



E3 European Environment and Epidemiology Network



European Environment and Epidemiology (E3) Network
ECDC - E3 GEOPORTAL
E3 Data Visualisation and Extraction Tool





INTRODUCTION

The **ECDC E3 Geoportal**, the central component of the **European Environment and Epidemiology (E3) Network**, has been designed by ECDC to collect and make available a wide range of information for those interested in infectious disease epidemiology and environment in Europe. The objective of the E3 Geoportal is to promote geospatial infectious disease modelling in Europe and includes advanced risk assessment for public health decision-making.

For this purpose the Data Visualisation and Extraction Tool (DVET) is built to favour the integration of environmental determinants in risk assessment workflows. It also provides an interface to explore, select and download key environmental parameters by administrative unit in continental Europe, by calendar week.

The overall goal is to leverage the effort of data gathering and processing by providing processed "*ready to use data*" (.csv) at a time (week) and spatial scale and commonly used for epidemiological data (e.g. three levels of Nomenclature of Territorial Units for Statistics)¹. This first version of the DVET focuses on three key environmental parameters that can play a role in infectious disease transmission: rainfall, land surface temperature (LST) and normalized difference vegetation index (NVDI) from reliable "Near Real Time" environmental data sources.

The current document describes the data workflow (data sources, processing steps and data outputs) and gives an overview of the functionalities of the Data Visualisation and Extraction Tool (DVET).

¹ <http://ec.europa.eu/eurostat/help/new-eurostat-website>



DESCRIPTION OF DATA

Data inputs

A specific effort was made to extract raw data from reliable and recognized sources used in environmental epidemiology as described in the table below.

Precipitation

Source: Daily reanalysis from NCEP CPC from CMORPH algorithm (information at http://www.cpc.ncep.noaa.gov/products/janowiak/cmorph_description.html)

Data source: <http://iridl.ldeo.columbia.edu/>

Original data format: NetCDF

Time resolution: daily

Spatial resolution: 0.25 degrees

Output: Aggregated to 7-days intervals for 3 EUROSTAT NUTS levels

Temporal extent: 2005-02-23 to present

Daytime Land surface temperature

Source: MODIS/Terra Land Surface Temperature (information at https://lpdaac.usgs.gov/products/modis_products_table)

Data source: Products MOD11C2 and MOD11A2 (LST day and nights) at NASA USGS – LP DAAC (https://lpdaac.usgs.gov/data_access)

Original data format: HDF-EOS

Time resolution: 8-days

Spatial resolution: 1 kilometer

Output: Aggregated to 7-days intervals for 3 EUROSTAT NUTS levels

Temporal extent: 2007 to present

(start date is subject to change as retrospective data will be included in database)

Daytime Land surface temperature

Source: MODIS/Terra NDVI – Normalized Difference Vegetation Index (information at https://lpdaac.usgs.gov/products/modis_products_table)

Data source: Product MOD13A2 (NDVI) at NASA USGS – LP DAAC (https://lpdaac.usgs.gov/data_access)

Original data format: HDF-EOS

Time resolution: 16-days

Spatial resolution: 1 kilometer

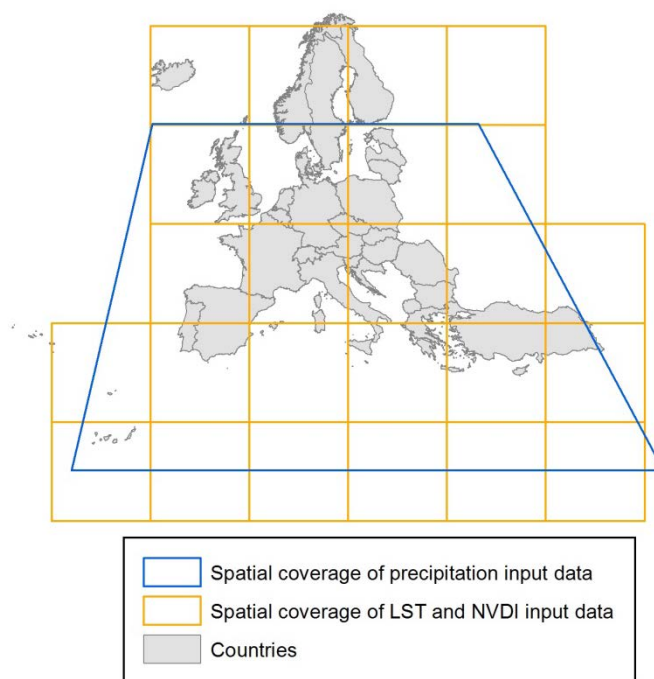
Output: Aggregated to 14-days intervals for 3 EUROSTAT NUTS levels

Temporal extent: 2007 to present

(start date is subject to change as retrospective data will be included in database)



Spatial coverage of data input in DVET:



Data processing steps

Data products are processed according to specific workflows. The main steps can be described as follow:

Rainfall estimates: 1) Data sets in NetCDF format are programmatically retrieved from the IRI/LDEO Climate Data Library via OPeNDAP (Open-source Project for a Network Data Access Protocol) connection., 2) Gridded data are acquired using Ingrid Post-Script-based language and Python to get weekly aggregates from daily measurements. Dates are, by server properties default, the mid-point date but they are converted into first point date (i.e. first week is 20120101 rather than 20120104) to align with isoWeeks. 3) Spatial aggregation at NUTS level 3 (sum) are performed using aeral averaging operator within a GIS environment.

