



D3.2 High-resolution surface parameter maps

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¹ **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent filings, videos, etc.; **OTHER**=other

² **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified, as referred to in Commission Decision 2001/844/EC

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ACRONYMS AND ABBREVIATIONS

Abbreviation	Definition
CC	Climate Change
ENCA	European Network of Heads of Nature Conservation Agencies
EU	European Union
HA	Historic Areas

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Executive Summary

This document aims to impact the realization of the current project by recording all the necessary and available data for the thematic layers of land use and the surface parameters for the pilot areas that will be used as input data and surface boundary conditions for the numerical simulation that will be **performed in WP3. All datasets of surface parameters and climatic drivers have been successfully compiled and uploaded to the project repository.** A folder dedicated to the Hyperion project has been created in the ICCS cloud service and data have been stored in this folder. The link is <https://isense-cloud.iccs.gr/s/a2TJoer9QbPnqnM>. The access is performed after communication with the Editor (Kalis Antonis).

1. Introduction

This task aims at the compilation, synthesis, homogenisation, pre-processing and delivery of high-resolution input data that will be used for the dynamical downscaling and spatio-temporal assessment of atmospheric stressors and soil-atmosphere interactions. Very high resolution (better than 1 km) and time-dependent land use and land cover maps will be compiled, including historical data and future land use scenarios. Maps of thermophysical, biophysical and artificial-surface parameters will be compiled, in cases that such thematic layers cannot be easily derived from the Land Use maps. Hydrological data will also be collected in the form of digital georeferenced maps, in scales ranging from 100km down to <1km.

1.1 Purpose of the Document

Main **purpose** of the document is **to record** all data sources and data services that will be needed during the next phases of WP3. This includes the already available files, as well as the ones that are to be collected within the given timeline.

The document will serve:

- the reliable quantification of climatic, hydrological and atmospheric stressors
- the creation of the Land Surface model that will be used to account for the impact of present and future climate parameters on soil surface
- the provision of input for the relevant regulatory framework that is under revision
- multi-hazard modelling, extended to cover CC related hazards as well as geo-hazards
- the on-site Integration, demonstration and validation of HYPERION platform

1.2 Intended Audience

D3.2 is intended to be used by all stakeholders involved in WP3. D.3.2 is a public document and will therefore be openly available.

2. Dataset Categories

Considering the general scope as well as the specific requirements of the project, specifications for five dataset categories will be defined in document D.2.4 “Geographic data and services inventory” and more specifically tables: 1-4 which will include the following categories:

- Geometry
- Land

Required information for the categories of interest is summarized in the referenced tables and, thus, very high resolution (better than 1 km) and time-dependent land use and land

cover maps, as well as maps of thermophysical, biophysical and hydrological data can be collected.

More information regarding each category's files, partner activities, responsibilities as well as data archiving and preservation methods can be found in the aforementioned document (D.2.4) that will be submitted after D3.2.

2.1 Climate Data and Selection of Scenarios

The EURO-CORDEX material will provide a selection of relevant episodes, as well as the quantification of the impacts to vulnerable buildings due to the increased frequency of such episodes.

Table 1: Climate Data and Selection of Scenarios Files

DATA Identification & Availability	Climate Data Specifications
Dataset description	Data sets of relevant atmospheric and surface variables.
Sources	https://euro-cordex.net/060374/index.php.en
Files & Types: NetCDF	
3D fields of climate variables	temperature, humidity, wind velocity etc.
2D fields of climate variables	surface precipitation, radiation, etc.
Resolution	0.11 degrees
Data exploitation and sharing	
Data exploitation (purpose/use of the data analysis)	The major aims of the CORDEX initiative are to provide a coordinated model evaluation framework, a climate projection framework, and an interface to the applicants of the climate simulations in climate change impact, adaptation, and mitigation studies.
Dissemination level: Confidential or Public	Public
Data sharing, re-use, distribution, publication	EURO-CORDEX data published via ESGF

2.2 Geometry

Geometrical data will be used in order to provide small scale models with the necessary information to resolve the influence of obstacle geometry and local topography.

