ESPON

EUROPEAN UNION

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Inspire policy making by territorial evidence

PROFECY – Processes, Features and Cycles of Inner Peripheries in Europe

(Inner Peripheries: National territories facing challenges of access to basic services of general interest)

Applied Research

Final Report

Annex 3. Visualization of Input Data as Basis for the Delineation of Inner Peripheries

Version 07/12/2017

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This delivery does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee.

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PROFECY – Processes, Features and Cycles of Inner Peripheries in Europe

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Abbreviations

EC	Eurocity train
EU	European Union
GDP	Gross domestic product
GIS	Geoinformation system(s)
GP	General practitioner(s)
HSL	High-speed line(s)
IC	Inter city train
Inh.	Inhabitant(s)
km	Kilometer(s)
LAU	Local administrative unit(s)
n.a.	Not available / not applicable
NUTS	Nomenclature des unités territoriales statistiques
OSM	OpeStreetMap
PPS	Purchasing-power-standards
SGI	Services-of-general-interest
sqkm	Square kilometer
TOR	Terms-of-reference
UMZ	Urban morphological zone(s)

1 Introduction

Complementing the data collection (see Annex 2 of the Draft Final Report), following is a map gallery illustrating the compiled input data. Additional useful comments will also be given to certain datasets / indicators. The visualized input data were used as inputs for the delineations of inner peripheries in Delineations 1, 2, 3 and 4.

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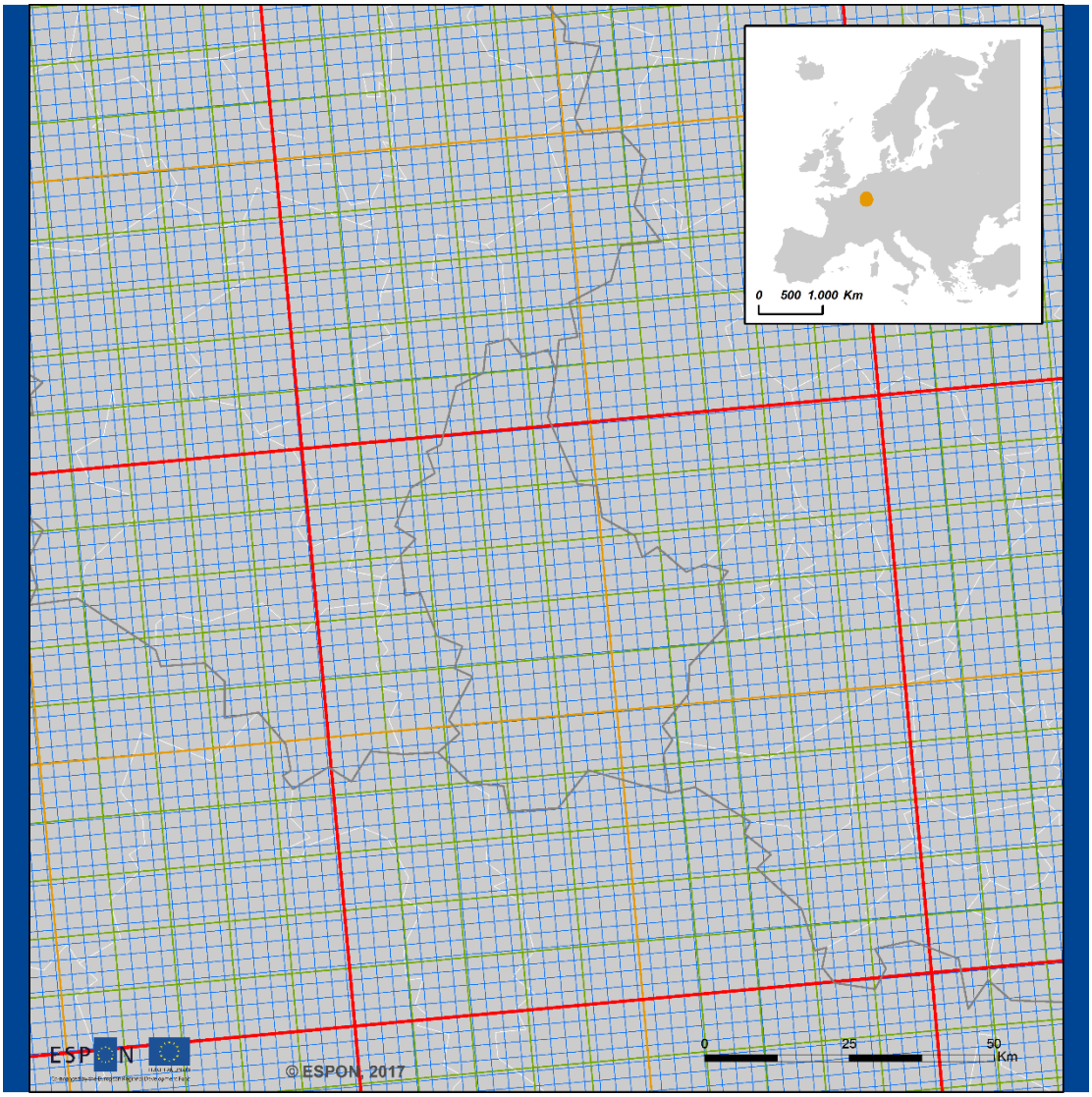
Map 1.1: Comparison of different grid resolutions.



ESPON Reference Grids:
- 10x10 km
- 50x50 km
- 100x100 km

ESPON TRACC:
- 2.5x2.5km

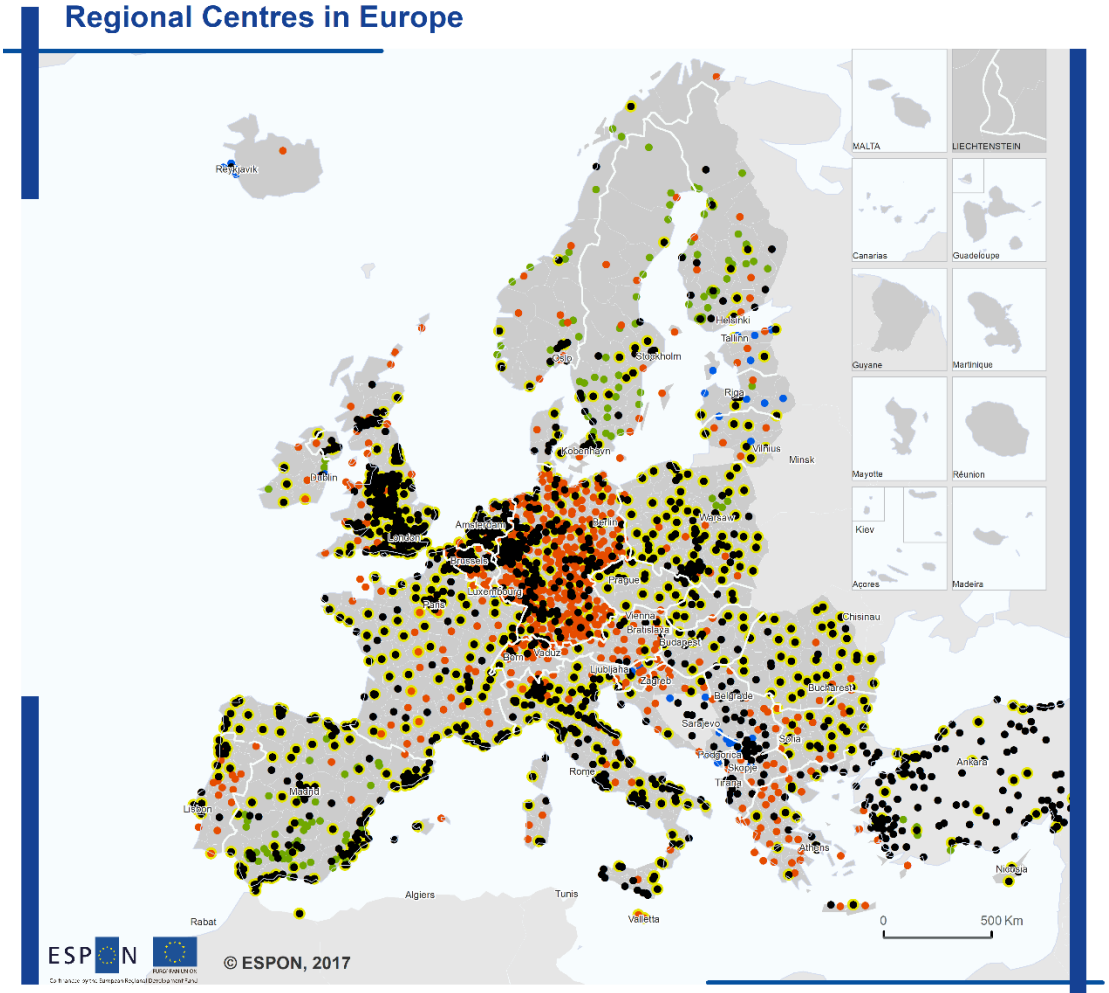
- Country boundaries
- NUTS-3 region2

Level: Grid systems
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON Reference Grids; ESPON Database, 2016; ESPON TRACC, 2011.
© EuroGeographics Association for administrative boundaries

Grid resolution:

After testing different resolutions, the resolution of 2.5 x 2.5 km for the European-wide grid system was selected, appearing as the most suitable one for European-wide analysis in ESPON Profecy, resulting in almost 920,000 grid cells

Map 1.2: Identified regional centers.



Criteria for the selection of regional centres:

Crtierion 1: all cities with more than 50,000 inhabitants

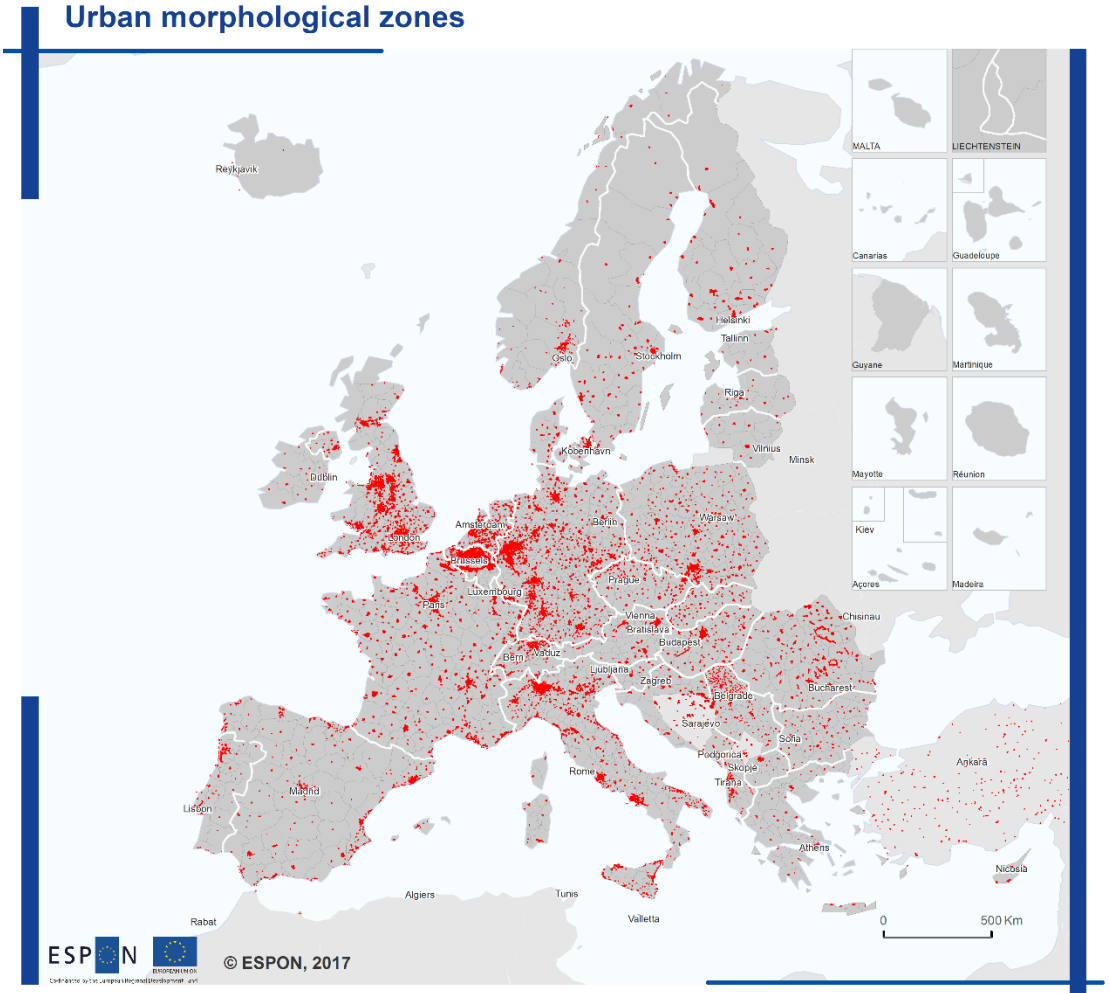
Criterion 2: NUTS-3 region centroids (whatever their population size)

Criterion 3: cities participating in urban audit programme

Criterion 4: ten largest cities in a country, if not yet included in criteria 1 to 3

Criterion 5: five largest cities > 15,000 inhabitants in large NUTS-3 regions, if not already included in criteria 1 to 4

Map 1.3: Urban morphological zones.



Urban morphological zones (EU Member States) and urban areas (non-EU countries)

Urban areas (proxy for places of work)

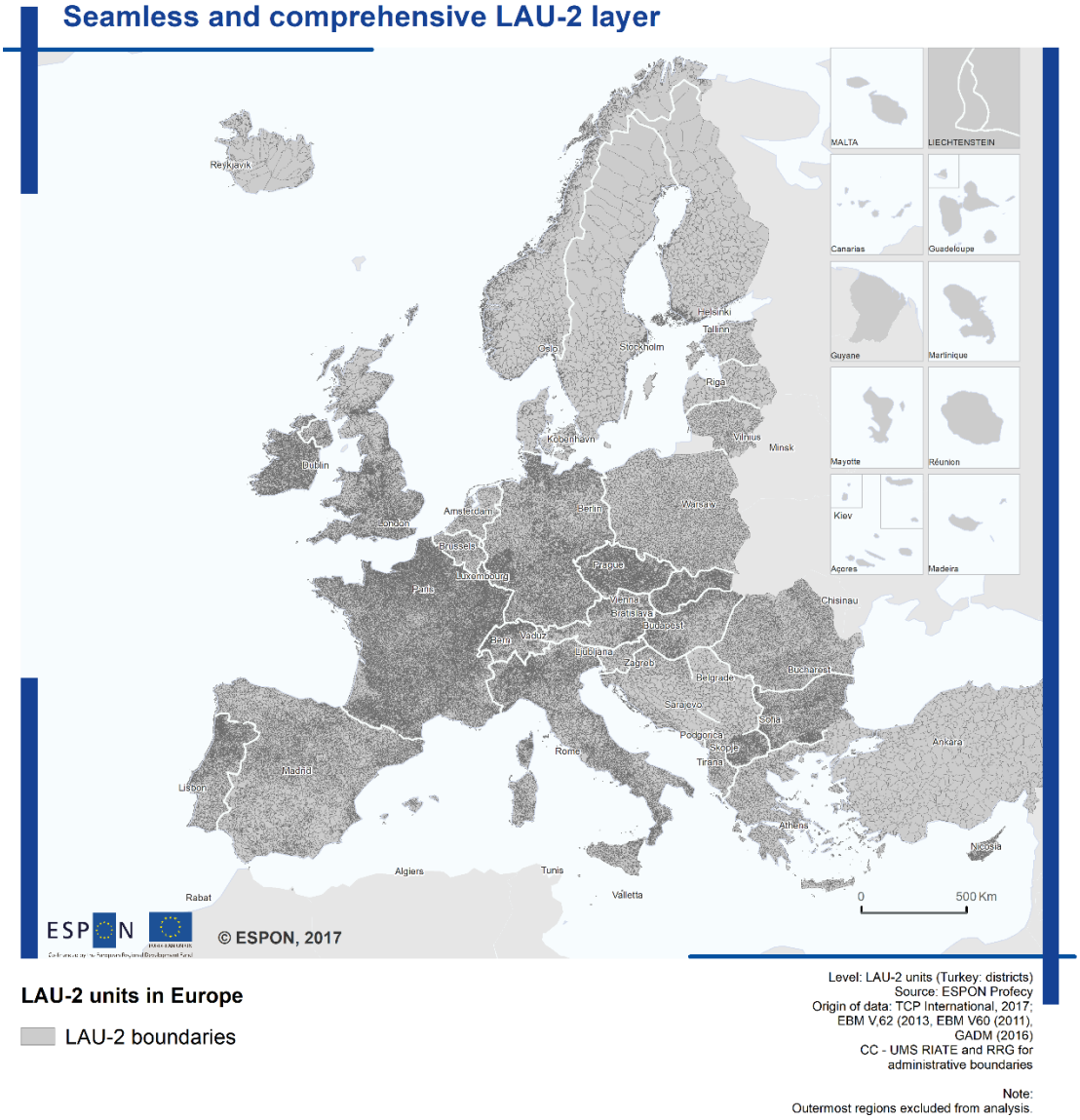
Source: ESPON Profecy
Origin of data: TCP International, 2017; ESPON M4D, 2012; OpenStreetMap (OSM), 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

UMZ and access to jos:

Since European-wide data on jobs (places of work) are not available as a GIS database, UMZ were used as a proxy, assuming that the majority of jobs is located within urban areas. Thus, in Delineation 3 the access to jobs at grid level was modelled as airline travel time from each grid cell to the closest UMZ point.

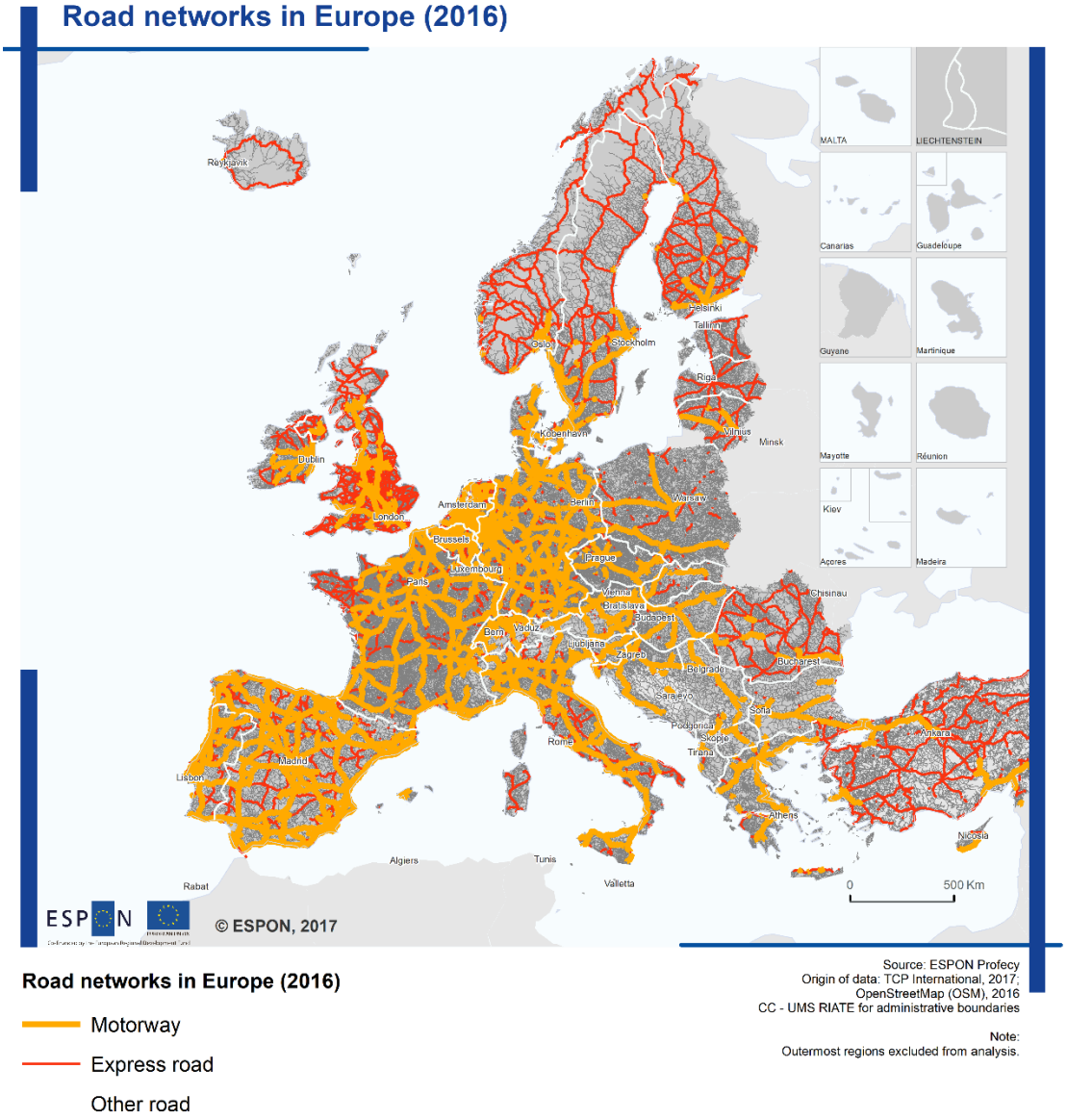
Map 1.4: LAU-2 units in Europe.



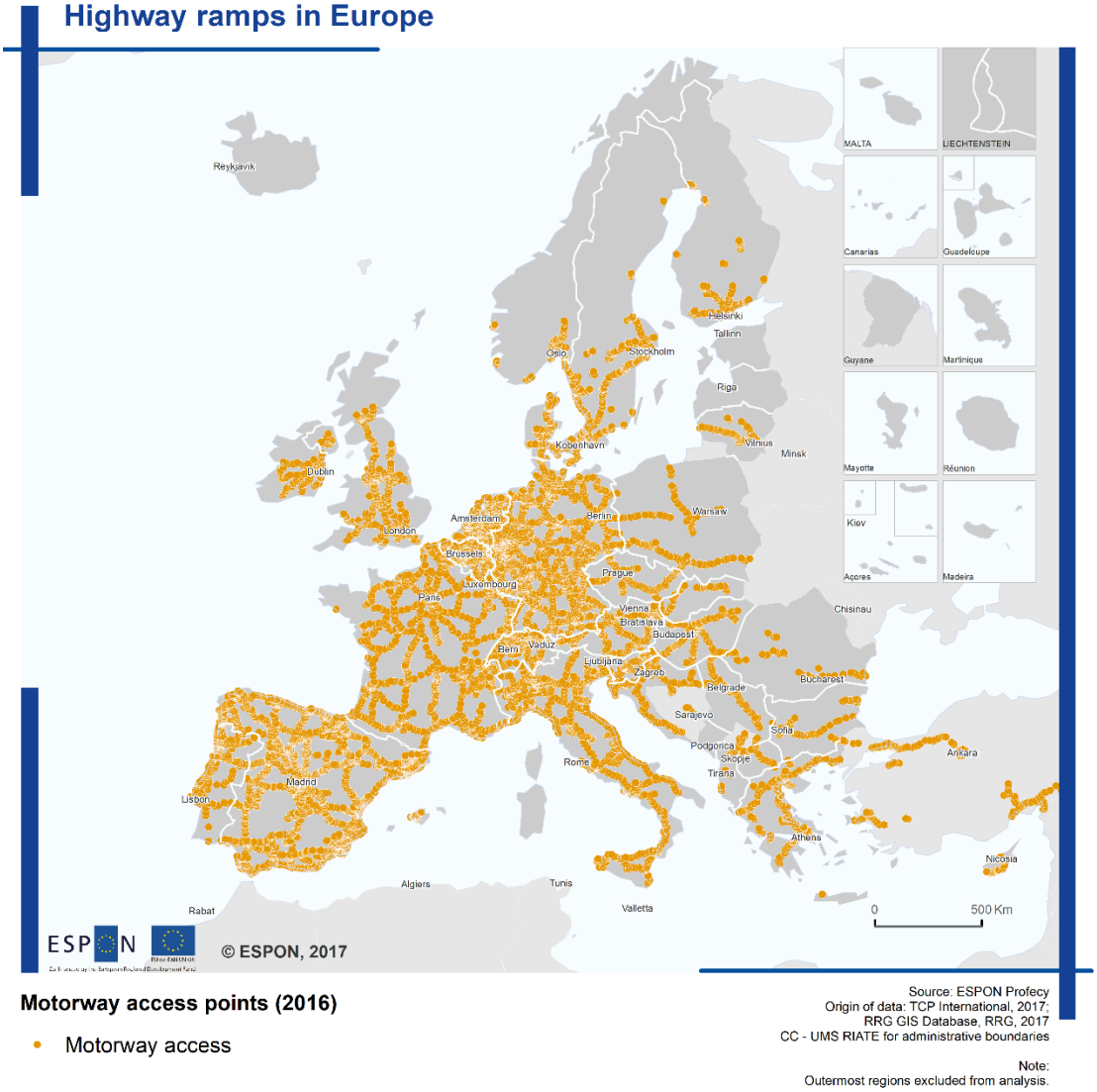
Seamless LAU-2 layer:

The seamless LAU-2 layer for the entire ESPON space has been generated by combining different individual layers, as indicated in the map legend.