Land surface temperature: 1) MOD11C2 (0.05 degrees global datasets) and MOD11A2 (1 km, LST day and nights) products are downloaded from the LD DAAC in HDF format, 2) after pixel-level metadata QC Quality control, tiles are reprojected (bilinear interpolation), mosaicked, subset and made available for subsequent processing, 3) images are gap filled by temporal and spatial interpolations 4) datasets are temporally resampled from from 8-days 7-days intervals, and 5) NUTS level 3 unit aggregation (arithmetic mean).

Normalized difference vegetation index (NDVI): 1) MOD13A2 (1km Vegetation Indices for 16-days) is downloaded, 2) Datasets are reprojected, resampled and subset, 3) linear temporal interpolation is applied to resample from from 16-days to 14-days intervals , and 4) NUTS level 3 unit aggregation (arithmetic mean).



Quick start [1]: Data Visualisation and Extraction Tool (DVET)

1 NUTS level selection

Textual search by NUTS name

Selection of map background

2 Polygon feature selection (only single selection allowed - selection by clicking)

Selection of environmental parameter of interest

3 Time range selection

Polygon feature (selection by clicking)

NUTS CODE	NUTS NAME	COUNTRY
ITD55	Bologna	Italy
ITD56	Ferrara	Italy
ITD57	Ravenna	Italy
ITD58	Forlì-Cesena	Italy
ITD59	Rimini	Italy
ITE11	Massa-Carrara	Italy
ITE12	Lucca	Italy
ITE13	Pistoia	Italy
ITE14	Firenze	Italy
ITE15	Prato	Italy
ITE16	Livorno	Italy
ITE17	Pisa	Italy
ITE18	Arezzo	Italy
ITE19	Siena	Italy

Country: ITALY
NUTS Code: ITD55 NUTS Name: BOLOGNA

Environmental parameters:
 Precipitation (mm) (weekly average)
 Land Surface Temperature (°C) (weekly average)
 Normalized Difference Vegetation Index (biweekly average)

Dates:
From: 2005-02-23
To: 2015-03-04

DATE	VALUE
2005-02-23	20.56
2005-03-02	8.211
2005-03-09	9.643
2005-03-16	1.031
2005-03-23	25.513
2005-03-30	0.81
2005-04-06	37.49
2005-04-13	6.625
2005-04-20	13.462
2005-04-27	1.82
2005-05-04	7.631
2005-05-11	31.773

ITD55 BOLOGNA Precipitation (mm) (weekly average) (2005-02-23-2015-03-04)

Save data as csv file

Multiple area selection

Download chart (.png file)

Download table format data (.csv file)

Time profile preview (use ctrl + scroll to change resolution)

Warning message in case of selection outside of current range of data available

To access to multiple selection panel (see section Quick start [2])



Quick start [2]: Data Visualisation and Extraction Tool (DVET)

NUTS level selection **Polygon feature(s) selection**
(multiple selection allowed - selection by clicking)

Textual search by NUTS name

Selection of environmental parameter of interest

Time range selection

Panel with selected polygon feature(s) (unselect by clicking)

NUTS CODE	NUTS NAME	COUNTRY
AT11	Burgenland (A)	Austria
AT12	Niederösterreich	Austria
AT13	Wien	Austria
AT22	Steiermark	Austria
AT32	Salzburg	Austria
AT33	Tirol	Austria
AT34	Vorarlberg	Austria

NUTS CODE	NUTS NAME	COUNTRY
AT21	Kärnten	Austria
AT31	Oberösterreich	Austria

DATE	VALUE
2005/02/23	0.586
2005/03/02	2.459
2005/03/09	14.296
2005/03/16	17.791
2005/03/23	19.716
2005/04/20	10.893
2005/04/27	5.849

Data table export options

For NUTS 1 and 2 levels:

- "Export aggregated data at selected NUTS level": .csv table contains aggregated value (arith. mean) from the lower NUTS level;
- "Export NUTS 3 raw data": .csv table includes the data by each NUTS level 3 within the NUTS 1 or 2 visible in selection panel.

For NUTS 3 level:

- By default only "Export NUTS 3 raw data" is available.



DISCLAIMER

All data and information presented on the E3 Geoportal have been prepared solely for the purpose of sharing and exchanging knowledge and expertise through a collaborative intent under the European Environment and Epidemiology (E3) Network.

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