Table 2: Geometry Files

DATA Identification & Availability	Geometry Data Specifications
Dataset description	Inventory, location of the buildings.
Sources	Social geographical information system and accompanying applications of the municipality of Rhodes, Opensource world maps: https://openmaptiles.com/ .
Files & Types: SHP	
3D Geometry	3D data for the area of the test sections e.g. in .dwg, .iges, .igs or .stl formats. Any format most CAD programs can read.
Digital Elevation Maps (DEM) SRTM files	Digital Elevation Maps (DEM) for the topography of the test sections under consideration in raster format such as ".geotiff".
Available for Rhodes Pilot Case	
Shape File containing geometry of the medieval town	Horizontal Coordinates of each roof of building geometrically defined in two dimensions (x and y coordinates of each point

<i>folder:Rhodes</i> <i>files:medieval_town.shp</i>	specified). The third dimension, corresponding to the points' altitude, is not available.
Available for Granada Pilot Case	
Shape File containing geometry of the city: <i>folder: Granada</i> <i>file:Granada.shp</i>	Horizontal Coordinates of each roof of building geometrically defined in two dimensions (x and y coordinates of each point specified). The third dimension, corresponding to the points' altitude, is available.
Available for Venice Pilot Case	
Shape File containing geometry of the city: <i>folder:Venice</i> <i>file:Venice.shp</i>	Horizontal Coordinates of each roof of building geometrically defined in two dimensions (x and y coordinates of each point specified). The third dimension, corresponding to the points' altitude, is available.
Available for Tonsberg Pilot Case	
Standards	
Info about metadata (production and storage dates, places) and documentation?	Data can be downloaded from https://openmaptiles.com/ and http://gis.rhodes.gr/rhodes/en/Inspire/tabid/81/Default.aspx .
Standards, format, estimated volume of data	- - .shp, Various KB.
Partners activities and responsibilities	
Partner owner of the data; copyright holder	Open Source Data
Partner in charge of data collection	AUTH
Partner in charge of data analysis	AUTH
Partner in charge of data storage	AUTH
Related WP(s) and task(s)	WP3, WP4
Data exploitation and sharing	
Data exploitation (purpose/use of the data analysis)	Models of the HA under study Information for vulnerability and risk analysis
Data access policy / Dissemination level: Confidential (members of the Consortium and the Commission Services only) or Public	<u>Dissemination level</u> : Public
Data sharing, re-use, distribution, publication	Open source inventory Can be published
Archiving and preservation (including storage and backup)	
Data storage (including backup)	AUTH

2.3 Land Use

The main goal of this task is the compilation, synthesis, homogenization, pre-processing and delivery of high-resolution input data that will be used for the needs of the numerical simulations with PALM LES at the local site scale.

Table 3: Land Use Data Files

DATA Identification & Availability	Land Use Data Specifications
Dataset description	Land use and land cover maps.
Sources	Opensource world maps: https://openmaptiles.com/
Files & Types: SHP	
Available for Granada Pilot Case	
Openmaptiles.com	Freely available land use dataset.
<i>folder: Granada</i>	
<i>file: Land_use.shp</i>	<i>It contains land use and land cover data for the city of Granada.</i>
Available for Venice Pilot Case	

Openmaptiles.com	<i>Freely available land use dataset.</i>
<i>folder:Venice</i>	
<i>file: Land_use.shp</i>	<i>It contains land use and land cover data for the city of Venice.</i>
Standards	
Info about metadata (production and storage dates, places) and documentation	Data can be downloaded from https://openmaptiles.com/
Standards, format, estimated volume of data	- .shp, Various KB.
Partners activities and responsibilities	
Partner owner of the data; copyright holder	Open Source Data
Partner in charge of data collection	AUTH
Partner in charge of data analysis	AUTH
Partner in charge of data storage	AUTH
Related WP(s) and task(s)	WP2 (Task 2.4), WP3
Data exploitation and sharing	
Data exploitation (purpose/use of the data analysis)	Feed for climatic and geo-hazards models
Data access policy / Dissemination level: Confidential or Public	<u>Dissemination level: Public</u>
Data sharing, re-use, distribution, publication	Open source inventory Can be published
Archiving and preservation (including storage and backup)	
Data storage (including backup)	AUTH

2.4 Vegetation

The main goal of this task is the compilation, synthesis, homogenization, pre-processing and delivery of high-resolution surface data that will be used for the needs of the numerical simulations with PALM LES at the local site scale. The exploitation of very high-resolution multi-temporal vegetation cover maps will enhance the downscaling methodology towards a quantitative assessment of surface forcings in small-scale climatology.