Map 1.5: Road network in Europe.



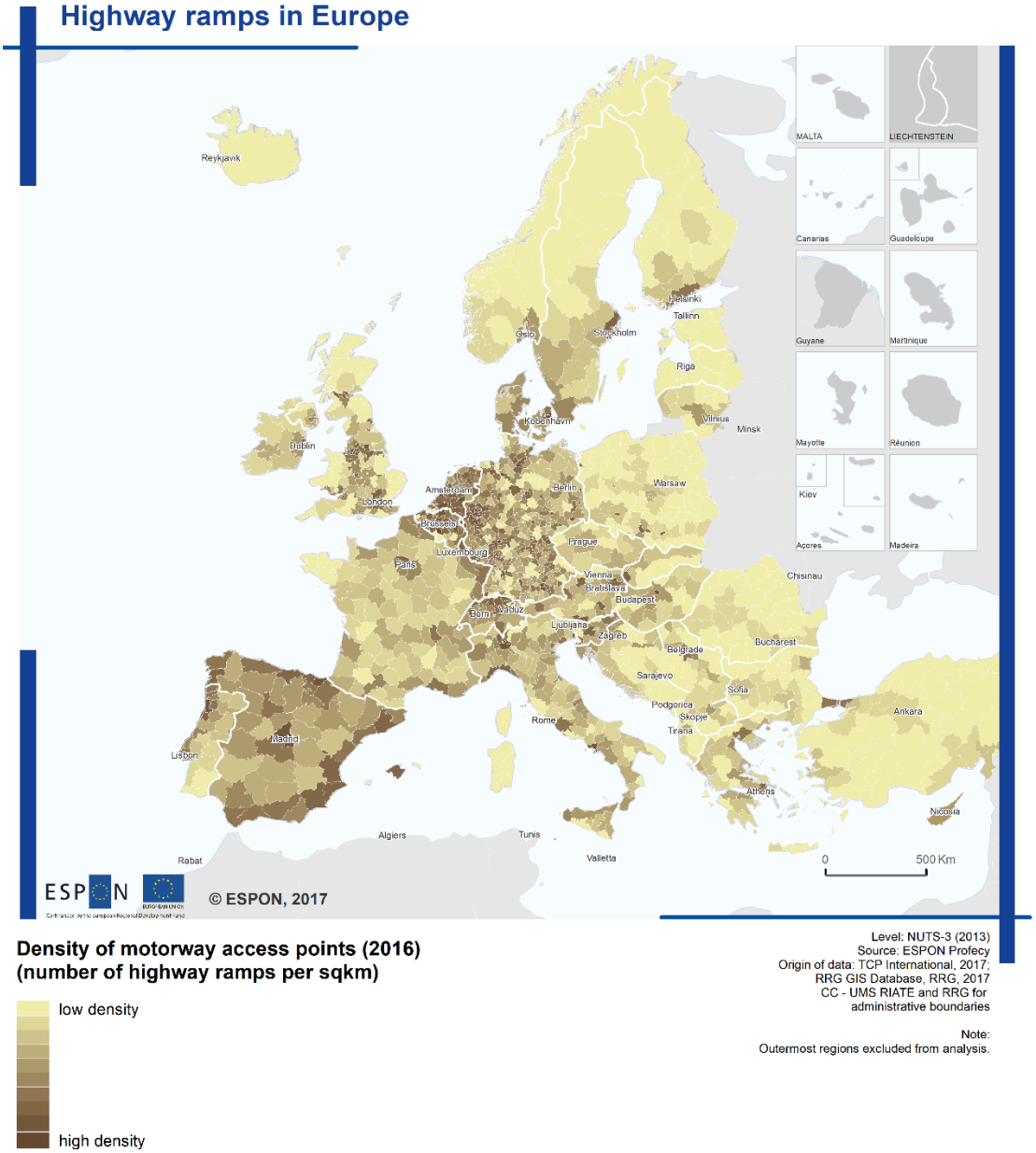
Map 1.6: Highway ramps / motorway access.



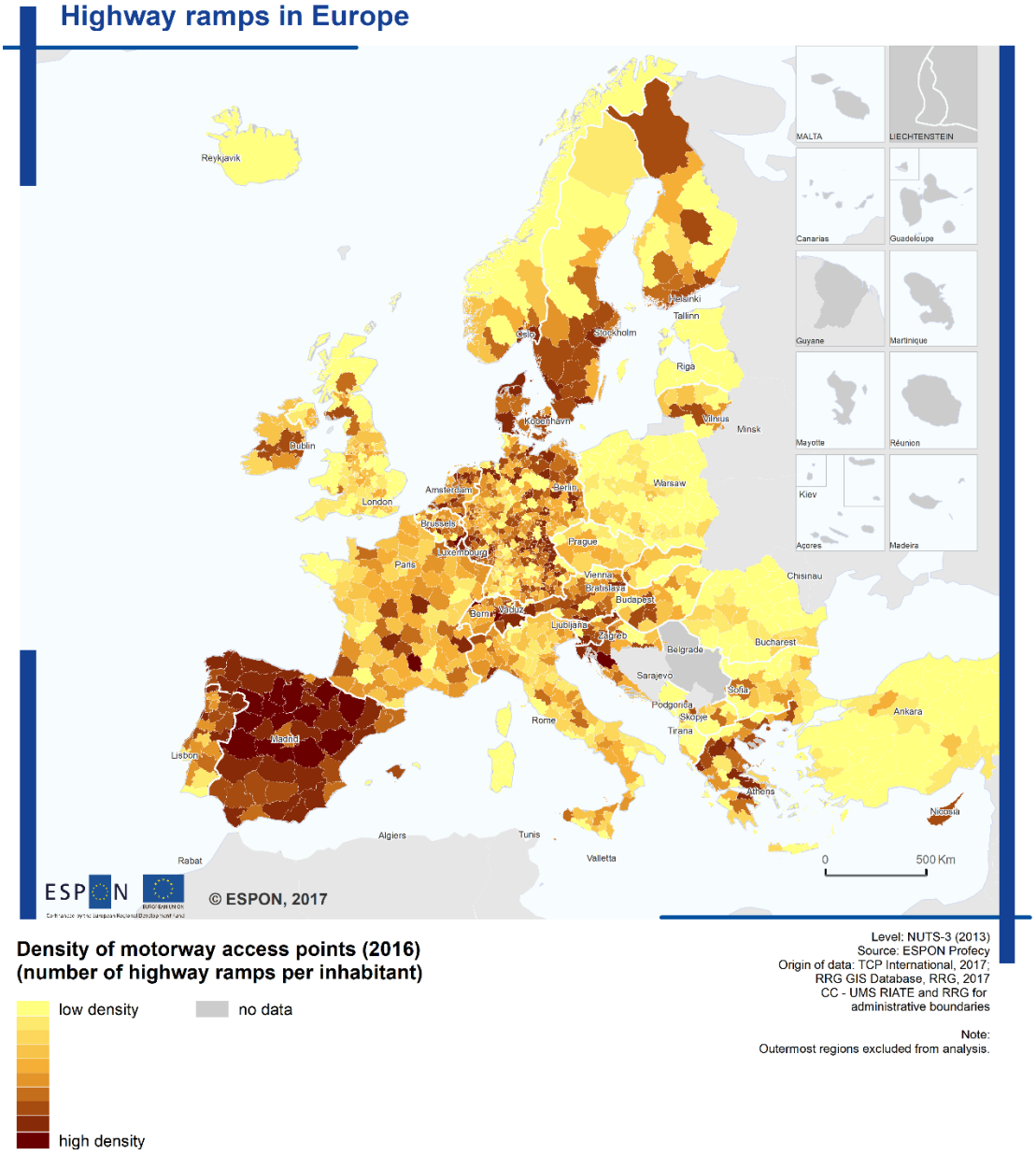
Highway ramps / motorway access:

Unlike suggested in the TOR, highway ramps are not being used as a variable for the delineation of inner peripheries, because they do not represent a trip “destination” in the mere sense; however, the number and density of motorway access points have been calculated for each NUTS-3 region and will be used as a variable for the analysis and characterization of inner peripheries in Europe.

Map 1.7: Density of motorway access points per sqkm.



Map 1.8: Density of motorway access points per inhabitant.



Density of motorway access points (2016)
(number of highway ramps per inhabitant)

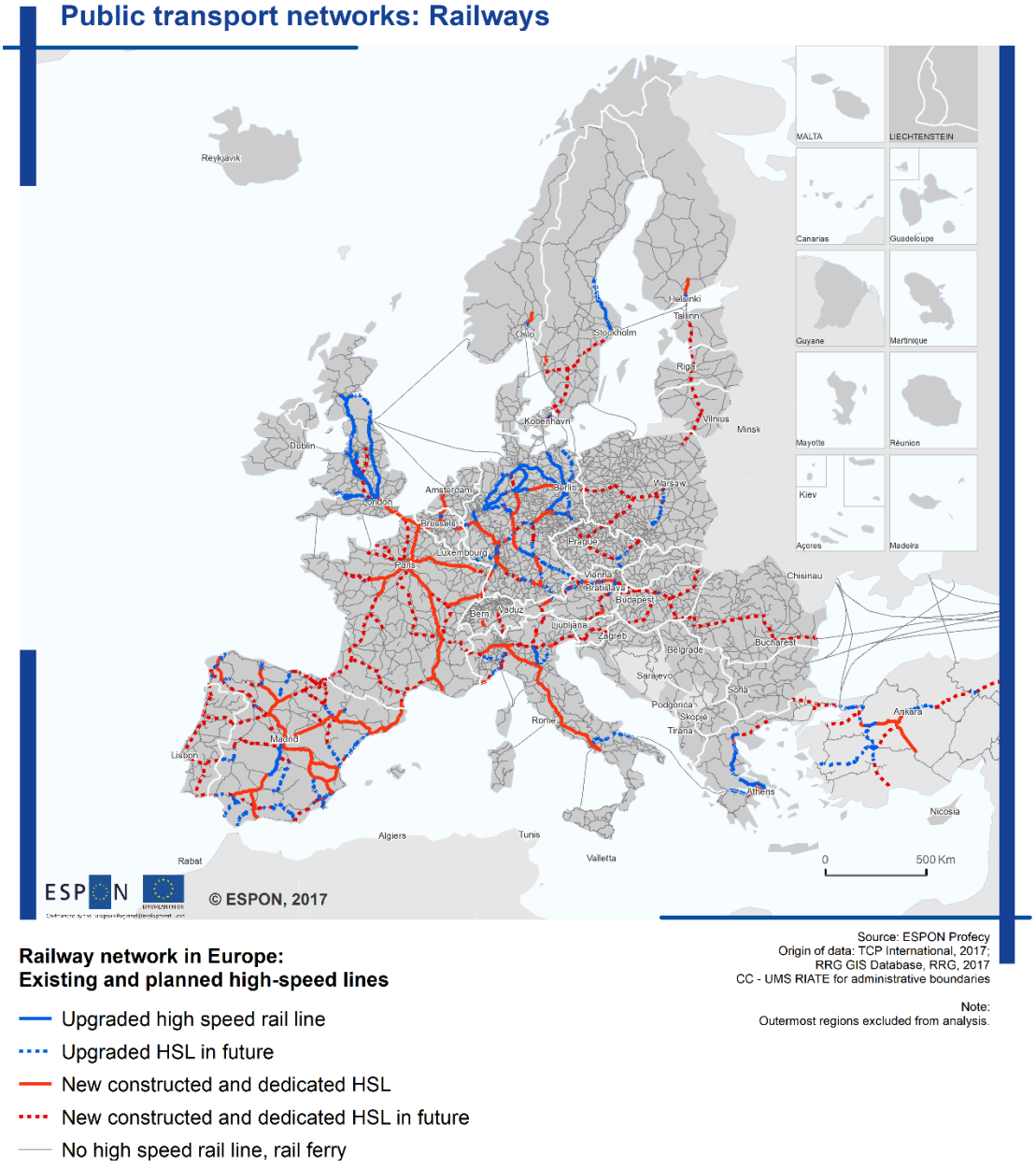
low density — no data

high density

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; RRG GIS Database, RRG, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

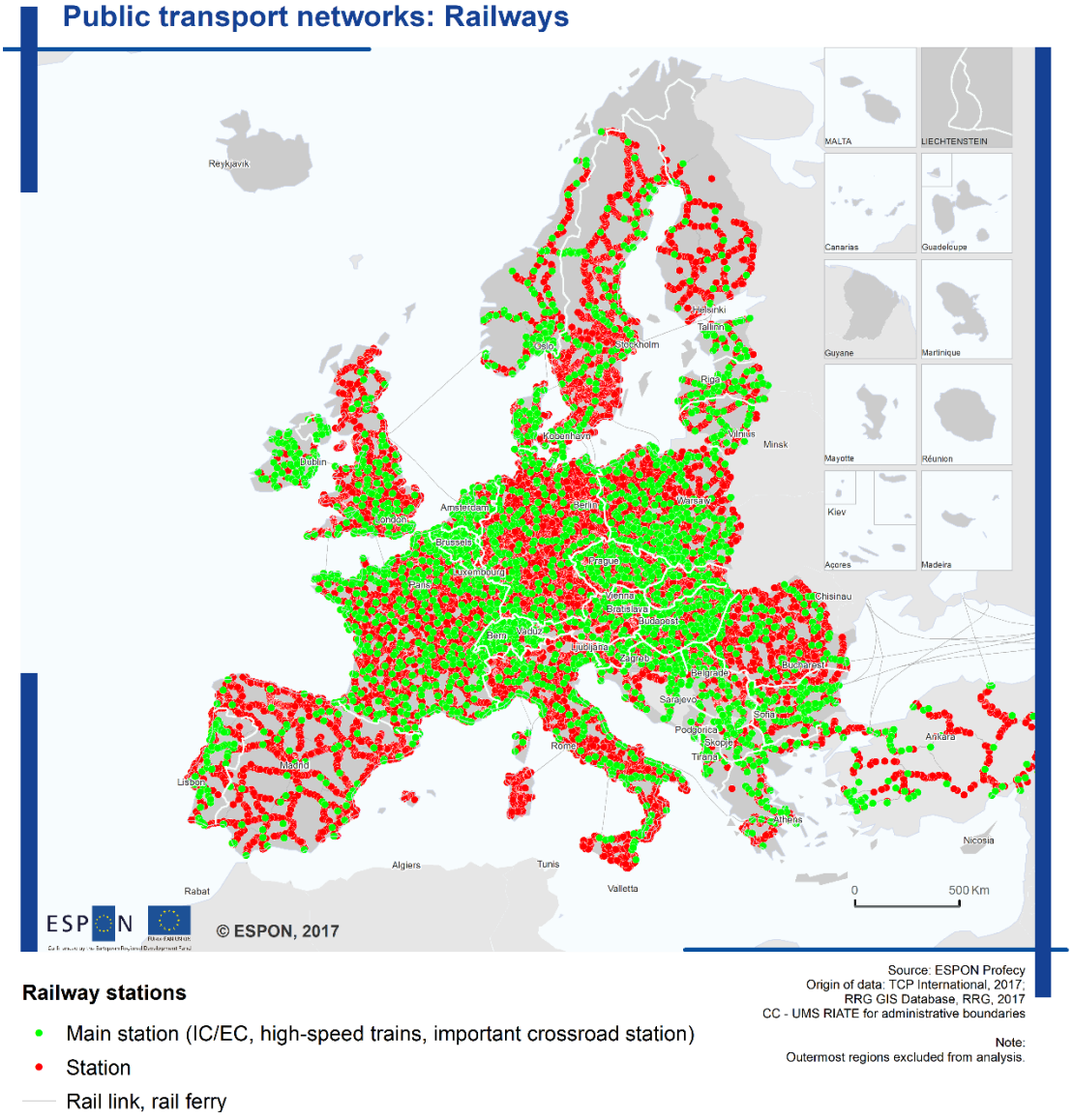
Map 1.9: Rail network in Europe.



Rail network:

The rail network includes all passenger railway lines under operation today. Rail links with cargo services only were excluded. As there is no comprehensive and complete European-wide bus network geodatabase available, it was decided to cease the analysis of IP regions in Europe based on public transport. Using railway networks alone does not suffice.

Map 1.10: Passenger train stations.

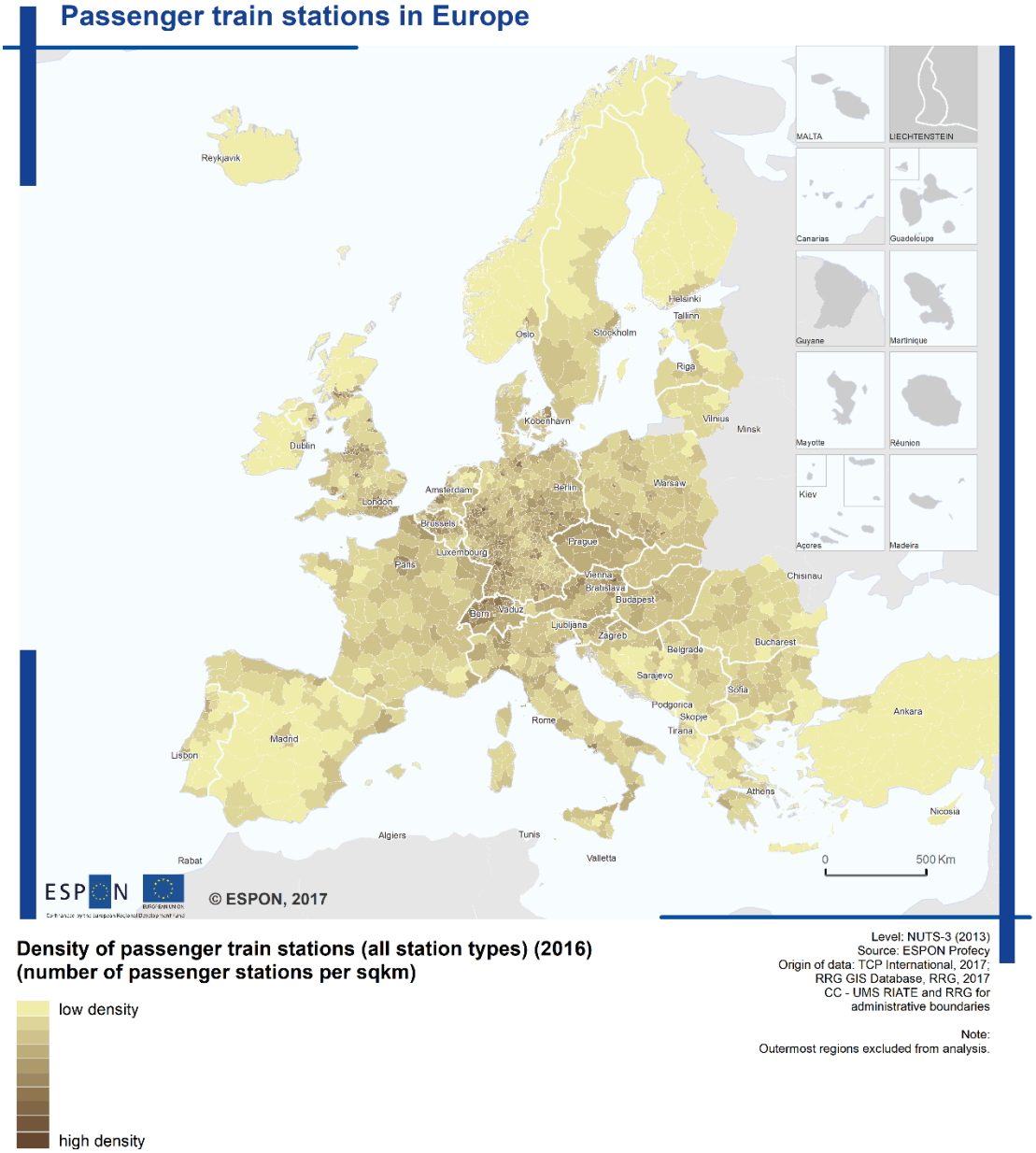


Passenger stations:

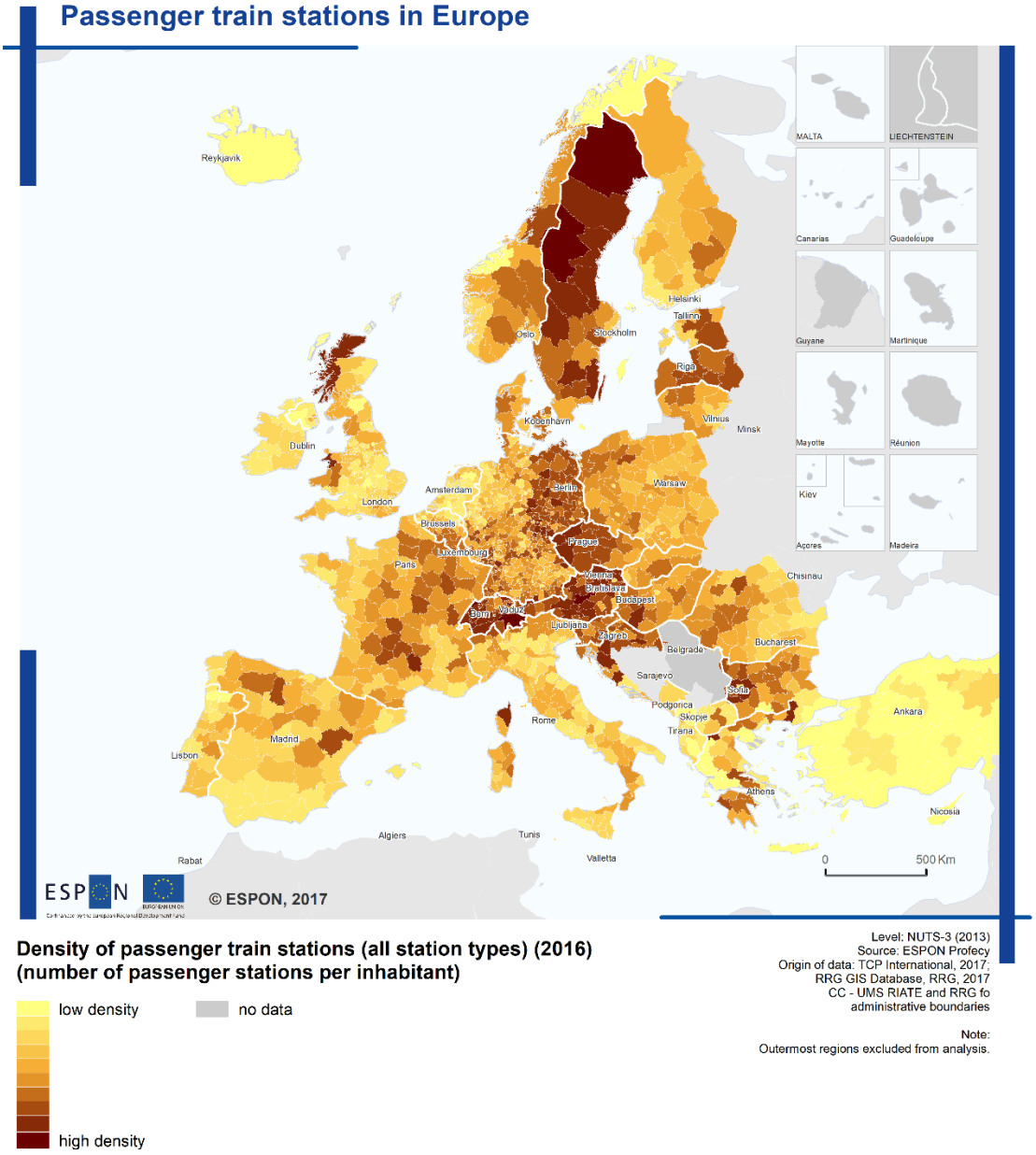
Passenger stations represent important services-of-general interest. Thus, access to passenger train stations were used as one of the variables in Delineation 3. All train stations, including main and secondary ones, were considered.

In addition, the density of train stations is used as variable for the characterization and analysis of inner peripheries.

Map 1.11: Density of passenger train stations per sqkm at NUTS3 level (all station types).



Map 1.12: Density of passenger train stations per inhabitant at NUTS-3 level (all station types).



