative bias of the values. Therefore, iterative adaptation of the logistic functions to the upper envelope of the data is applied in the following step. The function fit is performed on the PPI data. Values less than the first function fit are then considered as influenced by noise and thus less important, so their weights are decreased for the next iteration of the function fitting. Phenological metrics (and other parameters describing character of the given growing season) are finally extracted from the fitted function data. The following parameters are extracted for each detected growing season to determine the length of the growing season: Start-Of-Season (SOS): date of the start of the season defined as the date when the PPI has increased to the 20% level of the average annual PPI amplitude (Jin et al. 2017). The average annual PPI amplitude is the difference between the average peak level and the average base level for each pixel.

End-Of-Season (EOS): date of the end of the season defined as the date when the PPI drops under the 20 % level of the average annual PPI amplitude (Jin et al. 2017).

The season length is the difference of the EOS day and the SOS day, in days. For this indicator 20% of the seasonal PPI amplitude was used as the SOS and EOS detection threshold.

The output of the process is a season length metrics for each year of the time series 2000-2016 (17 years) covering the EEA39 territory. The spatial resolution of the productivity dataset is 500mx500m pixel size.

Detailed description of the methodology for calculating the productivity metric can be found in the TIMESAT software manual (publically available)

References:

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Metadata

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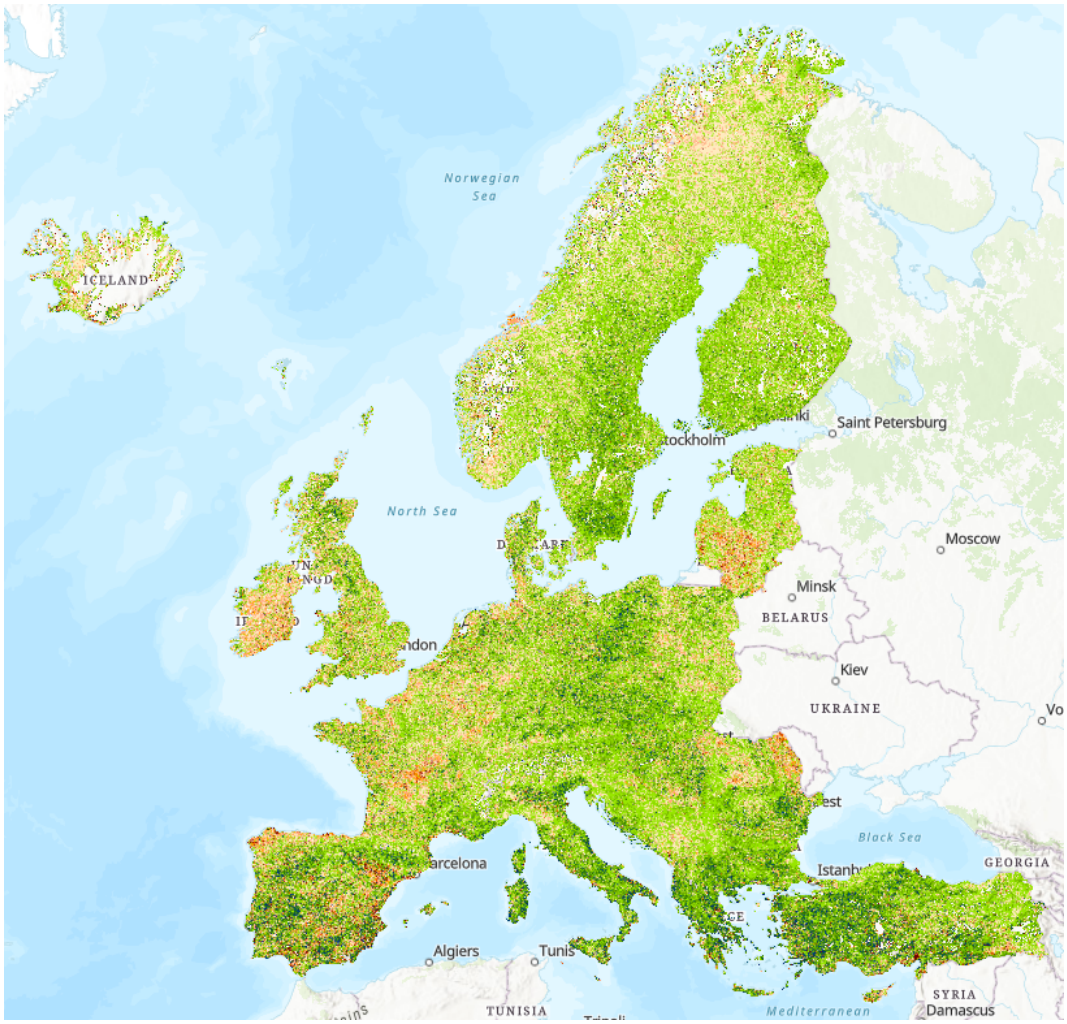
Overviews



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