Table 4: Vegetation Files

DATA Identification & Availability	Vegetation Data Specifications
Dataset description	Vegetation maps of the area surrounding the site.
Sources	Opensource world maps: https://openmaptiles.com/
Files & Types: SHP	
Available for Rhodes Pilot Case	
Vegetation Database <i>folder: Rhodes</i> <i>file: Vegetation.shp</i>	It contains vegetation data for the city of Rhodes
Available for Granada Pilot Case	
Vegetation Database <i>folder: Granada</i> <i>file: Vegetation.shp</i>	It contains vegetation data for the city of Granada
Available for Venice Pilot Case	
Vegetation Database <i>folder: Venice</i> <i>file:Vegetation.shp</i>	It contains vegetation data for the city of Venice

Available for Tonsberg Pilot Case	
Standards	
Info about metadata (production and storage dates, places) and documentation?	Data can be downloaded from https://openmaptiles.com/ and http://gis.rhodes.gr/rhodes/en/Inspire/tabid/81/Default.aspx .
Standards, format, estimated volume of data	- .shp, Various KB.
Partners activities and responsibilities	
Partner owner of the data; copyright holder	Open Source Data
Partner in charge of data collection	AUTH
Partner in charge of data analysis	AUTH
Partner in charge of data storage	AUTH
Related WP(s) and task(s)	WP3
Data exploitation and sharing	
Data exploitation (purpose/use of the data analysis)	Improve simulations of the climate related hazards on the city.
Data access policy / Dissemination level: Confidential or Public	<u>Dissemination level: Public</u>
Data sharing, re-use, distribution, publication	Open source inventory Can be published
Archiving and preservation (including storage and backup)	
Data storage (including backup)	AUTH

2.5 Hydrology (flood prone areas)

The main purpose of this set of data is the collection and providing of a quantitative and qualitative assessment on the relevance of primary and secondary impact indicators derived from climate calculations and real-time in situ measurements which will be used in WP5-WP7 in the process of providing real time hazard assessments for the DSS, as well as hydrothermal structural vulnerability assessment. Hence, information on the hydrological characteristics of the areas more likely to suffer from flooding at the selected pilot sites is essential. An example of the collected data files is shown in the following table.

Table 5: Hydrology Data Files

DATA Identification & Availability	Hydrological Data Specifications
Dataset description	Waterway
Sources	Opensource world maps: https://openmaptiles.com/
Files & Types: SHP files	
Hydrology Data & Flood Hazards	
Available for Granada Pilot Case	
<i>folder:Granada</i>	
Water.shp	Shape files of the waterway of the Granada city.
Available for Venice Pilot Case	
<i>folder:Venice</i>	
Water.shp	Shape files of the waterway of the Venice city.
Standards	
Info about metadata (production and storage dates, places) and documentation?	Data can be downloaded from https://openmaptiles.com/ .
Standards, format, estimated volume of data	- .shp, Various KB
Partners activities and responsibilities	
Partner owner of the data; copyright holder	Open Source Data

Partner in charge of data collection	AUTH
Partner in charge of data analysis	AUTH
Partner in charge of data storage	AUTH
Related WP(s) and task(s)	WP2 (Task 2.4), WP3
Data exploitation and sharing	
Data exploitation	Feed for climatic and geo-hazards models
Data access policy / Dissemination level: Confidential or Public	<u>Dissemination level:</u> Public
Data sharing, re-use, distribution, publication	Open source inventory. Can be published.
Archiving and preservation (including storage and backup)	
Data storage (including backup)	AUTH

3. Dataset Sources and Services & Data Management Applications

More information regarding dataset sources and services as well as data management applications can be found in document (D.2.4) that will be submitted after D3.2.

4. Conclusions

The present deliverable contains brief metadata documentation on the georeferenced data, in the form of thematic layers of land use, climate and surface parameters for the HYPERION pilot areas, delivered or available by online services in a GIS format. The main objective of Tasks 3.1 and 3.2 has been the collection, quality control, consolidation and annotation of the data sets that will be used to perform assessment and modelling activities in Tasks 3.3, 3.5, 3.6 and 3.7. In response to the collective data requirements of the WP3 partners, all datasets of surface parameters and climatic drivers have been successfully compiled and uploaded to the project repository. Climatic data and scenarios are provided by the EUROcordex initiative. It is expected that in the course of the implementation of subsequent WP3 tasks, additional feedback will be used to streamline the delivery and QA/QC of these datasets.

5. References

- *ENCA Network*. Available: <https://www.encanetwork.eu/about-enca>. Last accessed 05/03/2020.
- *Sede Electrónica del Catastro*. Available: <https://www.sedecatastro.gob.es/>. Last accessed 05/03/2020.
- *CORINE Land Cover*. Available: <https://land.copernicus.eu/pan-european/corine-land-cover>. Last accessed 05/03/2020.
- *Hellenic Cadastre*. Available: <http://www.ktimatologio.gr>. Last accessed 05/03/2020.