Density of passenger train stations (all station types) (2016)
(number of passenger stations per inhabitant)

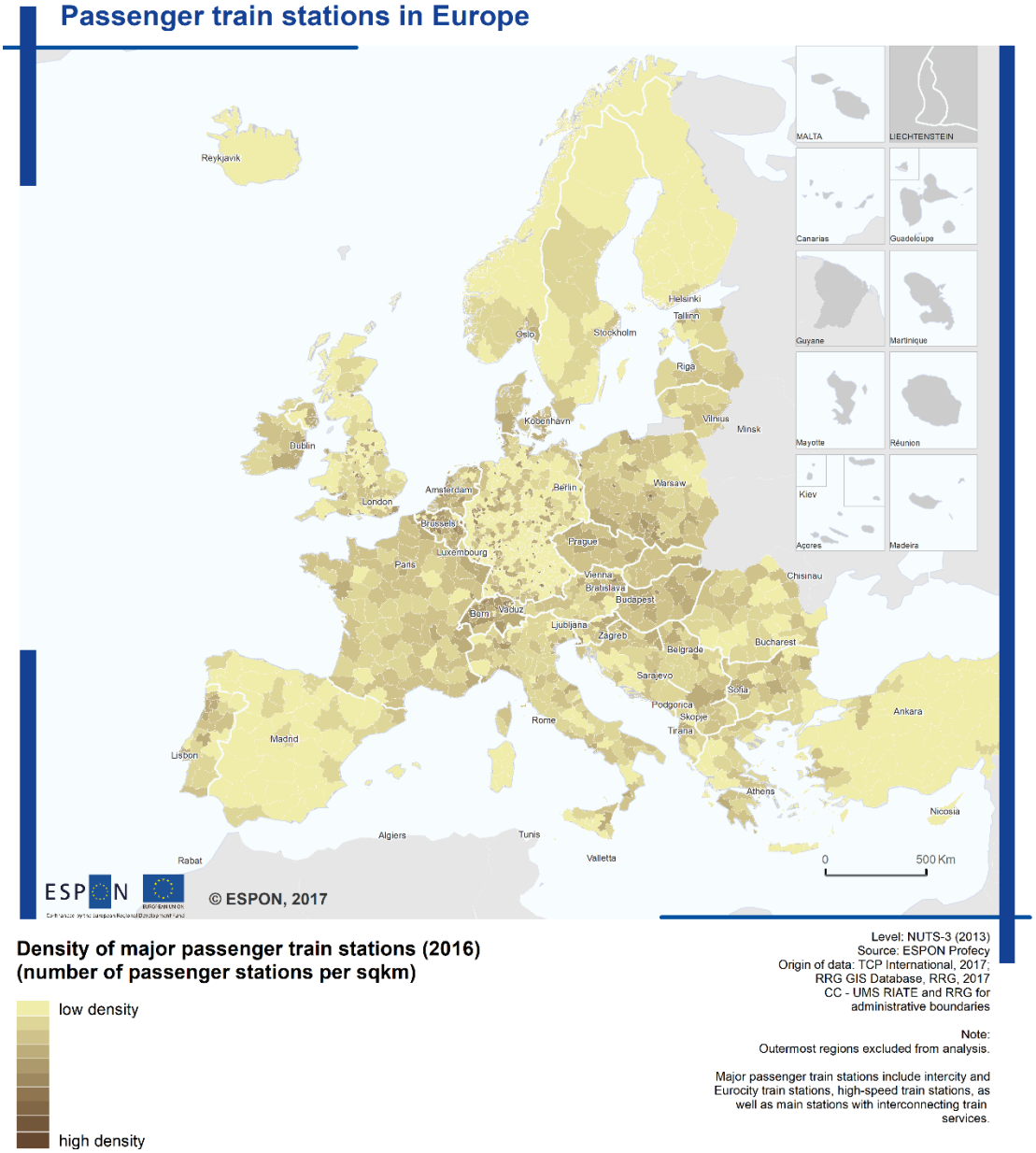
low density — high density

no data

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017;
RRG GIS Database, RRG, 2017
CC - UMS RIATE and RRG fo
administrative boundaries

Note:
Outermost regions excluded from analysis.

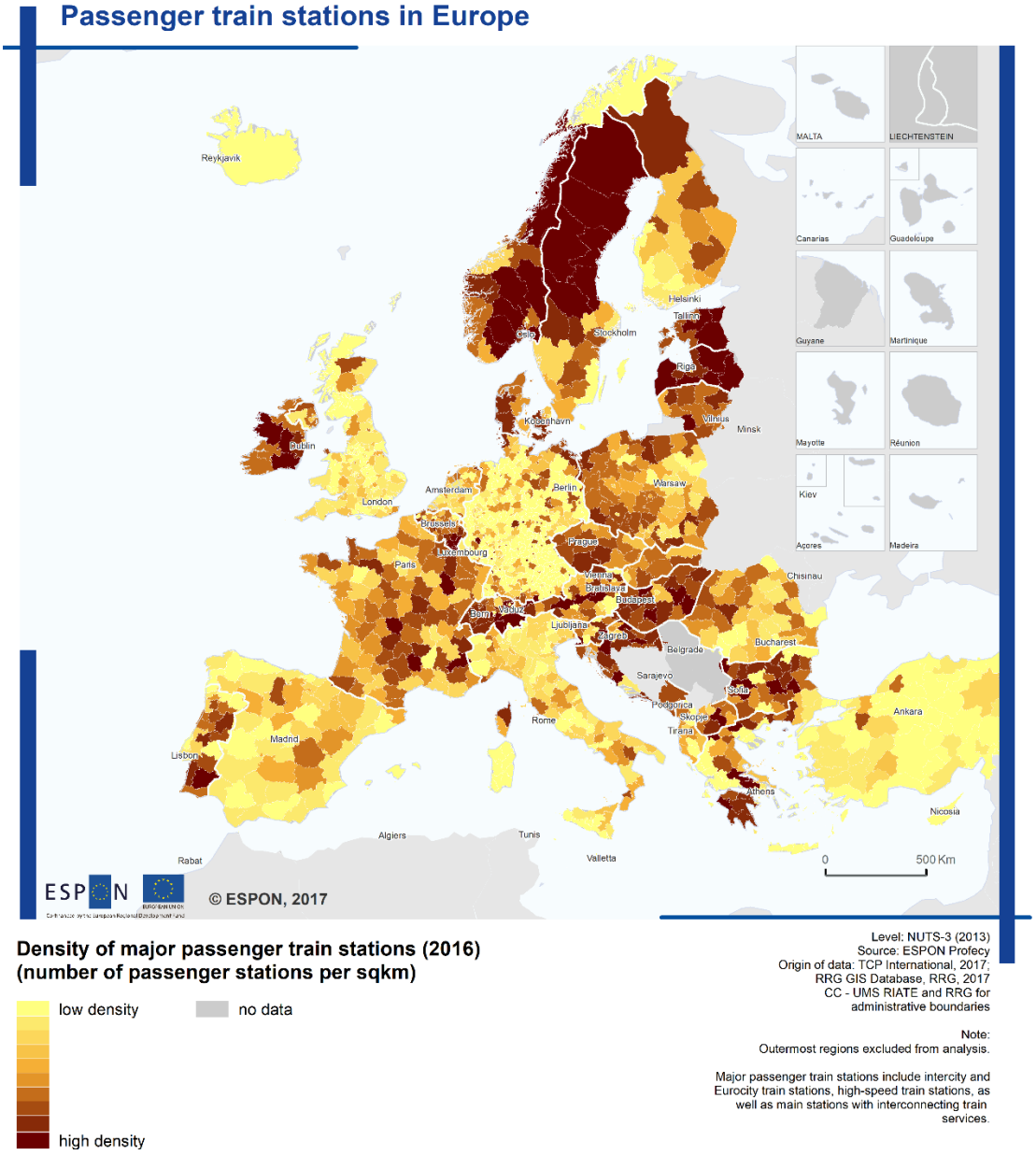
Map 1.13: Density of major passenger train stations per sqkm at NUTS-3 level.



Major passenger train stations:

Major passenger train stations include intercity and Eurocity train stations, high-speed train stations, as well as main stations with interconnecting train services.

Map 1.14: Density of major passenger train stations per inhabitant at NUTS-3 level.



Density of major passenger train stations (2016)
(number of passenger stations per sqkm)

low density — high density

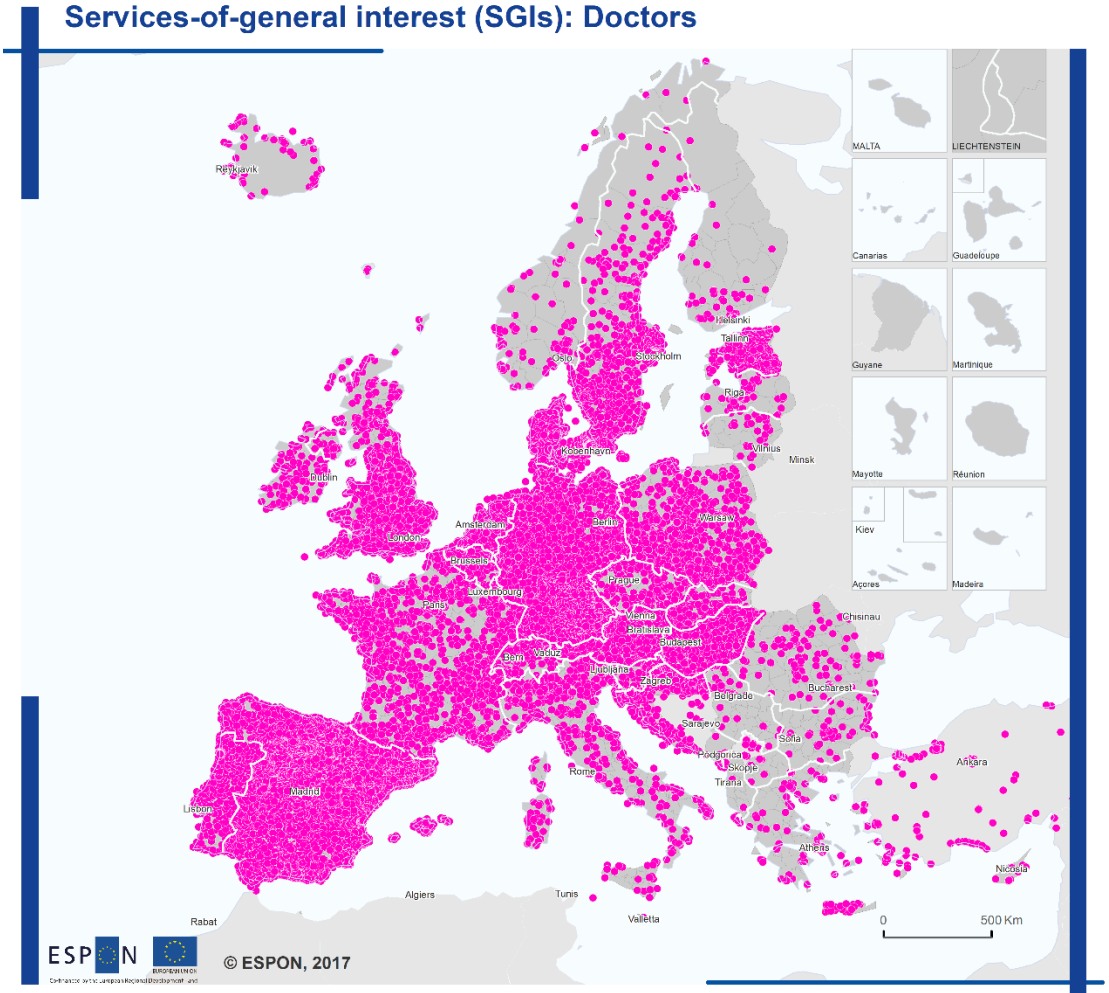
no data

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; RRG GIS Database, RRG, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Major passenger train stations include intercity and Eurocity train stations, high-speed train stations, as well as main stations with interconnecting train services.

Map 1.15: Doctors in Europe (GP - general practitioners).



Doctors in Europe (GP - General practitioners)

- Doctors (general practitioners)

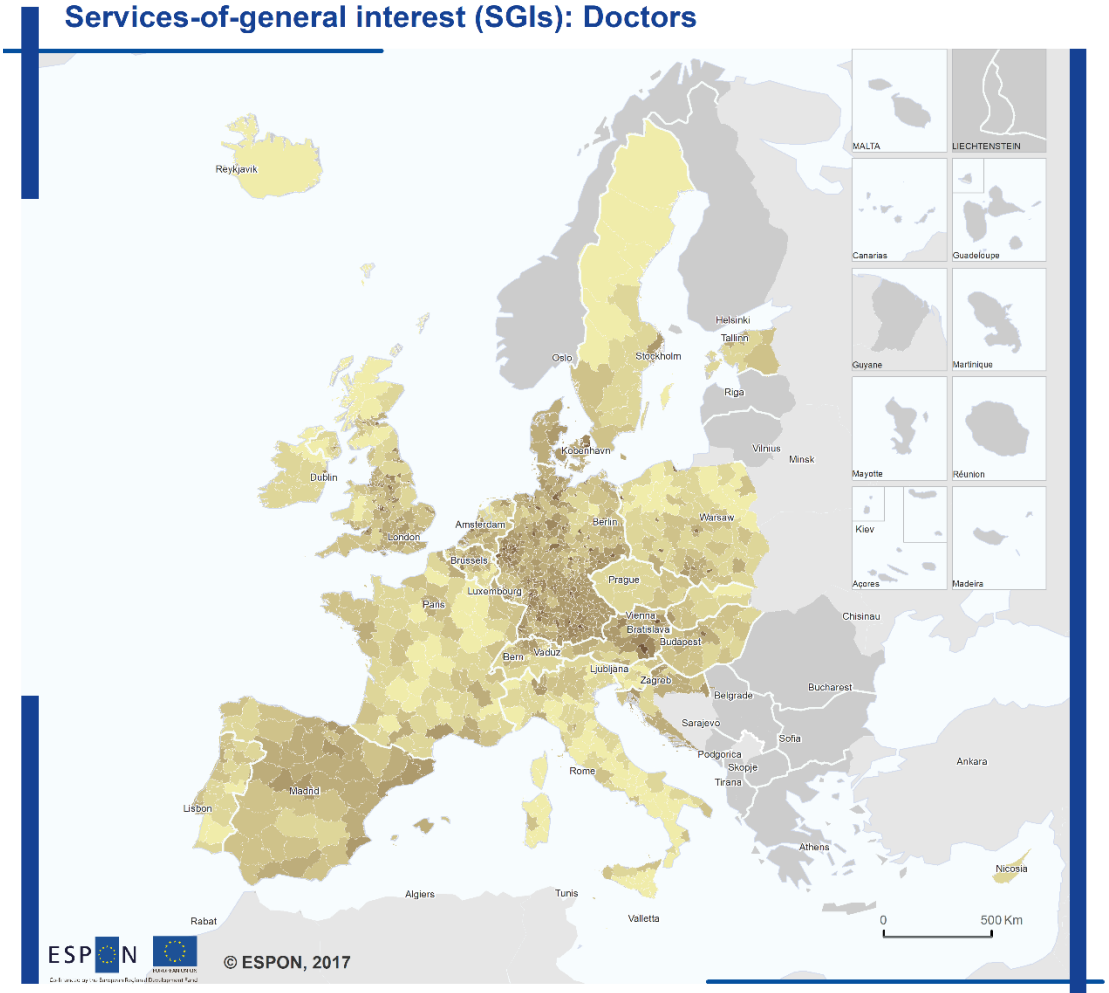
Source: ESPON Profecy
Origin of data: TCP International, 2017; OpenStreetMap (OSM), 2016; Hungarian Ministry of Health, 2017; SNS - Serviço Nacional de Saúde, 2017; Croatia Ministry of Health, 2017; 1177 Vardguiden (SE), 2017; Sundhed DK, 2017; Eesti Haigekassa, 2017; Principality of Liechtenstein, 2017; Ministry of Welfare Iceland, 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Type of doctors:

Focus was given on compiling a database of general practitioners / general surgeries. Specialized doctors (like dentists) and specialized surgeries have been excluded. However, in case of doubt, a doctor location remained in the dataset. Surgeries have been included in this doctors layer (in some countries, surgeries are rather combined with hospitals).

Map 1.16: Density of doctors (GP - general practitioners) per sqkm.



Density of doctors (general practitioners) (number of surgeries per sqkm)

low density

high density

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Hungarian Ministry of Health, 2017; SNS - Servico Nacional de Saude, 2017; Croatia Ministry of Health, 2017; 1177 Vardguiden (SE), 2017; Sundhed DK, 2017; Eesti Haugekassa, 2017; Principality of Liechtenstein, 2017; Ministry of Welfare Iceland, 2016
CC - UMS RIATE and RRG for administrative boundaries

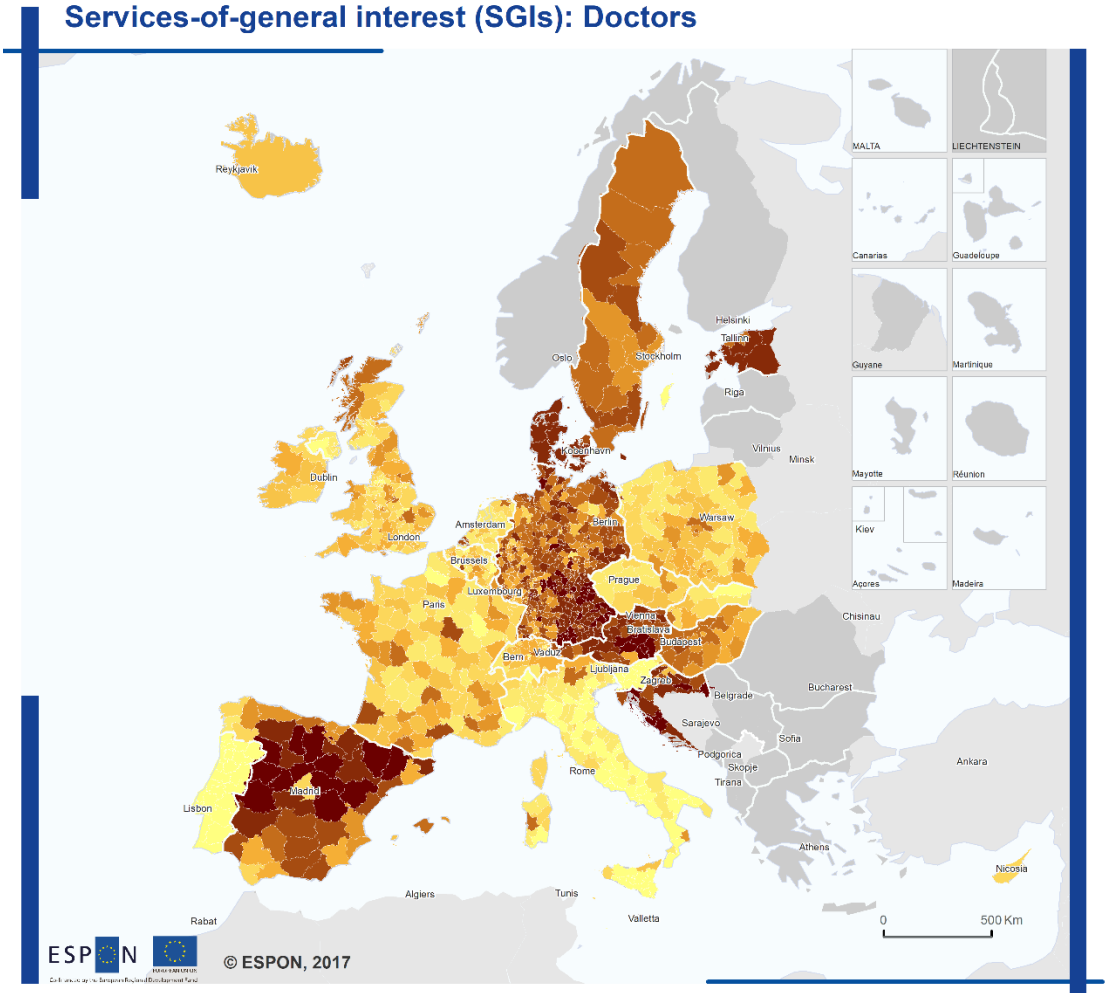
Note:
Outermost regions excluded from analysis.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far: AL, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Doctors in OSM database:

The OSM database seems quite incomplete as regards general doctors for some countries. Thus, despite all effords to complement the OSM database by other data sources, the following countries have been excluded from analysis: Albania, Bulgaria, Finland, Kosovo, Lithuania, Latvia, Montenegro, Macedonia, Malta, Norway, Romania, Republic of Serbia, and Turkey.

Map 1.17: Density of doctors (GP - general practitioners) per inhabitant.



Density of doctors (general practitioners) (number of surgeries per inhabitant)

low density

high density

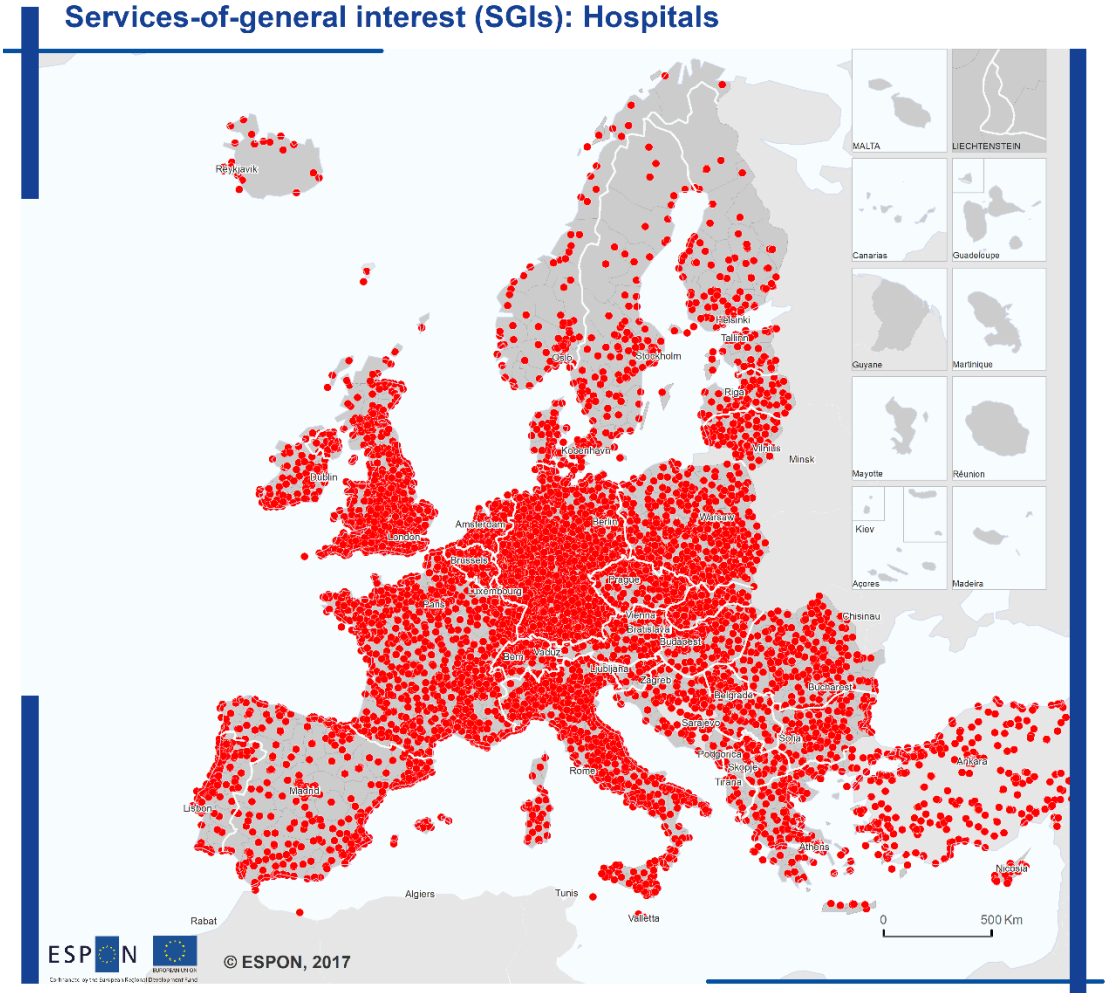
no data

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP Internaitonal, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Hungarian Ministry of Health, 2017; SNS - Servico Nacional de Saude, 2017; Croatia Ministry of Health, 2017; 1177 Vardguiden (SE), 2017; Sundhed DK, 2017; Eesti Haugekassa, 2017; Principality of Liechtenstein, 2017; Ministry of Welfare Iceland, 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

The following countries have been excluded from analyses, because the OSM database is too incomplete, and alternative data sources providing complete address information for all doctors have not been found so far: AL, BG, EL, FI, KS, LT, LV, ME, MK, MT, NO, RO, RS, TR.

Map 1.18: Hospitals in Europe.



