



...T...Systems



Copernicus Data and Exploitation Platform – Deutschland

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# **Sentinel-2 Level 2B: Vegetation Indices (AGRO-DE)**

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### 1.1 Introduction

CODE-DE provides a suite of spectral indices in 10m spatial resolution calculated based on Sentinel-2 L2A data which were processed using the DLR PACO<sup>1</sup> software for atmospheric correction. Indices are calculated for all pixels which are flagged cloud and cloud-shadow free by Fmask<sup>2</sup>.

This product was developed in the context of the [AGRO-DE](#) Project.

The following indices are included:

Index	Name	Formula
EVI	Enhanced vegetation index	$2.5 * (nir1 - red1) / (nir1 + 6 * red1 - 7.5 * blue2) + 1$
HA56	Hanse Agro 56	$100 * (\log(redEdge2) - \log(redEdge1))$
NDRE	Normalized Difference Red Edge Index	$(nir1 - redEdge1) / (nir1 + redEdge1)$
NDVI	Normalized Difference Vegetation Index	$(NIR - red) / (NIR + red)$
NDWI	Normalized Difference Water Index	$(NIR1 - SWIR2) / (NIR1 + SWIR2)$
PSRI	Plant Senescence Reflectance Index	$(red1 - blue2) / redEdge2$
REIP	Red Edge Reflection Point	$700 + 40 * (red + redEdge3/2 - redEdge1) / (redEdge2 + redEdge1)$

<sup>1</sup> de los Reyes, Raquel und Richter, Rudolf und Langheinrich, Maximilian und Pflug, Bringfried und Schwind, Peter (2018) Validation of a new atmospheric correction software using AERONET reference data PACO: Python-based Atmospheric COrrrection. LPVE2018 - Workshop on Land Product Validation and Evolution, Frascati, Italy

<sup>2</sup> Zhu, Z., Wang, S. and Woodcock, C.E. (2015). "Improvement and expansion of the Fmask algorithm: cloud, cloud shadow, and snow detection for Landsats 4-7, 8, and Sentinel 2 images", Remote Sensing of Environment 159, 269-277



with band designations:

Sentinel 2 Band	Interpretation
B1	blue1
B2	blue2
B3	green
B4	red
B5	redEdge1
B6	redEdge 2
B7	redEdge 3
B8	NIR1
B8a	NIR2
B9	NIR3
B10	SWIR1
B11	SWIR2
B12	SWIR3

## 1.2 Product Folder

The product folder contains download links for each granule and acquisition date.

Sentinel-2 A/B spectral indices are made available for all Sentinel-2 granules within Germany, which were acquired from 01/01/2019 onwards and which feature a solar zenith angle smaller than 70°.

The product folder contains download links for each granule and acquisition date.

Folder structure is: /agrode/S2\_L2B\_index/<year>/<month>/<day>/<scene>\_index/

For example:

agrode/S2\_L2B\_index/2019/02/18/S2B\_MSIL1C\_20190218T101059\_N0207\_R022\_T32UQC\_20190218T153123\_index/

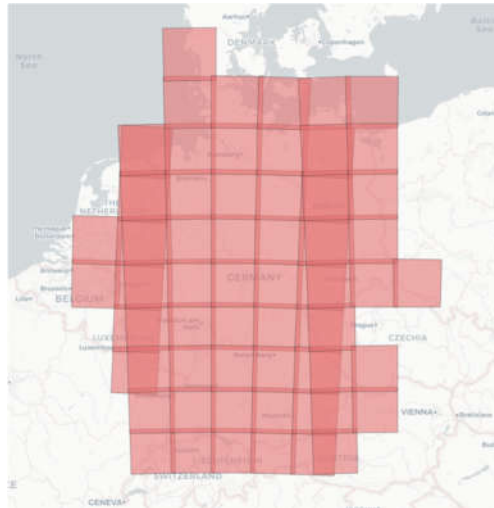


Fig. 1 Sentinel 2 granule coverage of Germany.

### 1.3 Product Name

Products are named according to the [ESA standard naming convention](#) for Sentinel-2 Level 1C products with the suffix “\_<index>.tif”.

For example:

S2B\_MSIL1C\_20190118T104359\_N0207\_R008\_T32ULU\_20190118T123528\_ndvi.tif

### 1.4 Product Format

Each zip archive holds 7 files, which are distinguished by their suffix appended to the standard scene identifier (e.g. “S2A\_MSIL1C\_20190219T103051\_N0207\_R108\_T31UGQ\_20190219T124050”).

Files are in GeoTiff format.

Filename	Variable	Spatial resolution	Compression	Interleave	Scale factor	Data type	No-data
<scene>_evi.tif	EVI	10m	LZW	BAND	1	Float32	-9999
<scene>_ha56.tif	HA56	10m	LZW	BAND	1	Float32	-9999
<scene>_ndre.tif	NDRE	10m	LZW	BAND	1	Float32	-9999
<scene>_ndvi.tif	NDVI	10m	LZW	BAND	1	Float32	-9999
<scene>_ndwi.tif	NDWI	10m	LZW	BAND	1	Float32	-9999
<scene>_psri.tif	PSRI	10m	LZW	BAND	1	Float32	-9999
<scene>_reip.tif	REIP	10m	LZW	BAND	1	Float32	-9999



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## 1.5 Terms and Conditions

Products are open access data and can be used under the terms and conditions of the Creative Commons Attribution ShareAlike 4.0 International (CC-BY-SA 4.0) license (<https://creativecommons.org/licenses/by-sa/4.0/>). Please also quote the ESA Copernicus Open Access Hub (<https://scihub.copernicus.eu/>) and the year of reception for the used Sentinel-2 Level 1C data when products are published or distributed.