Hospitals in Europe

- Hospital

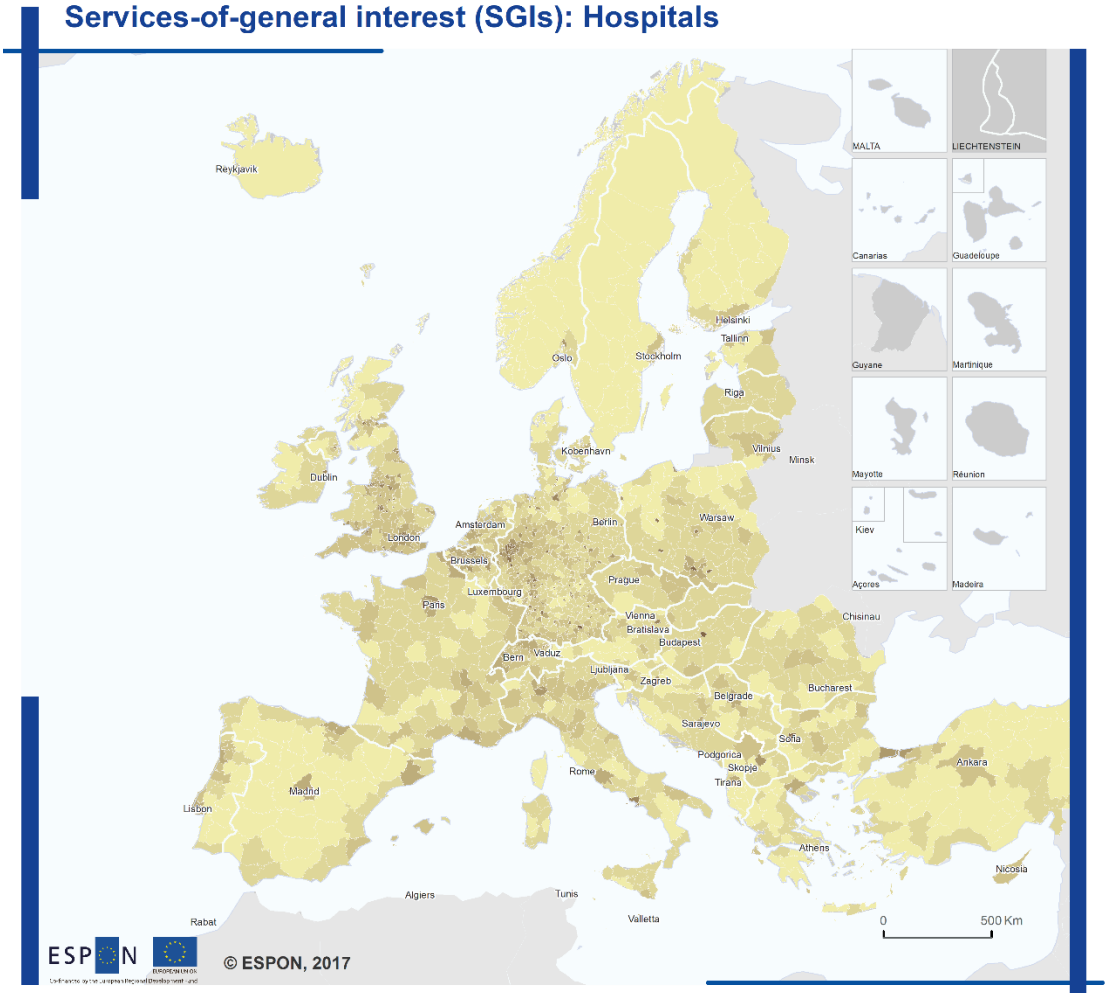
Source: ESPON Profecy
Origin of data: TCP International, 2017;
OpenStreetMap (OSM), 2016; Catalog of World Hospitals, 2011;
Croatian Health Insurance Fund, 2017; Eesti Haigekassa, 2012; HLMO, 2011;
Hospitals Worldwide, 2012; Institute for Economic & Social Reforms, 2012;
Italian Ministry of Health, 2010; Kurklinikverzeichnis, 2017; Lietuvos Medicina, 2012;
Ministerul Sănătății, 2017; Slovenian Ministry of Health, 2017; Ministry
of Welfare Iceland, 2016; STMAS, 2009; Wikipedia, 2012
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Type of hospitals:

Focus was given on compiling a database of general hospitals. Specialized hospitals like hospices, wellness clinics, rehabilitation centres, sanatoriums etc. have been excluded. However, in case of doubt, a hospital remained in the dataset.

Map 1.19: Density of hospitals per sqkm.



Density of hospitals
(number of facilities per sqkm)

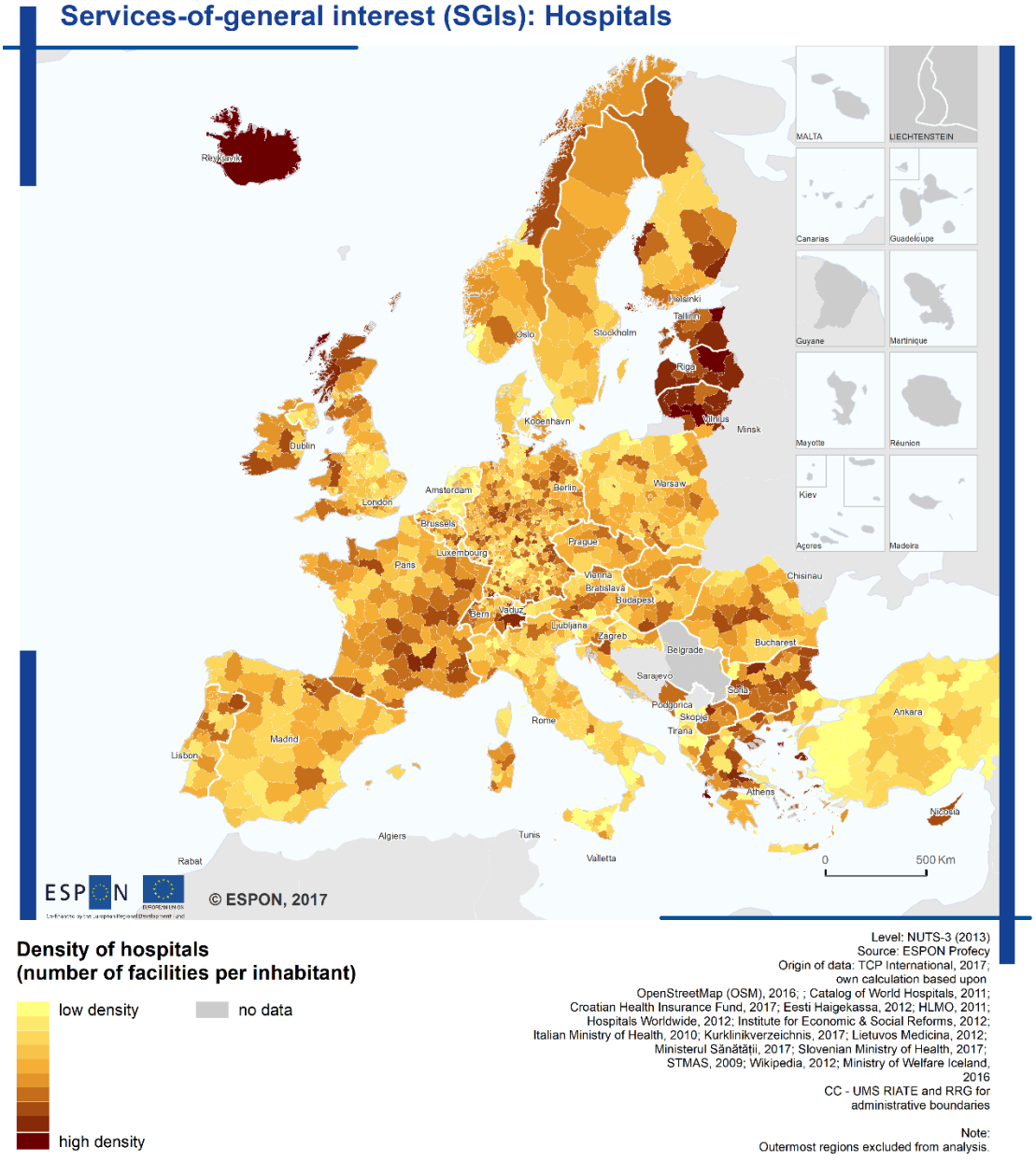
low density

high density

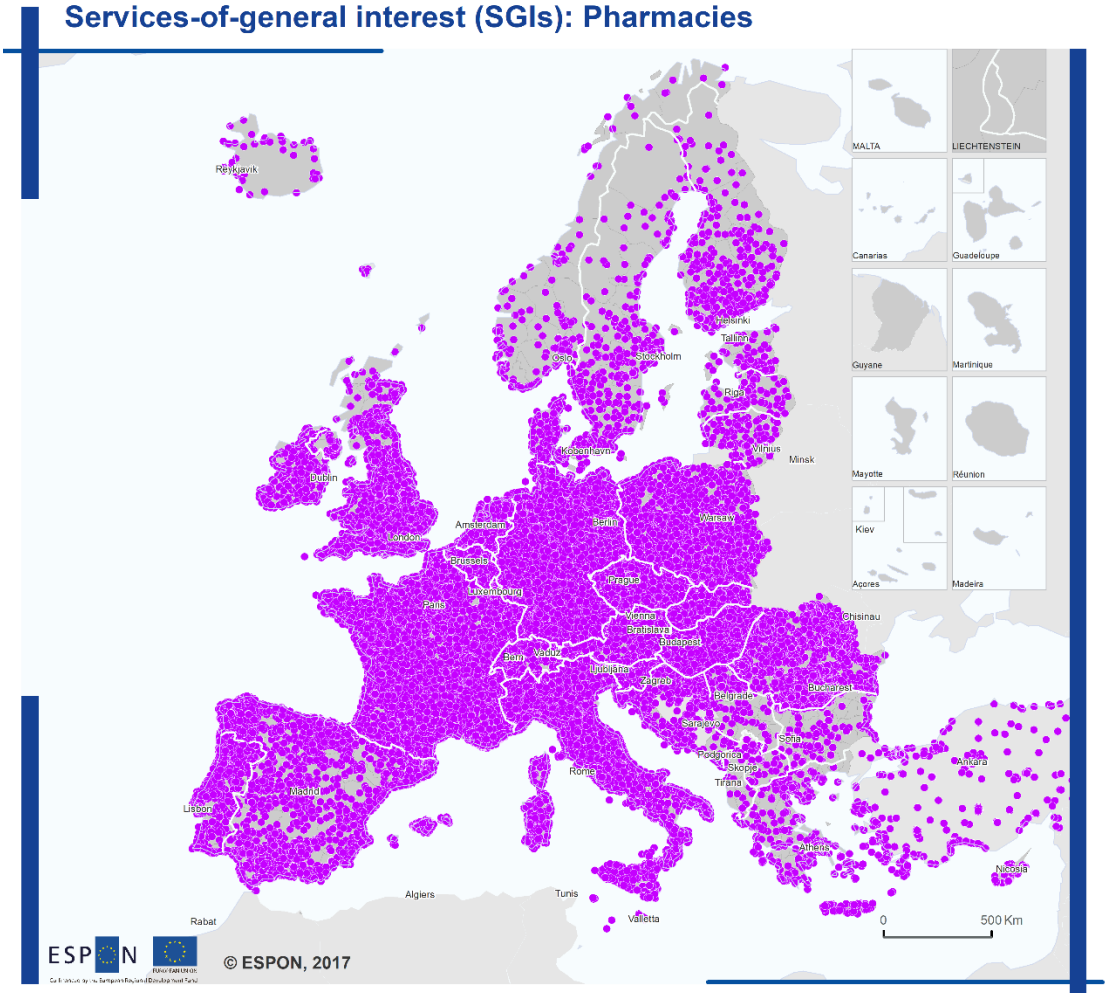
Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; ; Catalog of World Hospitals, 2011; Croatian Health Insurance Fund, 2017; Eesti Haigekassa, 2012; HLMO, 2011; Hospitals Worldwide, 2012; Institute for Economic & Social Reforms, 2012; Italian Ministry of Health, 2010; Kurklinikverzeichnis, 2017; Lietuvos Medicina, 2012; Ministerul Sănătății, 2017; Slovenian Ministry of Health, 2017; STMAS, 2009; Wikipedia, 2012; Ministry of Welfare Iceland, 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.20: Density of hospitals per inhabitant.



Map 1.21: Pharmacies in Europe.



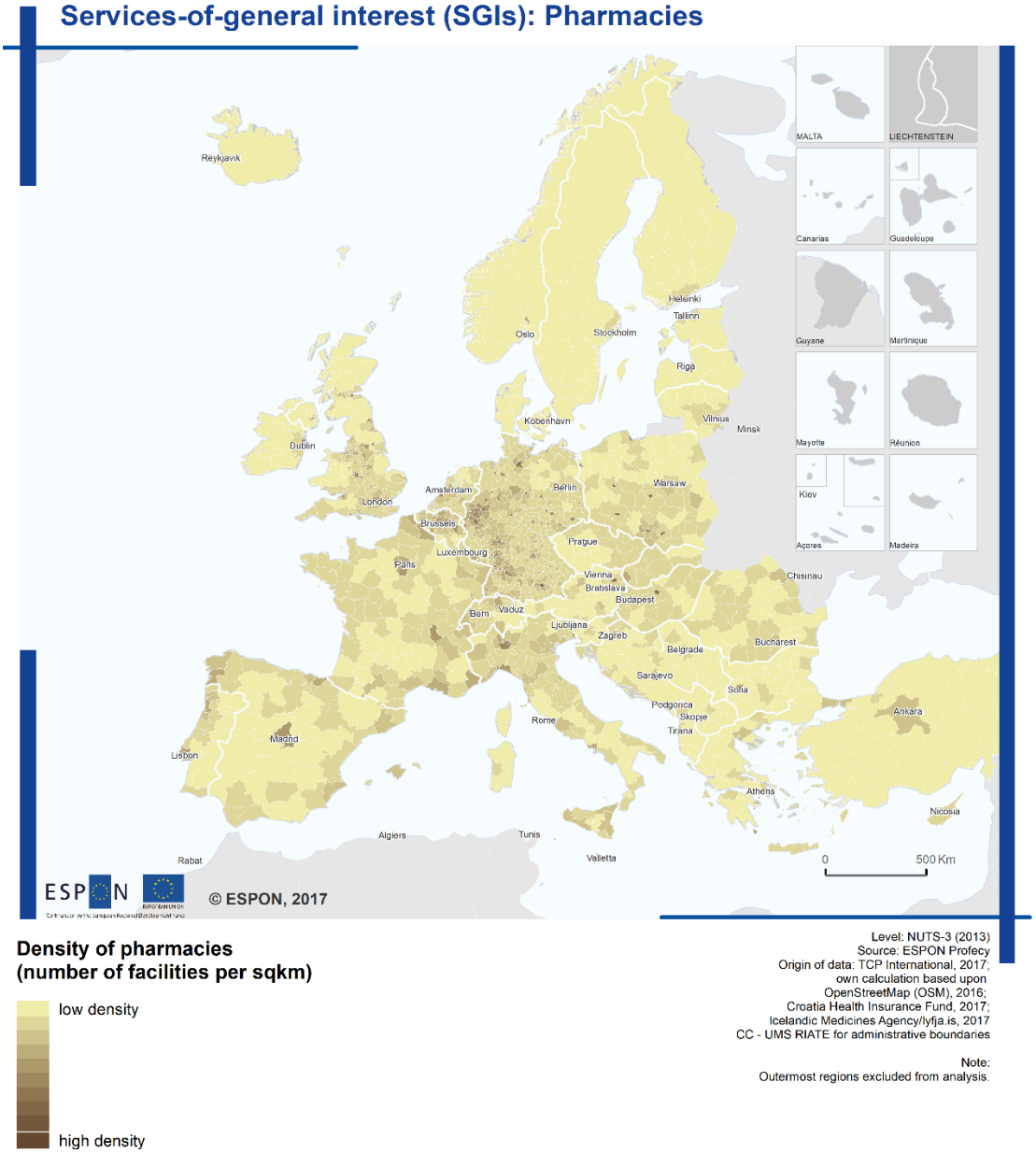
Pharmacies in Europe

- Pharmacies

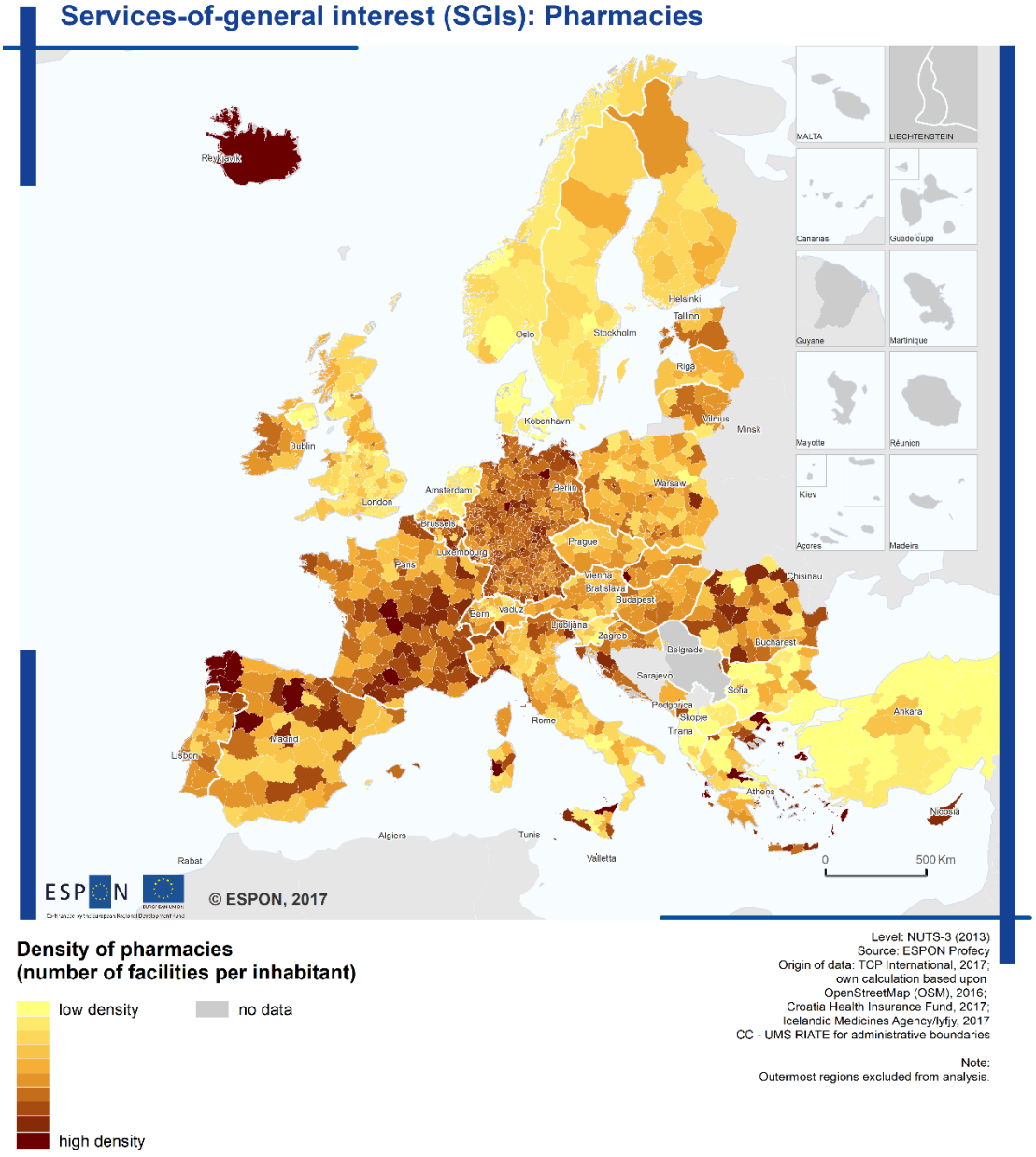
Source: ESPON Profecy
Origin of data: TCP International, 2017;
OpenStreetMap (OSM), 2016;
Croatia Health Insurance Fund, 2017;
Icelandic Medicines Agency/lyfja.is, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

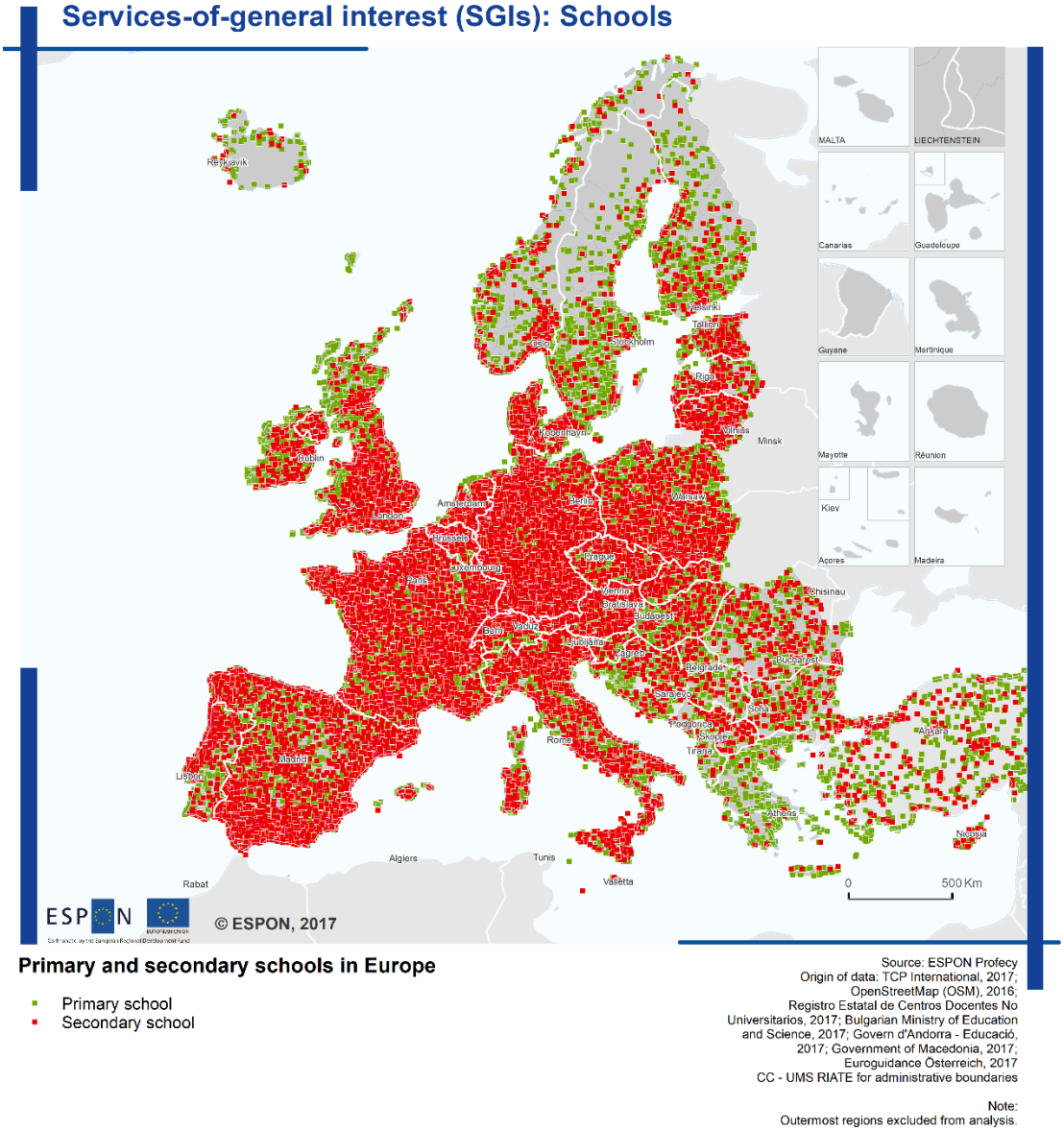
Map 1.22: Density of pharmacies per sqkm in Europe.



Map 1.23: Density of pharmacies per inhabitant in Europe.



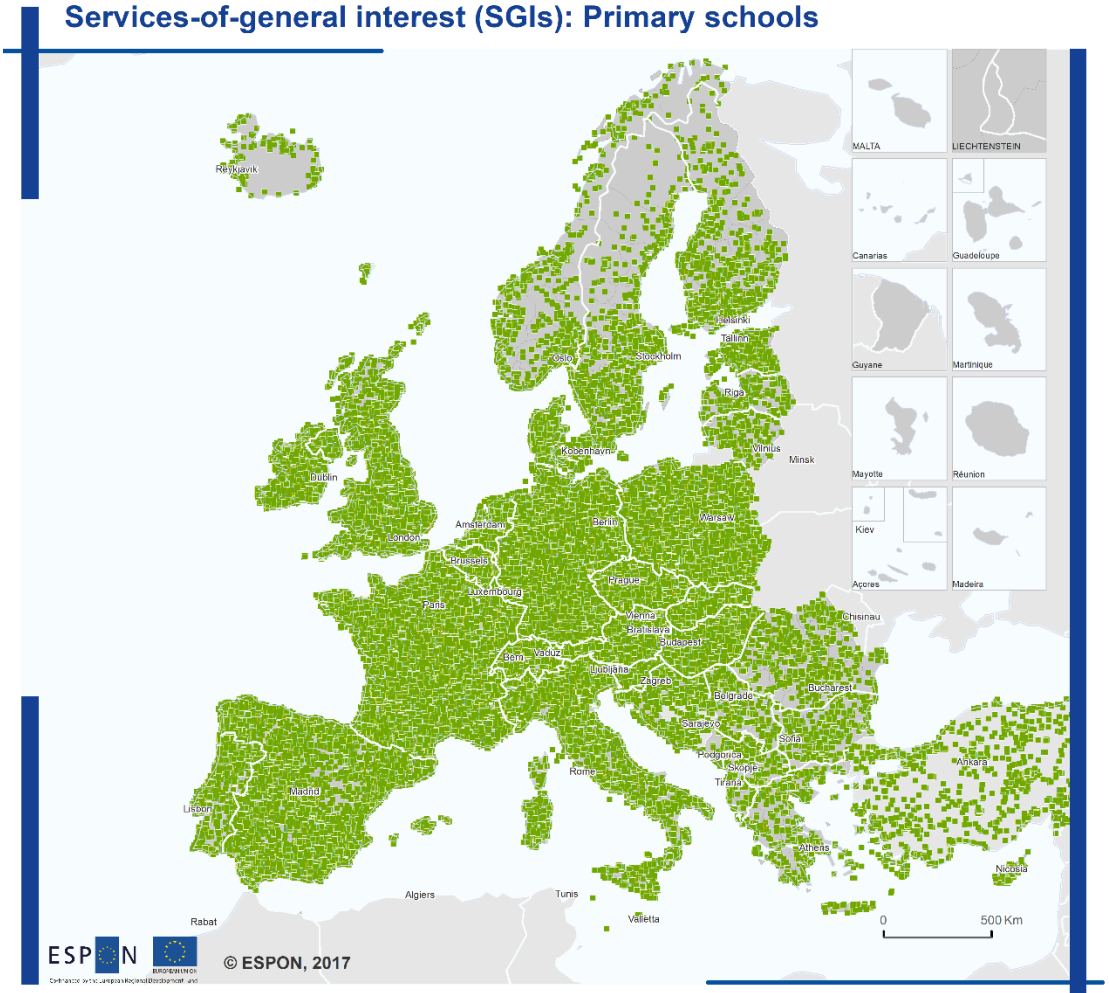
Map 1.24: Schools in Europe (primary and secondary education).



School types:

Focus was given on compiling a database on primary and secondary schools. Pre-schools have not been considered.

Map 1.25: Primary schools in Europe.



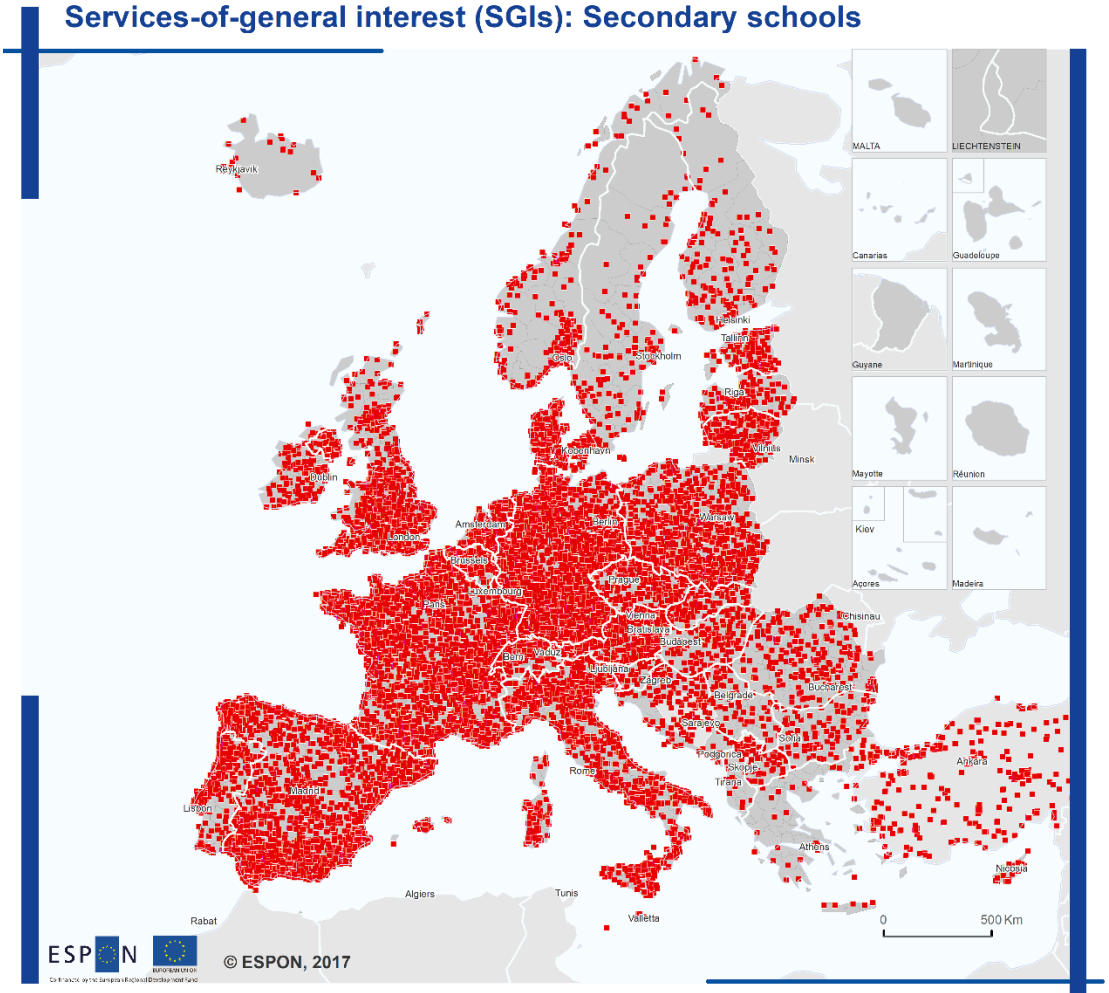
Primary schools in Europe

- Primary school

Source: ESPON Profecy
Origin of data: TCP International, 2017; OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Österreich, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.
Pre-schools are not included.

Map 1.26: Secondary schools in Europe.



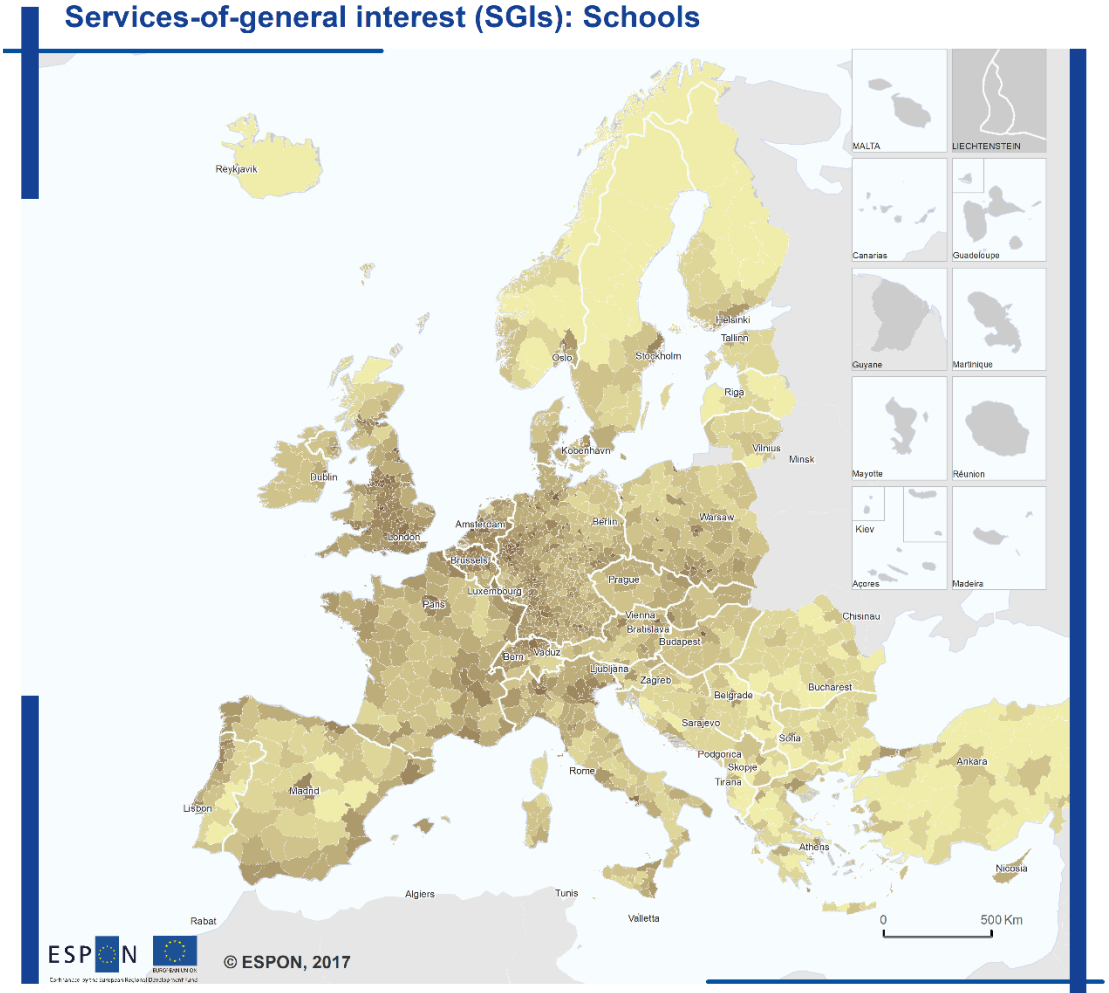
Secondary schools in Europe

- Secondary school

Source: ESPON Profecy
Origin of data: TCP International, 2017; OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Österreich, 2017
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.27: Density of primary and secondary schools per sqkm.



Density of primary and secondary schools in Europe (number of schools per sqkm)

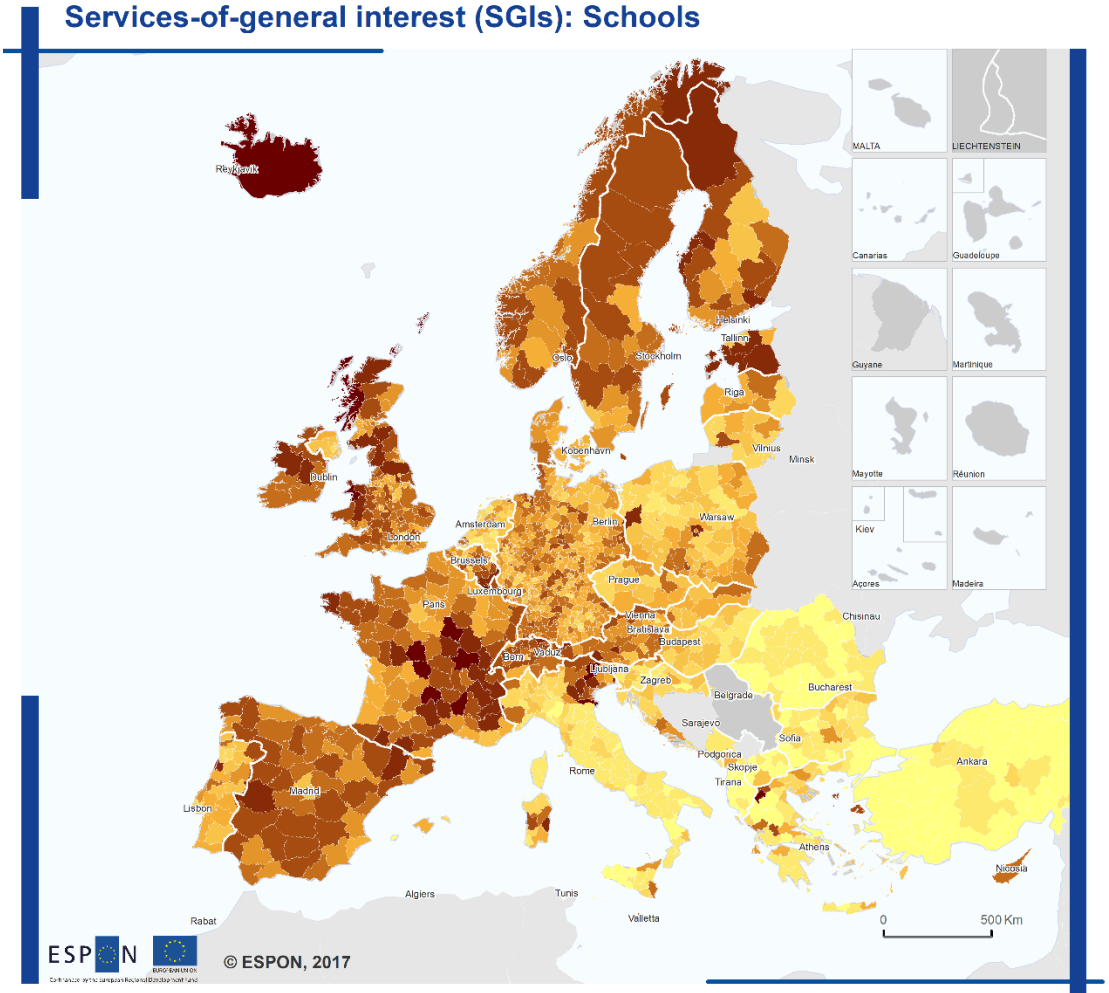
low density

high density

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Osterreich, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.
Pre-schooles not considered.

Map 1.28: Density of primary and secondary schools per inhabitant.



Density of primary and secondary schools in Europe (number of schools per inhabitant)

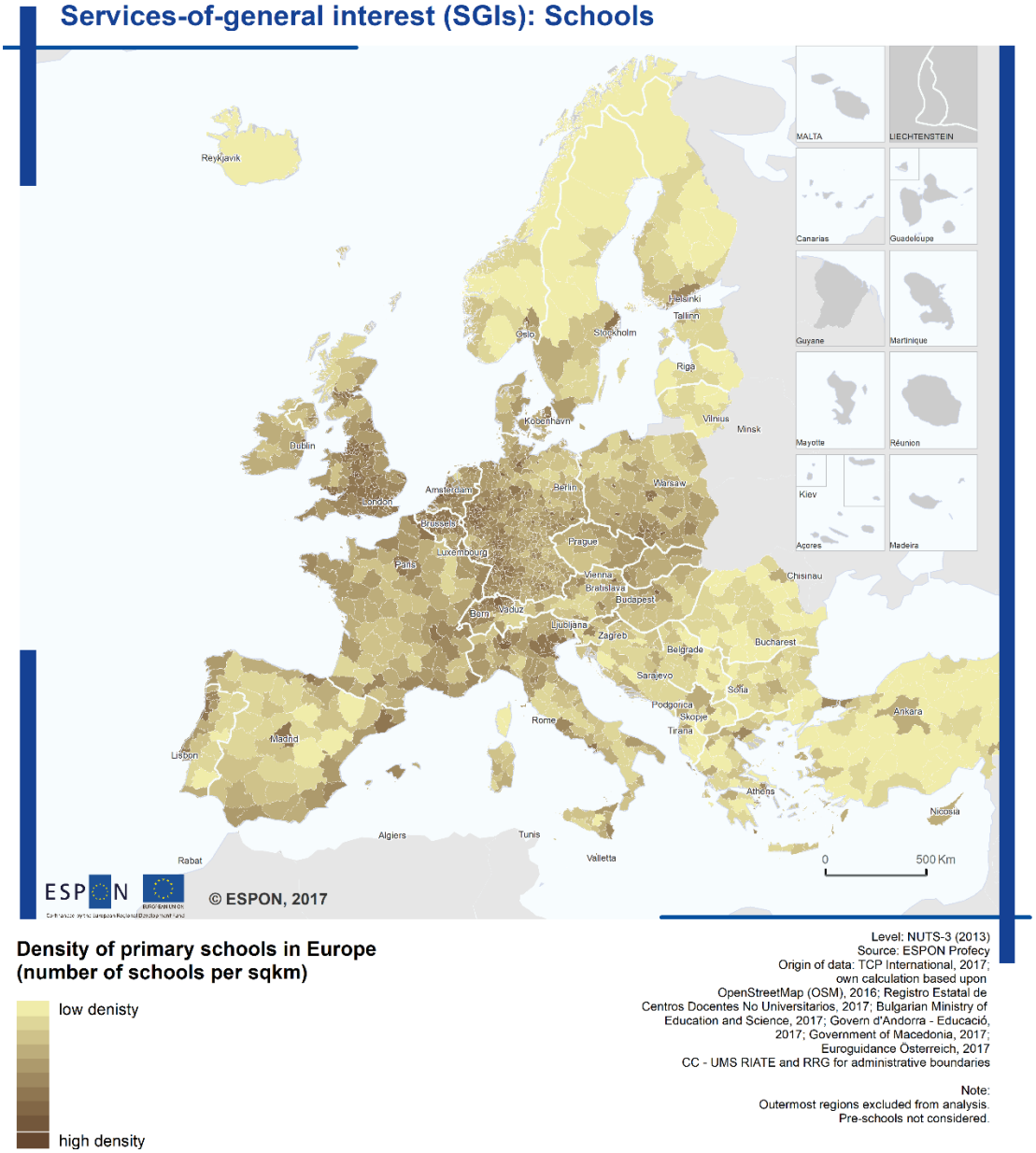
low density — high density

no data

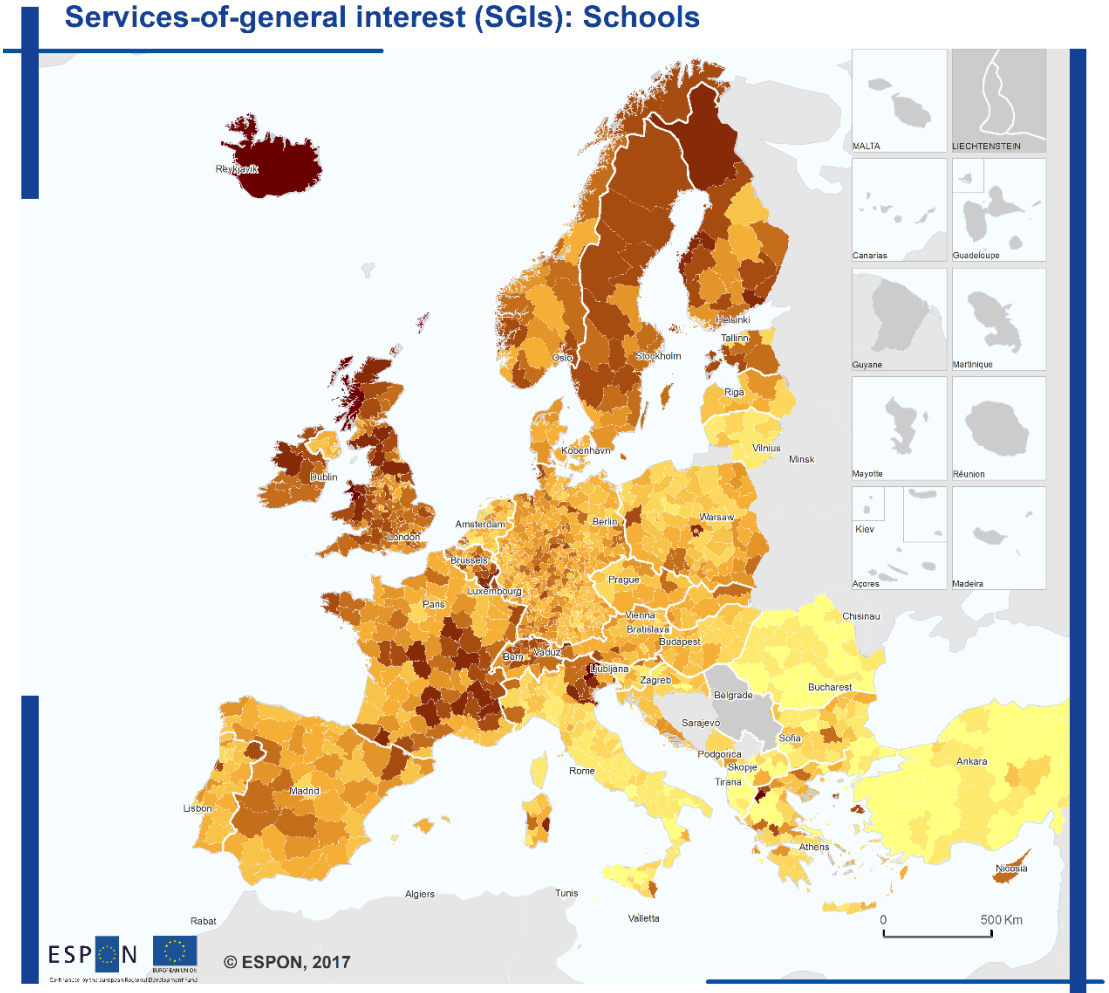
Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Osterreich, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.
Pre-schools not considered.

Map 1.29: Density of primary schools per sqkm.



Map 1.30: Density of primary schools per inhabitant.



Density of primary schools in Europe (number of schools per inhabitant)

low density

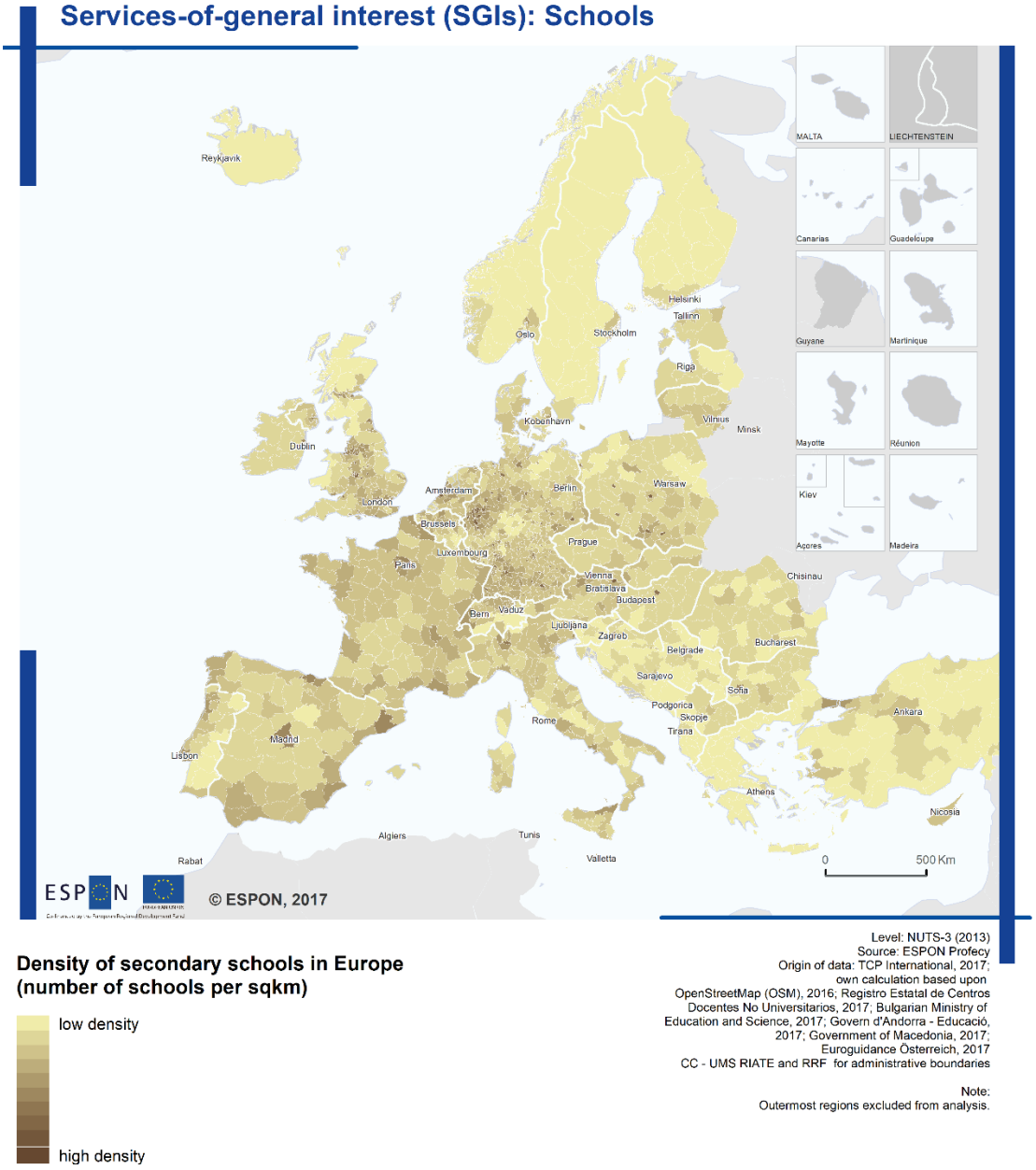
high density

no data

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Osterreich, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.
Pre-schools not considered.

Map 1.31: Density of secondary schools per sqkm.



Density of secondary schools in Europe (number of schools per sqkm)

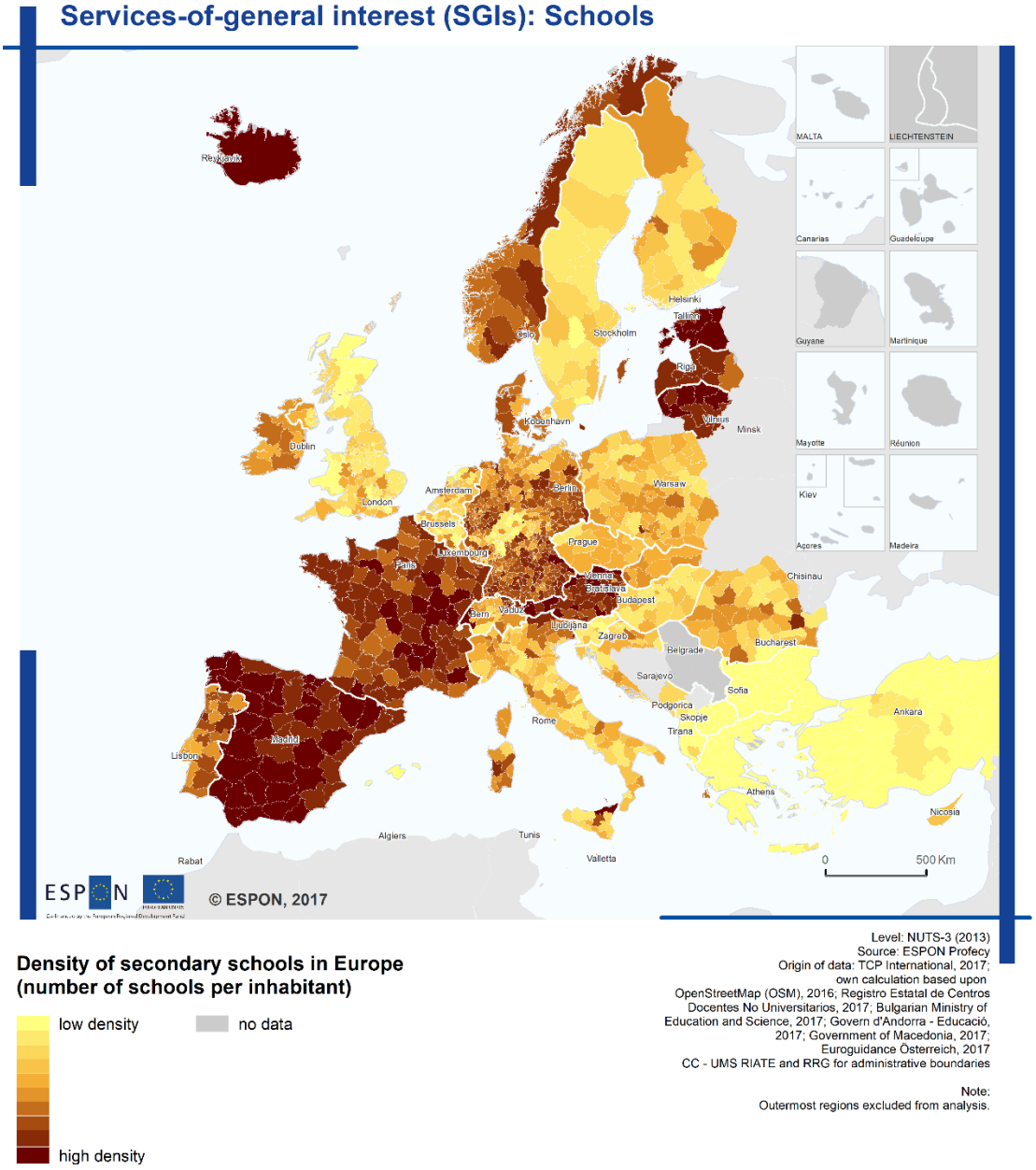
low density

high density

Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Österreich, 2017
CC - UMS RIATE and RRF for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.32: Density of secondary schools per inhabitant.



Density of secondary schools in Europe (number of schools per inhabitant)

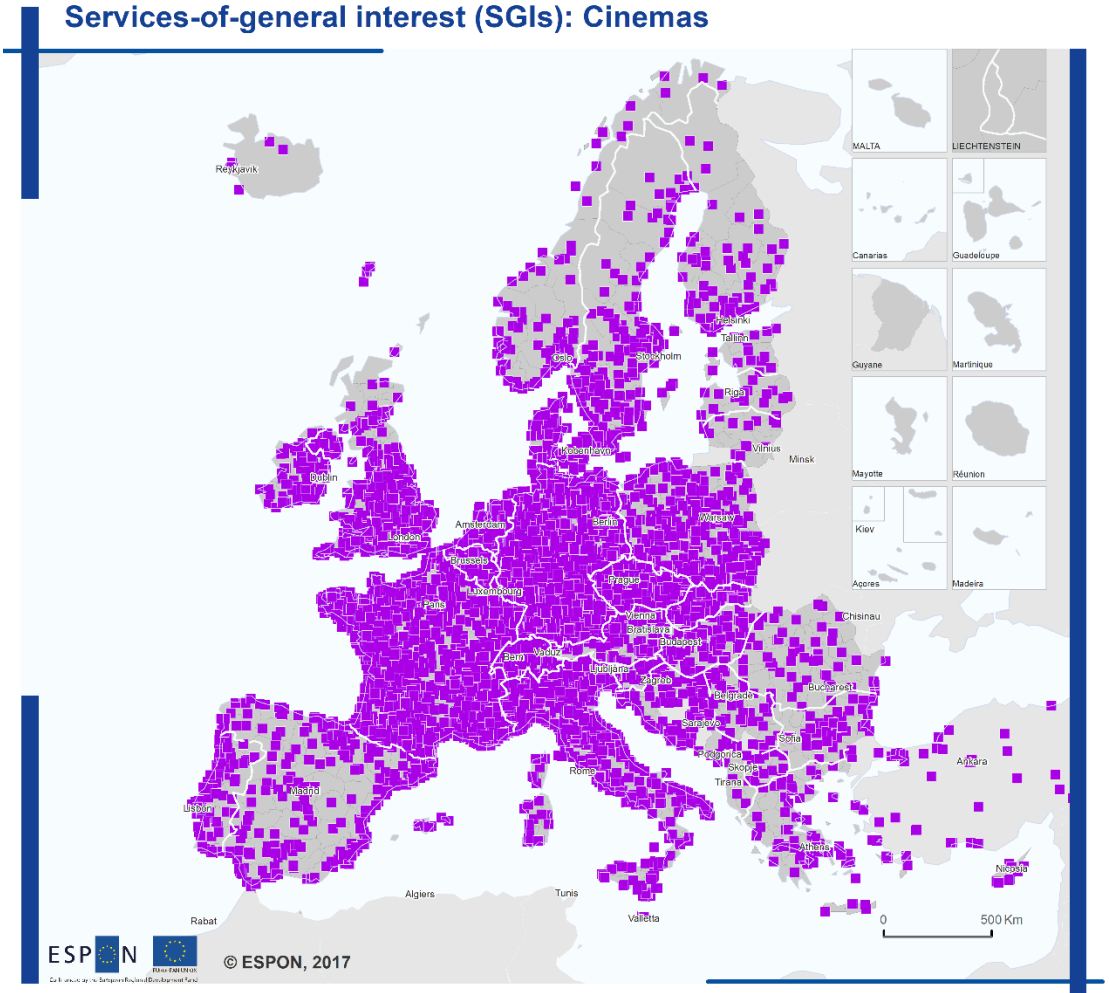
low density — high density

no data

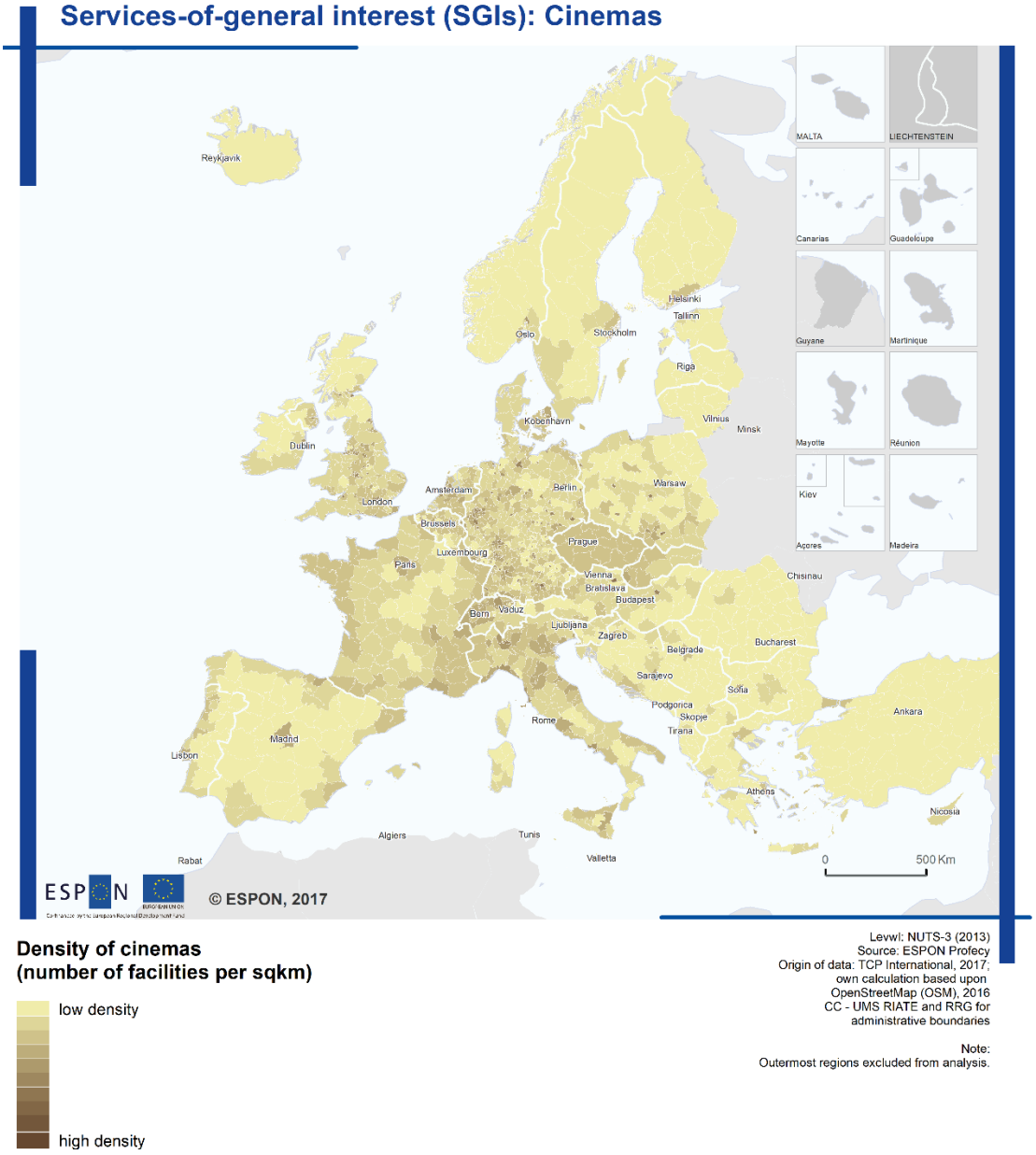
Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016; Registro Estatal de Centros Docentes No Universitarios, 2017; Bulgarian Ministry of Education and Science, 2017; Govern d'Andorra - Educació, 2017; Government of Macedonia, 2017; Euroguidance Österreich, 2017
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

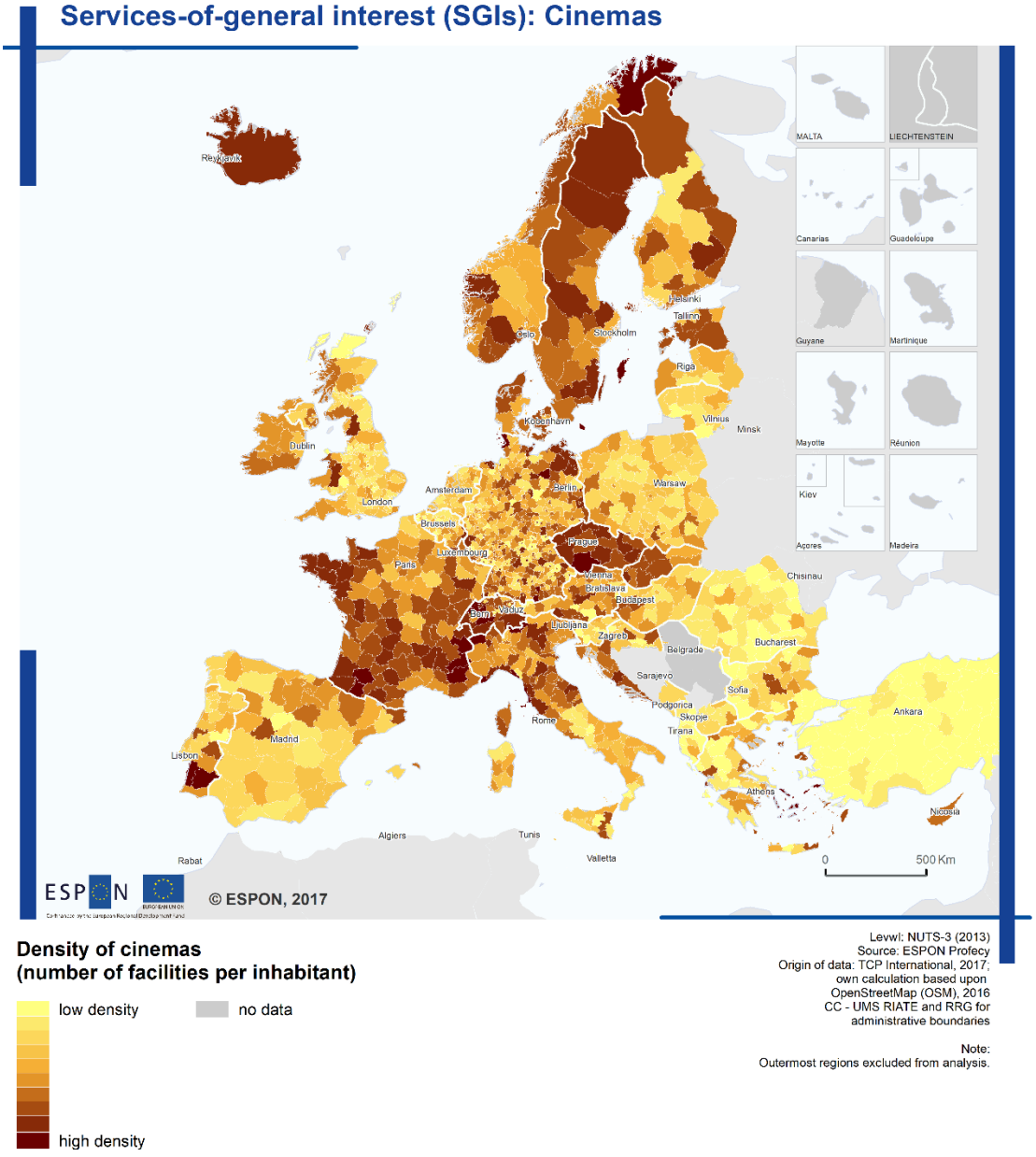
Map 1.33: Cinemas in Europe.



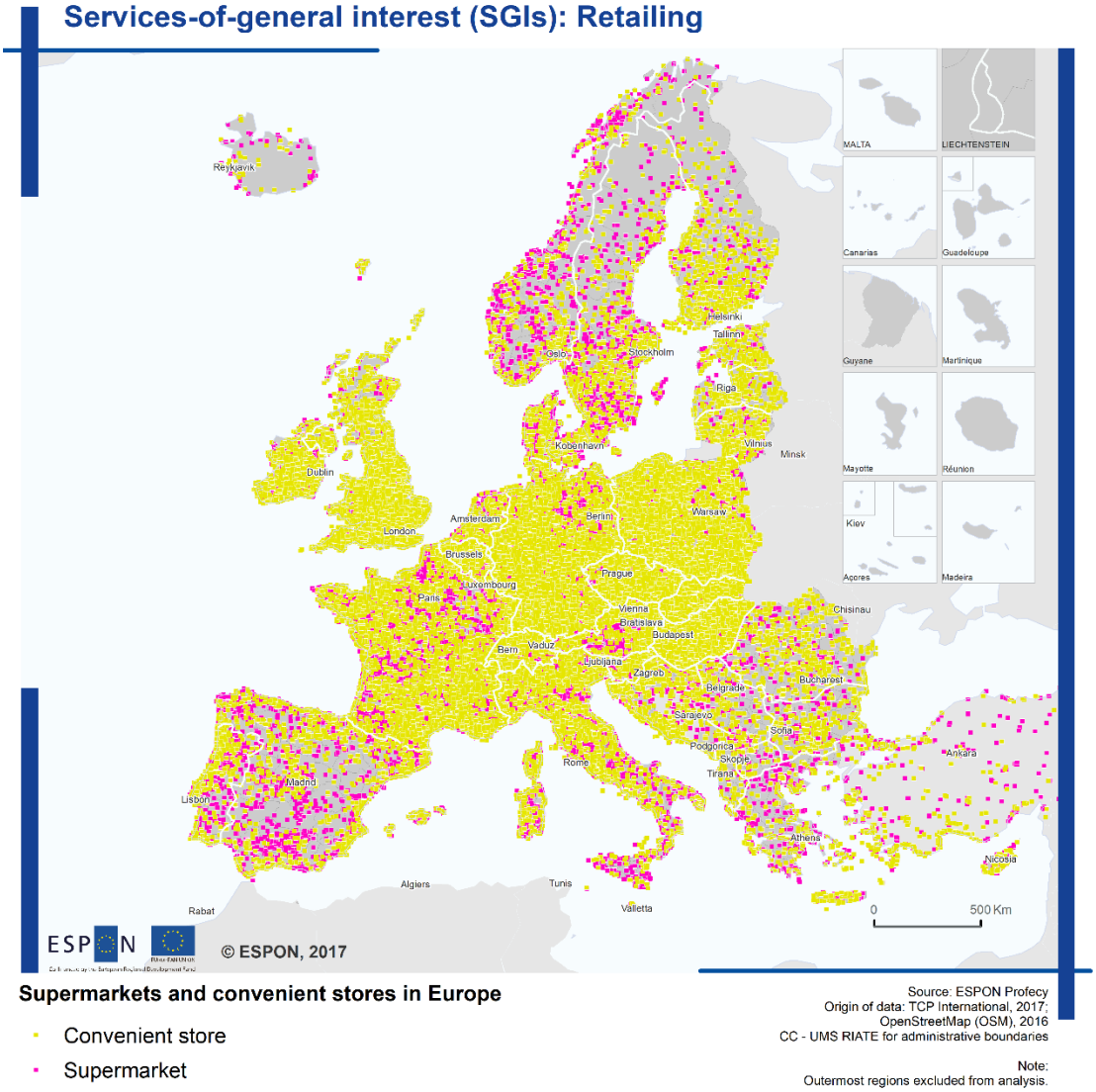
Map 1.34: Density of cinemas per sqkm.



Map 1.35: Density of cinemas per inhabitant.



Map 1.36: Supermarkets and convienent stores in Europe.

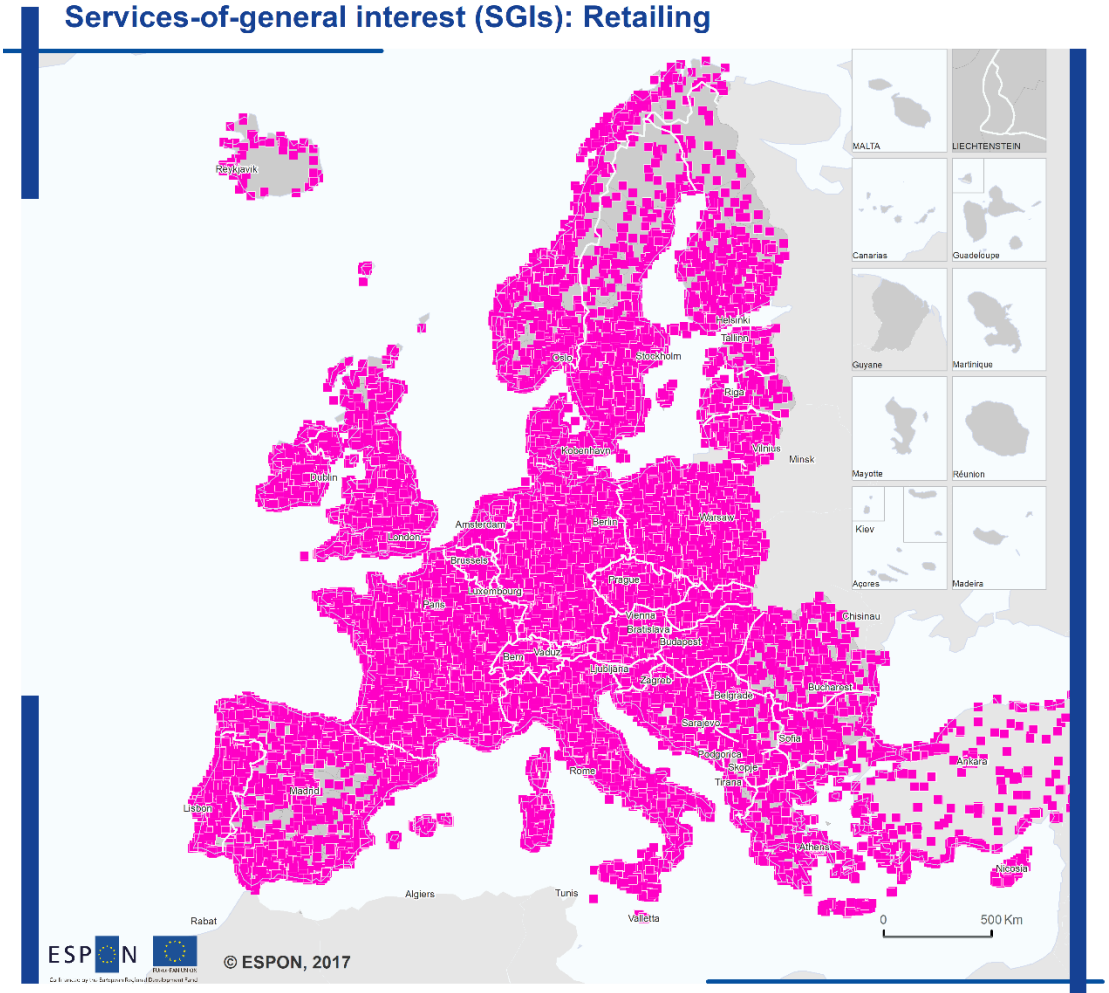


Types of retail facilities:

Data on both supermarkets and convenient stores have been collected from OSM; from the point of view of daily goods supply, both are deemed relevant. In some countries, convenient stores have a larger share (like Poland, Baltic States), in other countries (e.g. Spain, Italy) supermarkets are the dominant shop type. Sometimes, however, the distinction between convenient stores and supermarkets is not clear from the OSM database.

Shopping malls, however, have been excluded because this type of retail facility usually is not meant for daily supply of goods, but for medium to long-term supply, and usually can only be found in larger cities.

Map 1.37: Supermarkets in Europe.



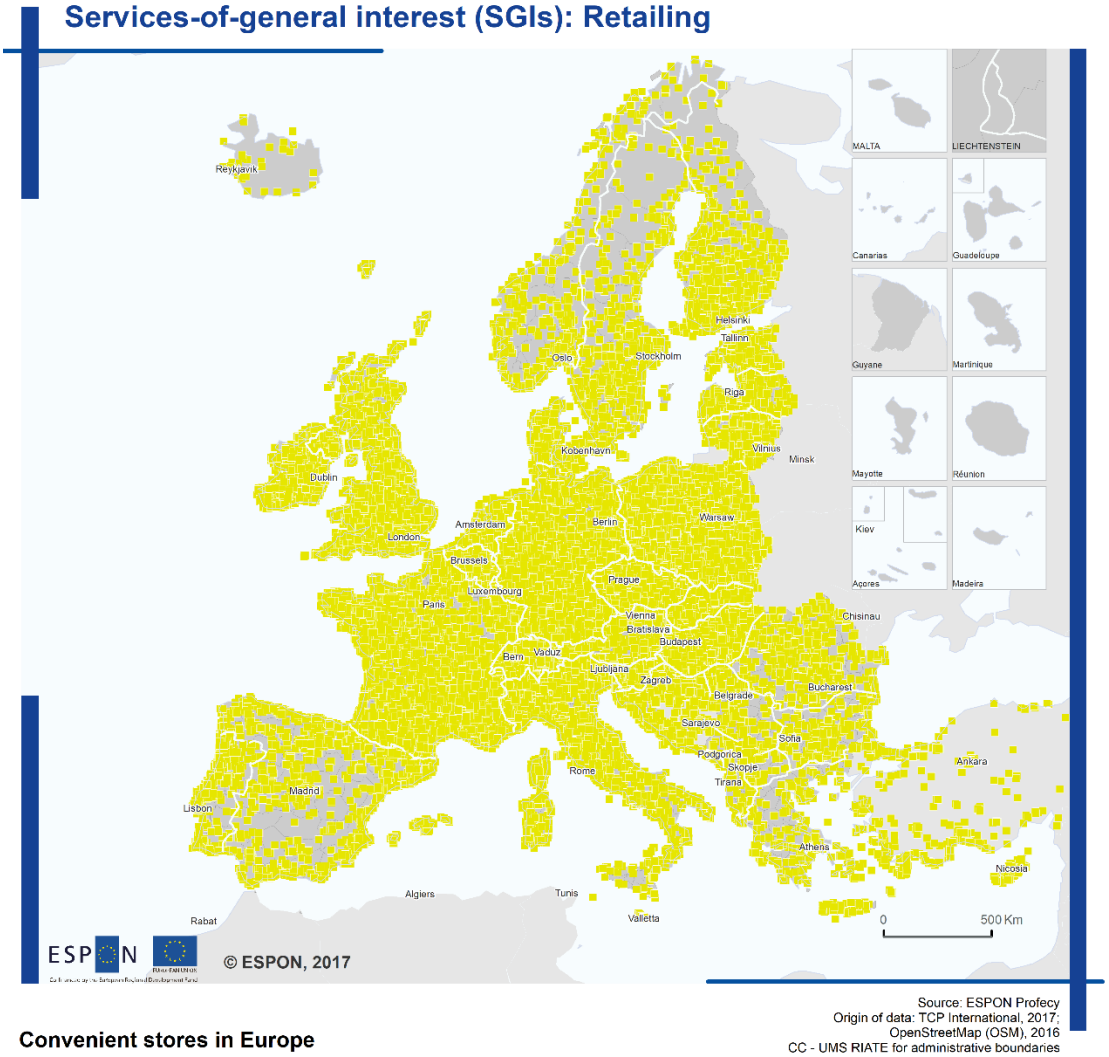
Supermarkets in Europe

- Supermarket

Source: ESPON Profecy
Origin of data: TCP International, 2017;
OpenStreetMap (OSM), 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.38: Convenient stores in Europe.



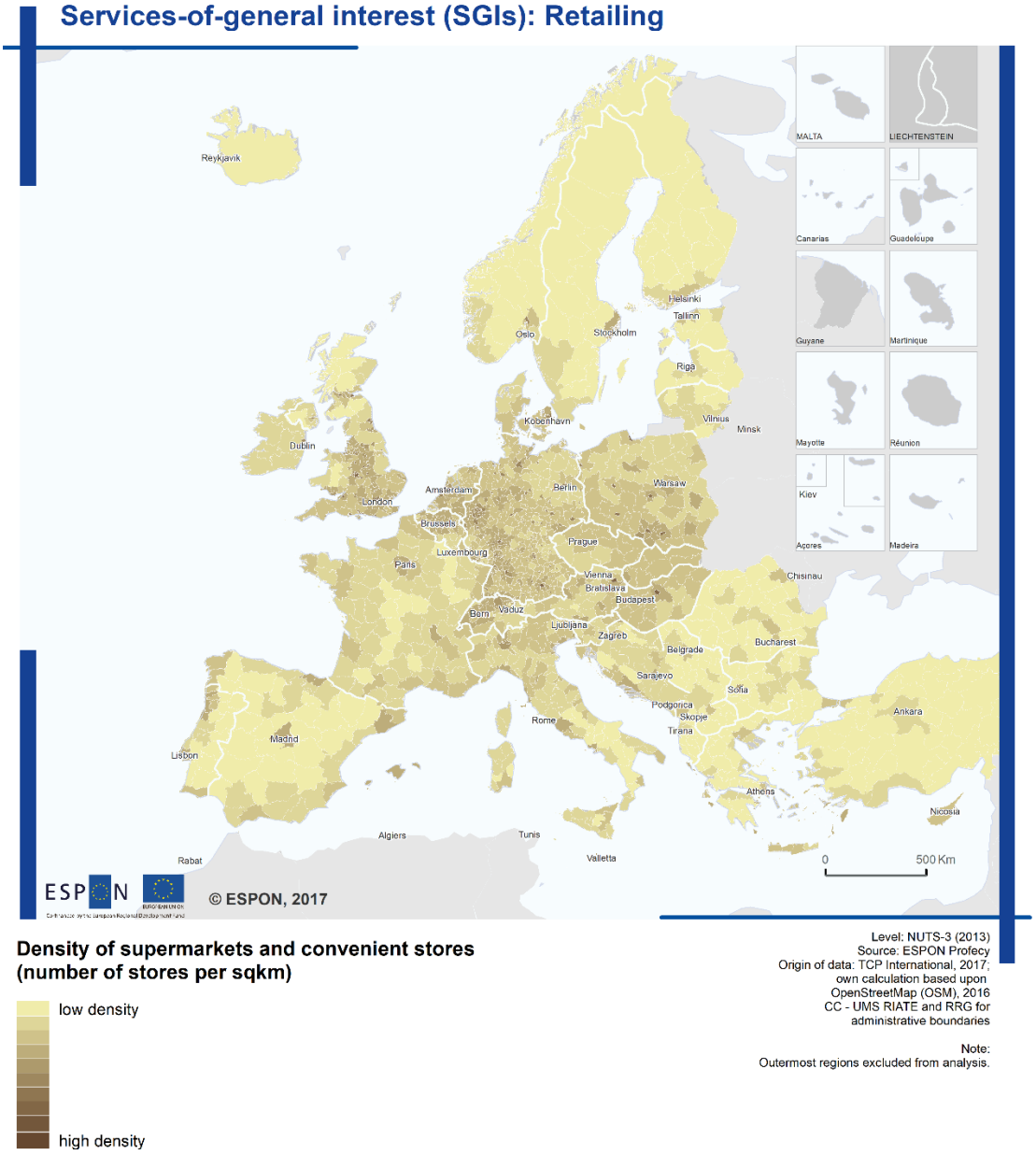
Convenient stores in Europe

- Convenient store

Source: ESPON Profecy
Origin of data: TCP International, 2017; OpenStreetMap (OSM), 2016
CC - UMS RIATE for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.39: Density of retail facilities (combined supermarkets and convenient stores) per sqkm.



Density of supermarkets and convenient stores (number of stores per sqkm)

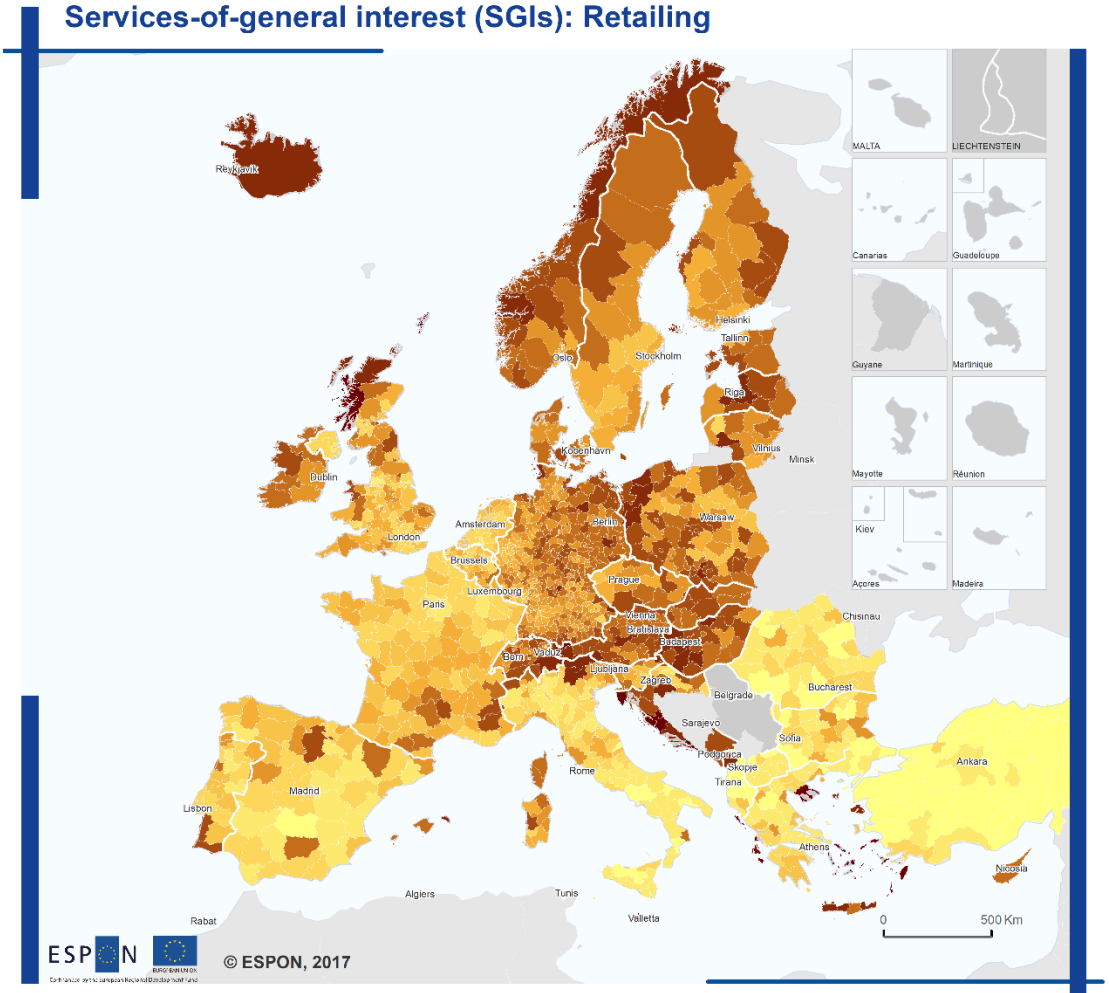
low density

high density

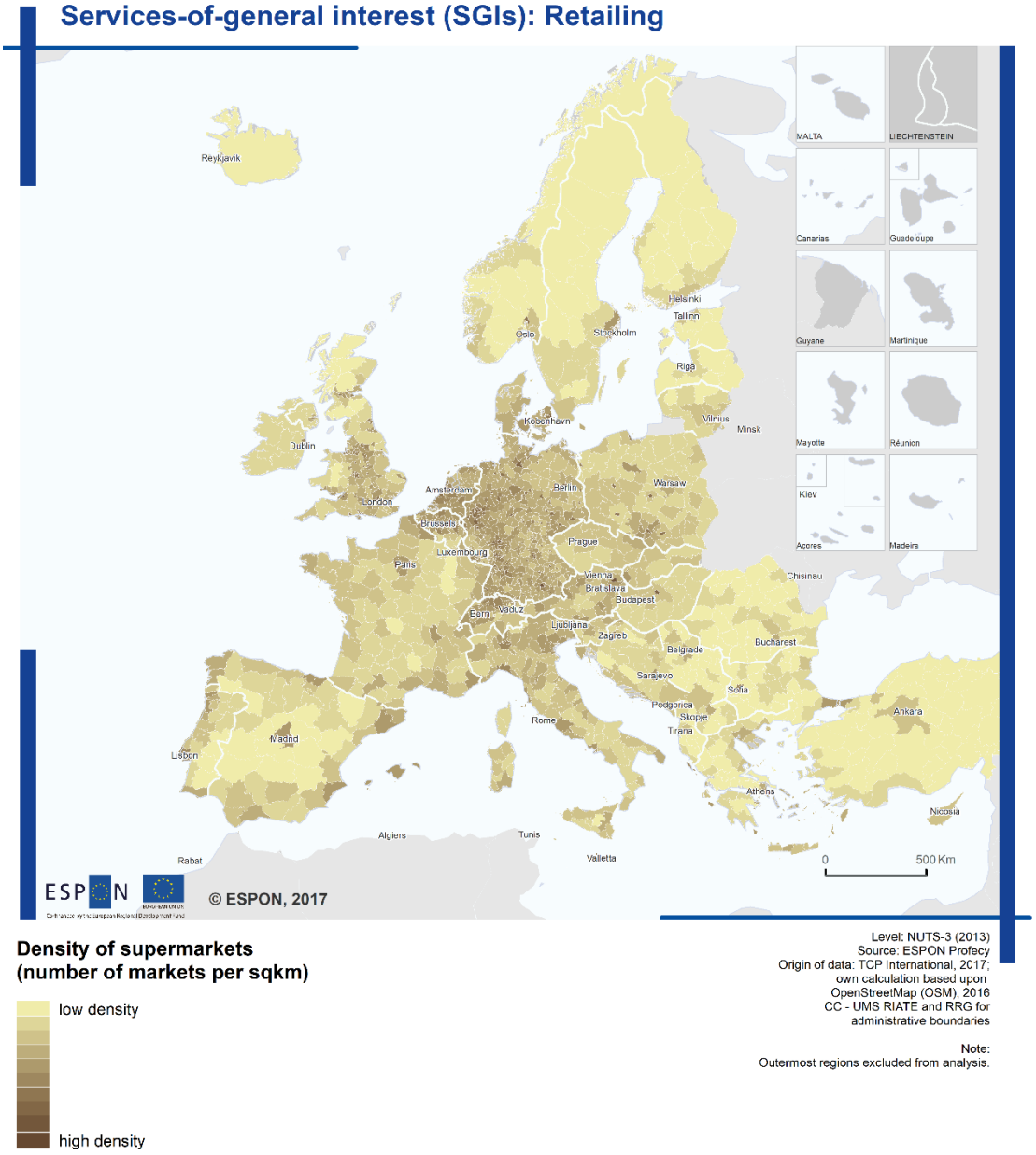
Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

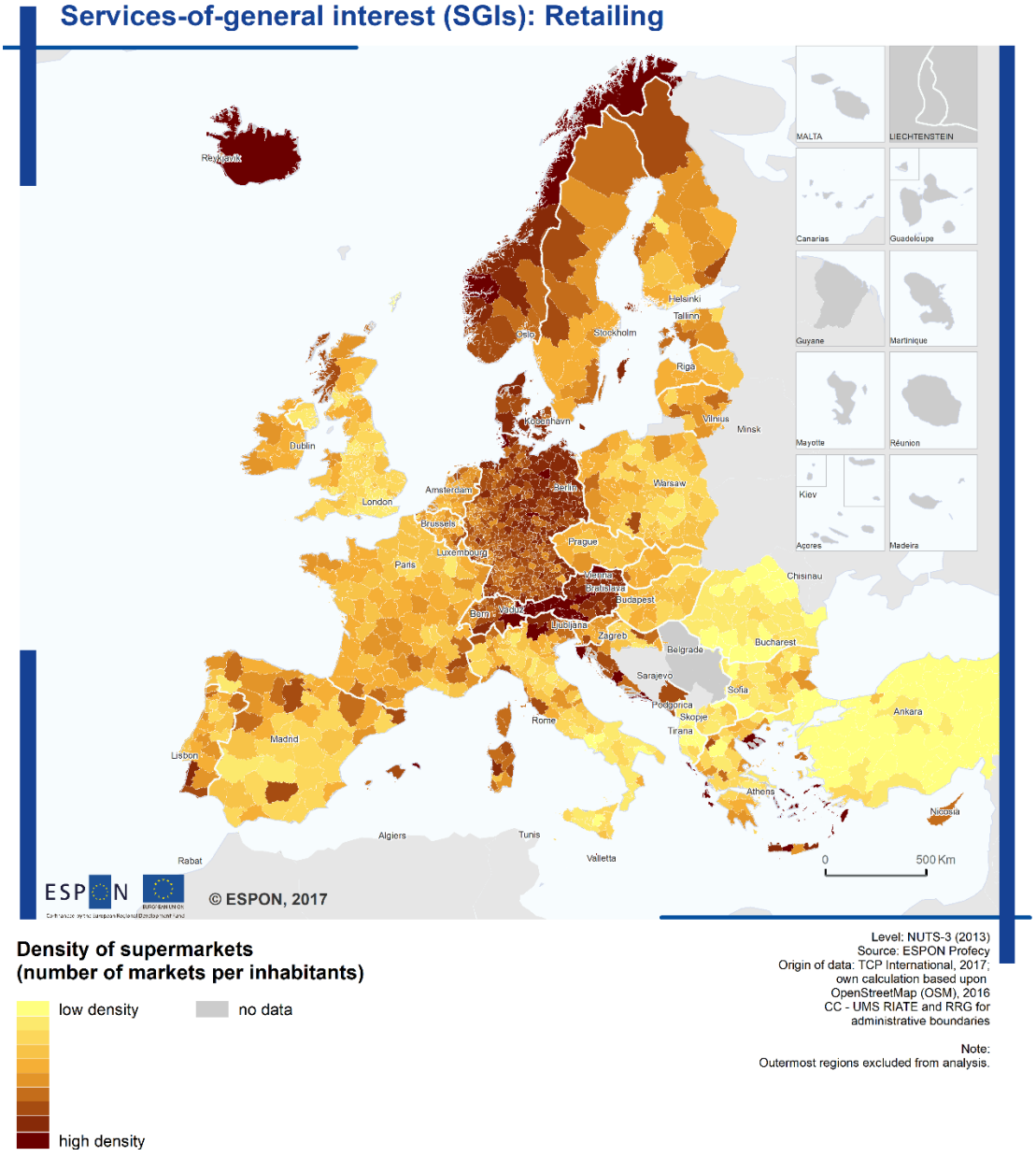
Map 1.40: Density of retail facilities (combined supermarkets and convenient stores) per inhabitant.



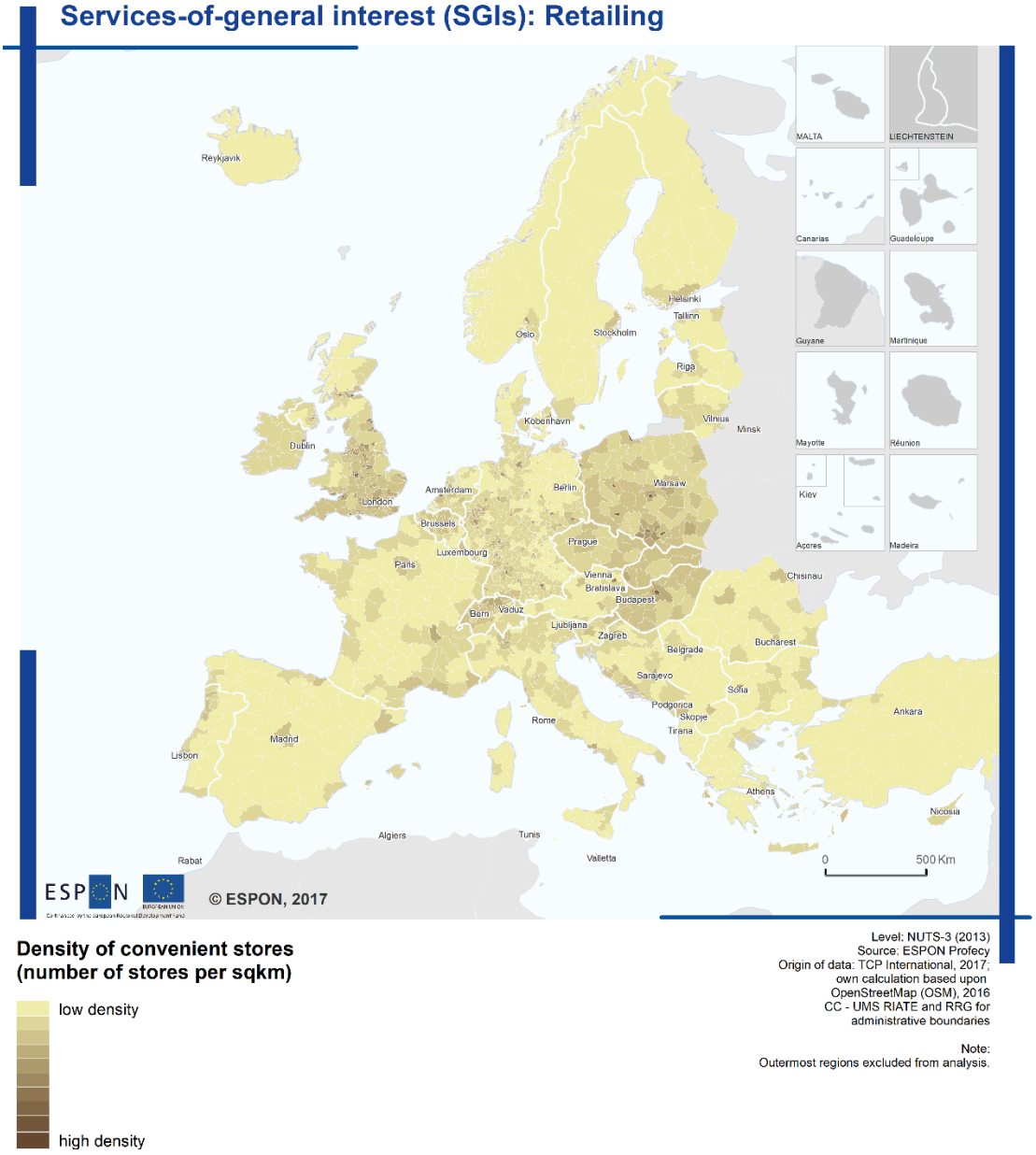
Map 1.41: Density of supermarkets per sqkm.



Map 1.42: Density of supermarkets per inhabitant.



Map 1.43: Density of convenient stores per sqkm



Density of convenient stores (number of stores per sqkm)

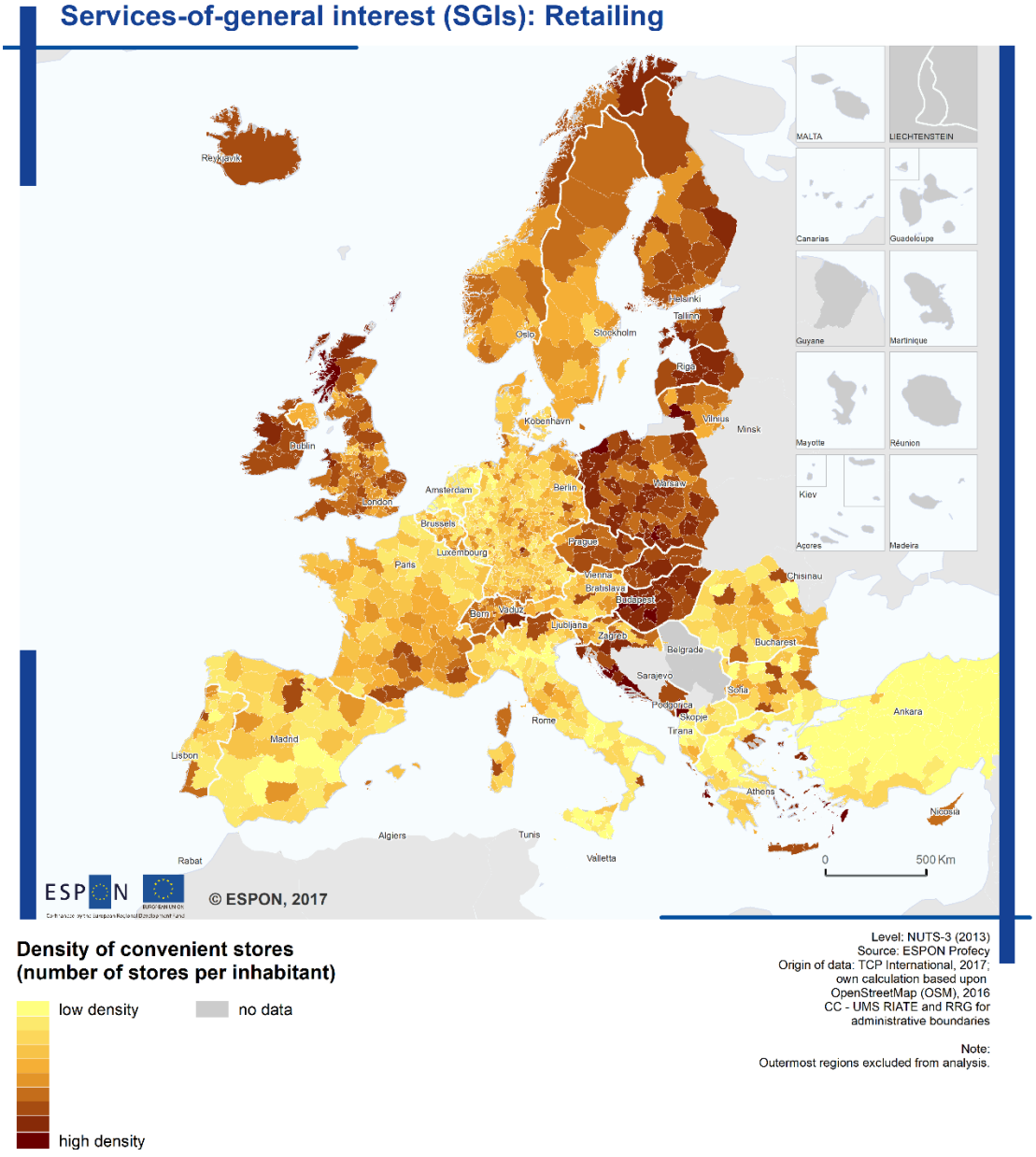
low density

high density

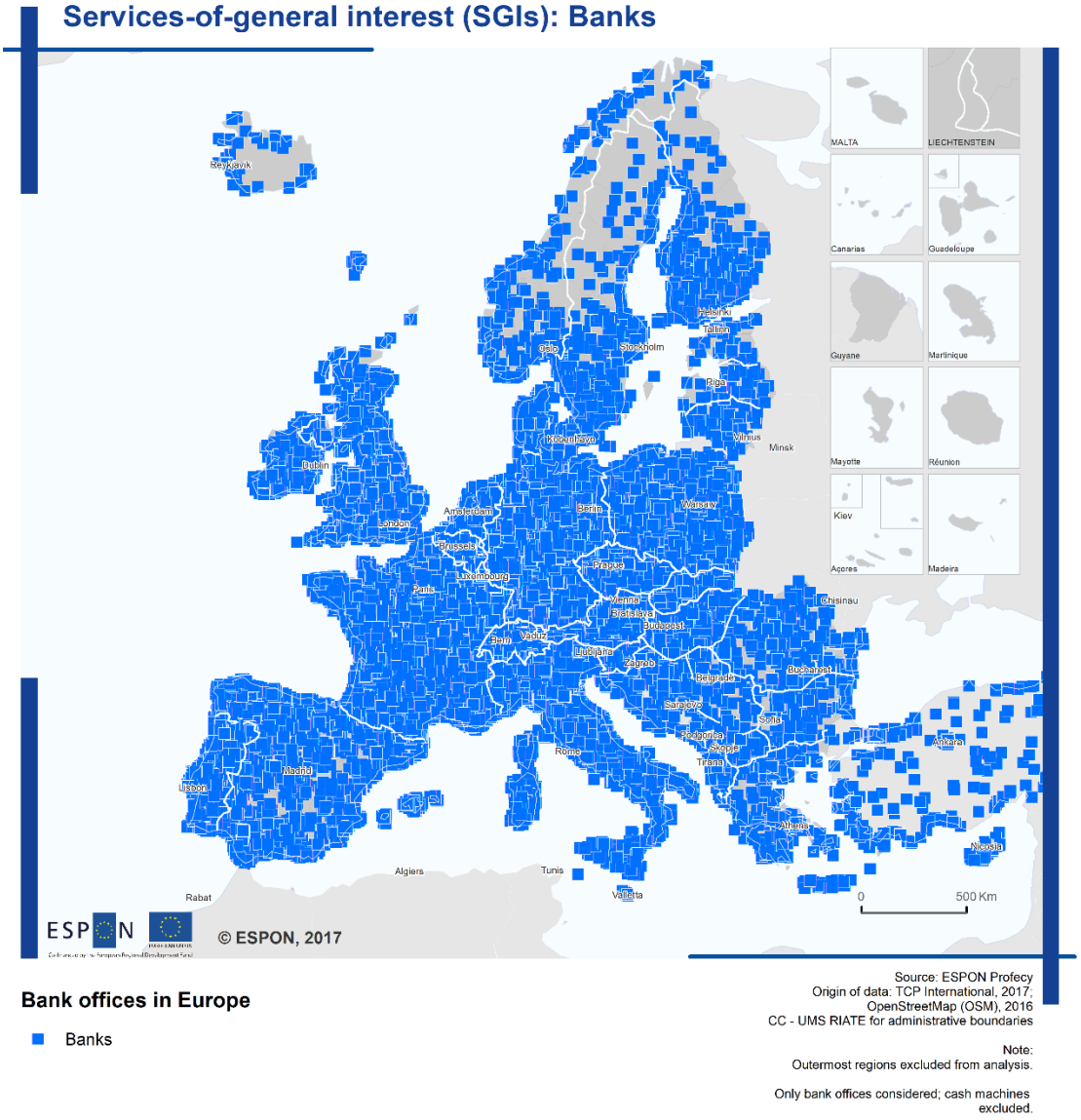
Level: NUTS-3 (2013)
Source: ESPON Profecy
Origin of data: TCP International, 2017; own calculation based upon OpenStreetMap (OSM), 2016
CC - UMS RIATE and RRG for administrative boundaries

Note:
Outermost regions excluded from analysis.

Map 1.44: Density of convenient stores per inhabitant.



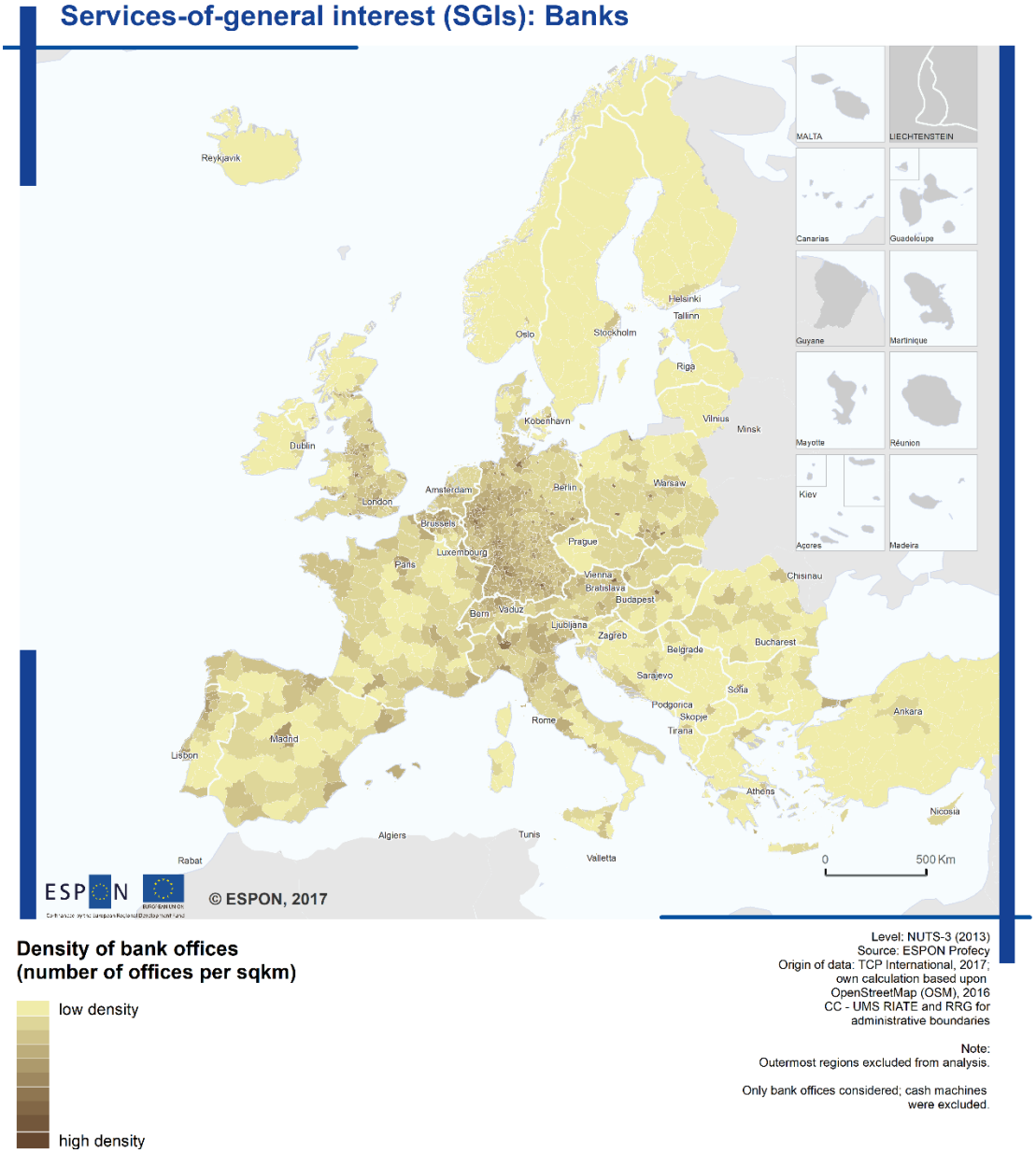
Map 1.45: Bank offices in Europe.



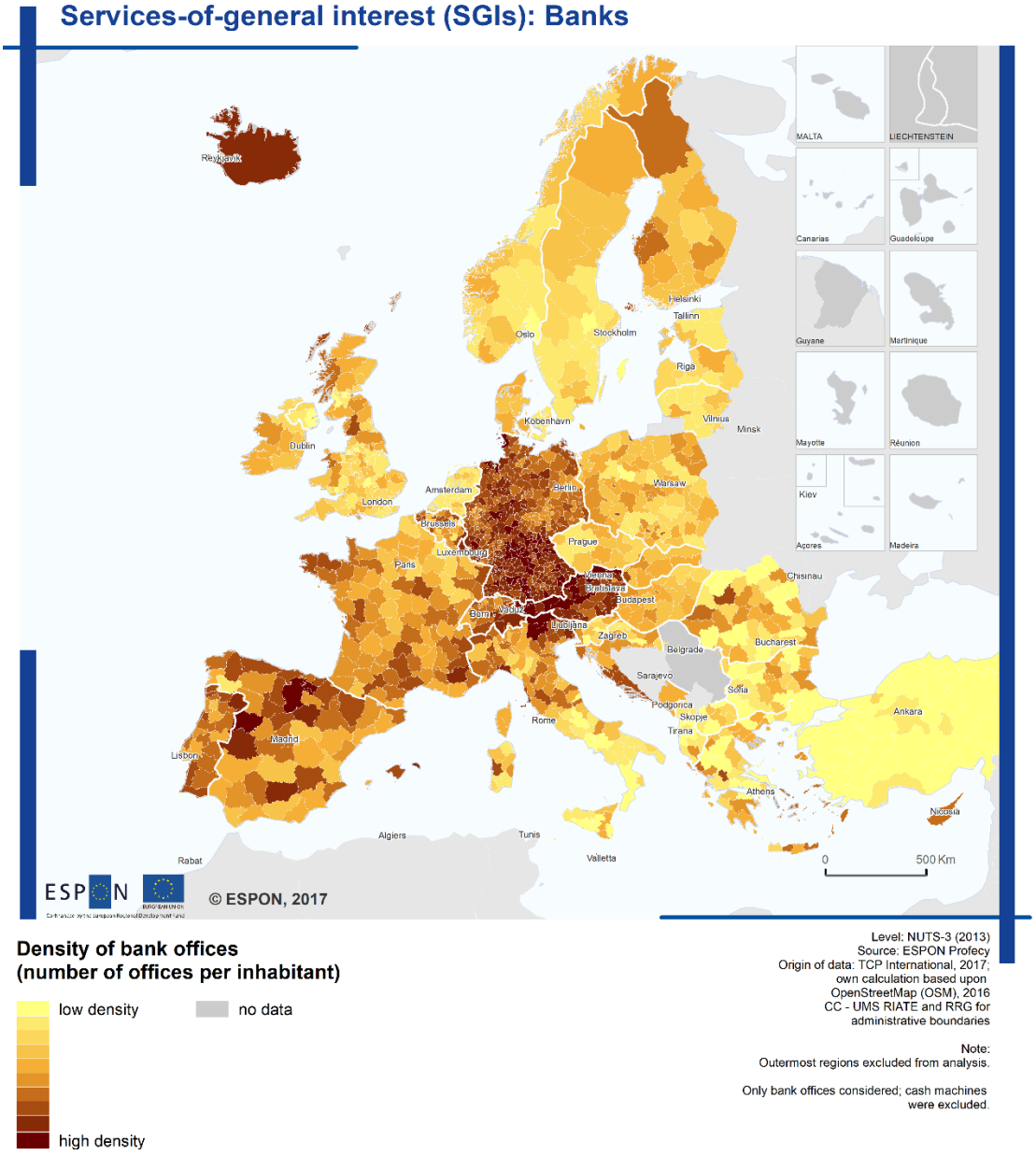
Bank offices and cash machines:

The compiled dataset covers bank offices only; locations of cash machines were excluded.

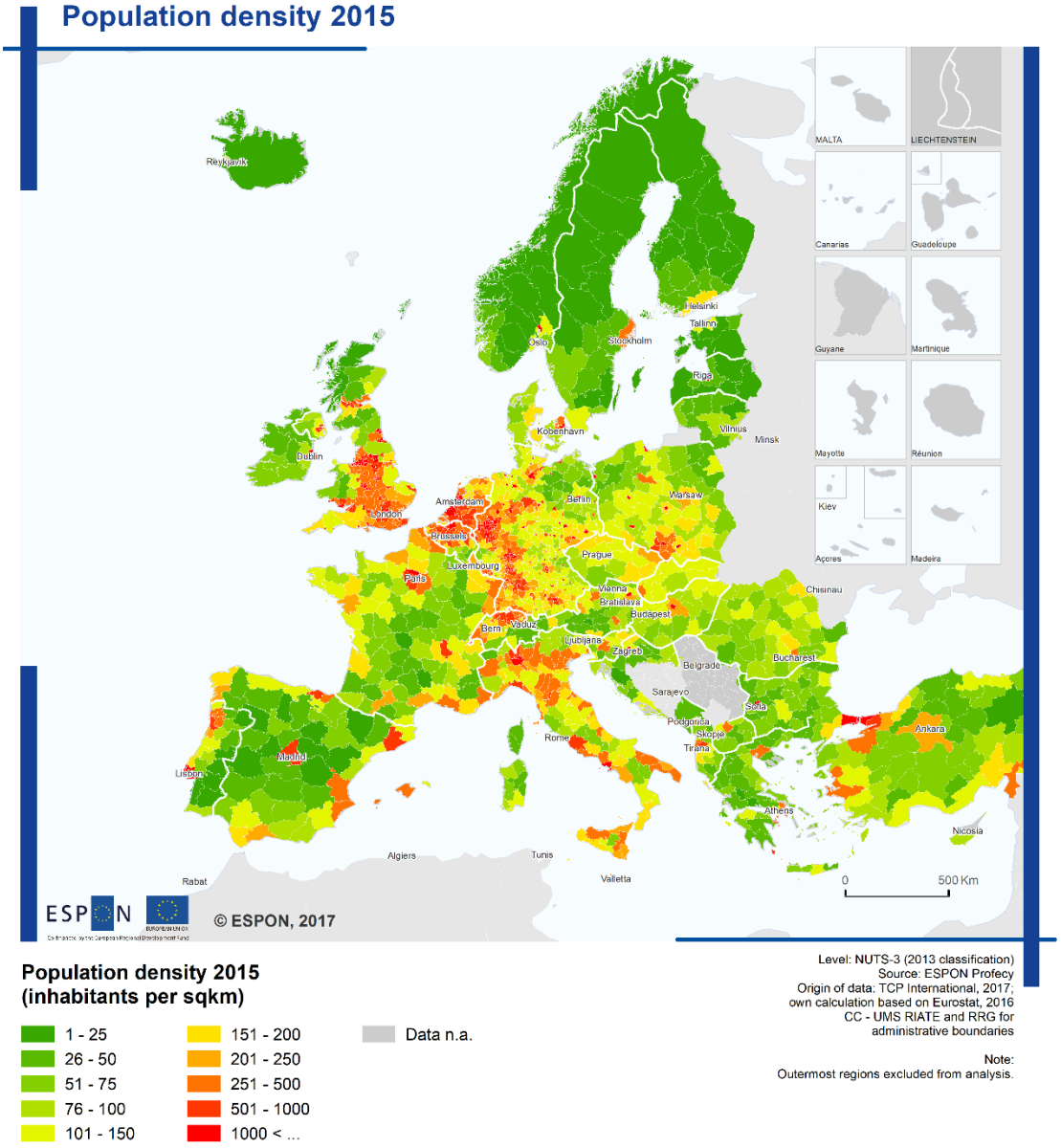
Map 1.46: Density of bank offices per sqkm.



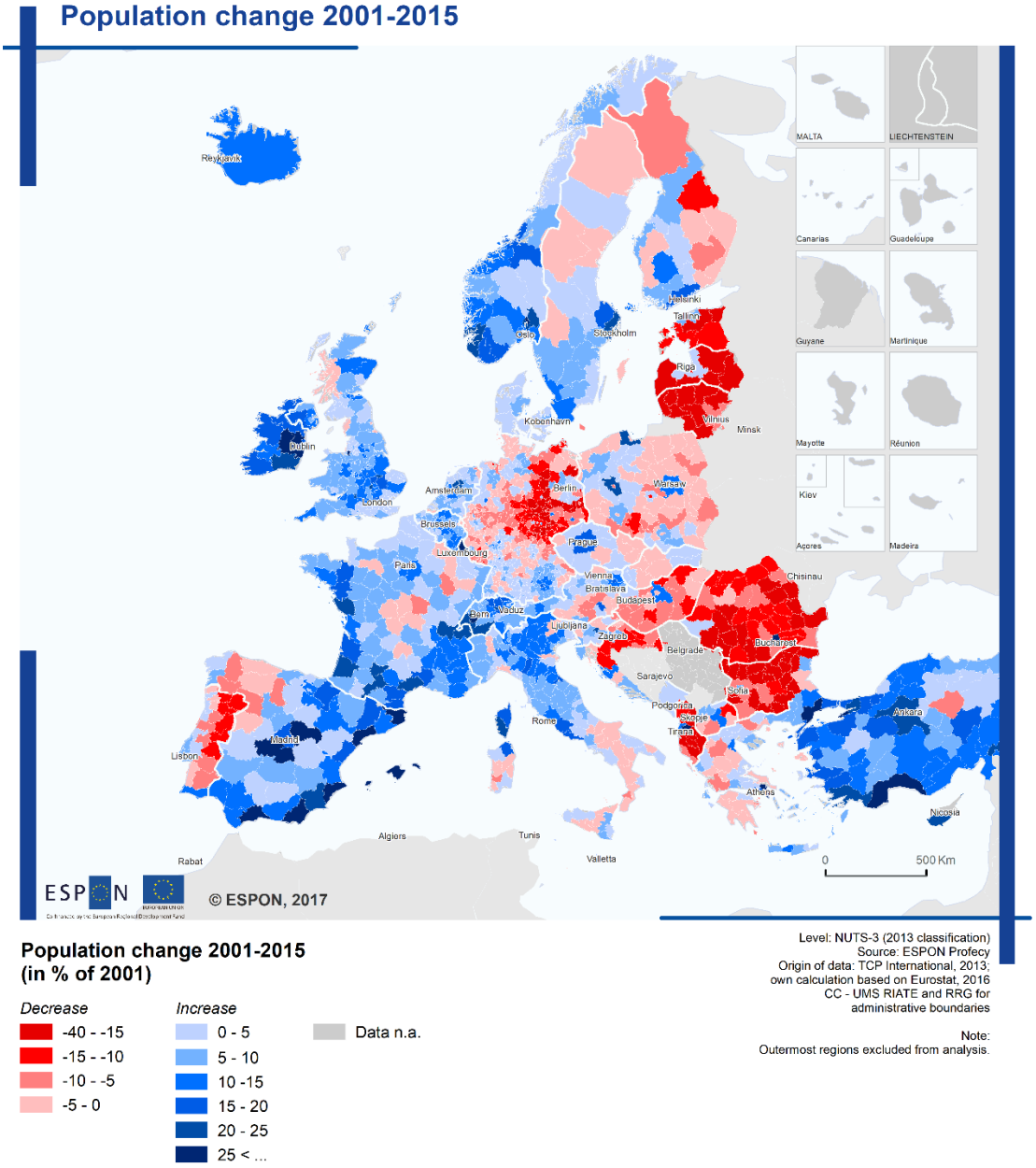
Map 1.47: Density of bank offices per inhabitant.



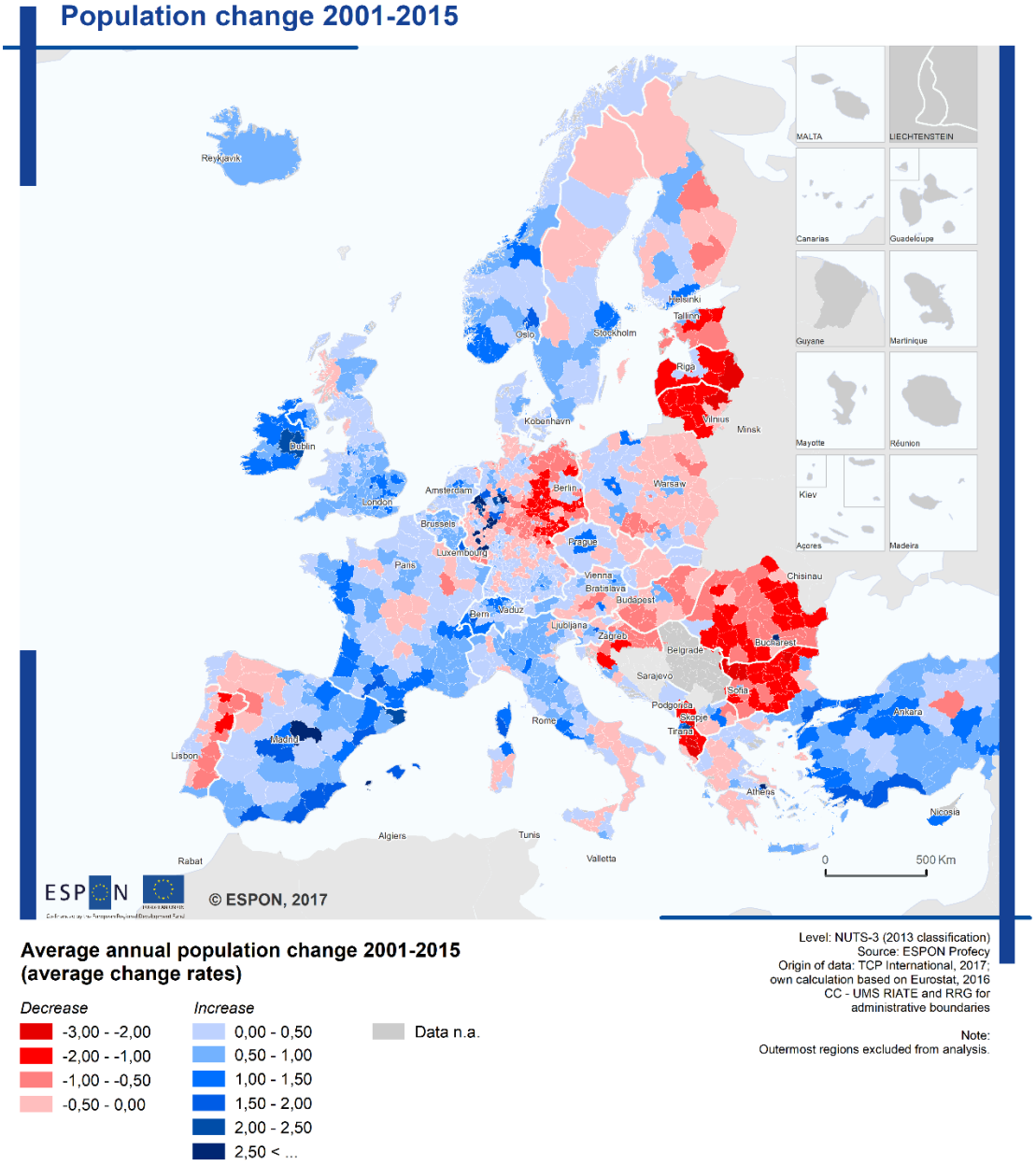
Map 1.48: Population density 2015 (NUTS-3).



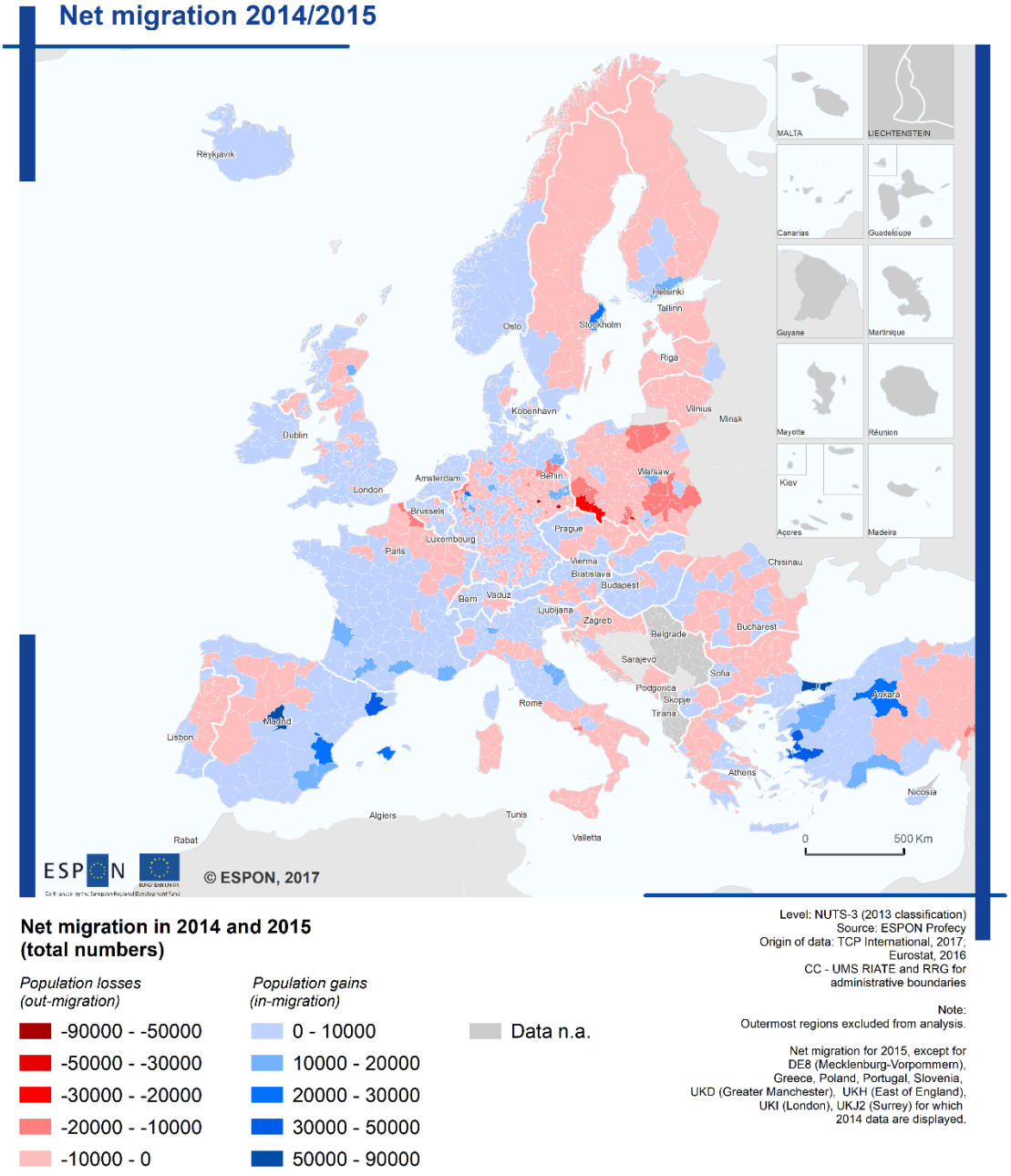
Map 1.49: Population change 2001-2015.



Map 1.50: Average annual population change, 2001-2015 (average annual change rates).



Map 1.51: Net migration 2014/2015.



Net migration in 2014 and 2015 (total numbers)

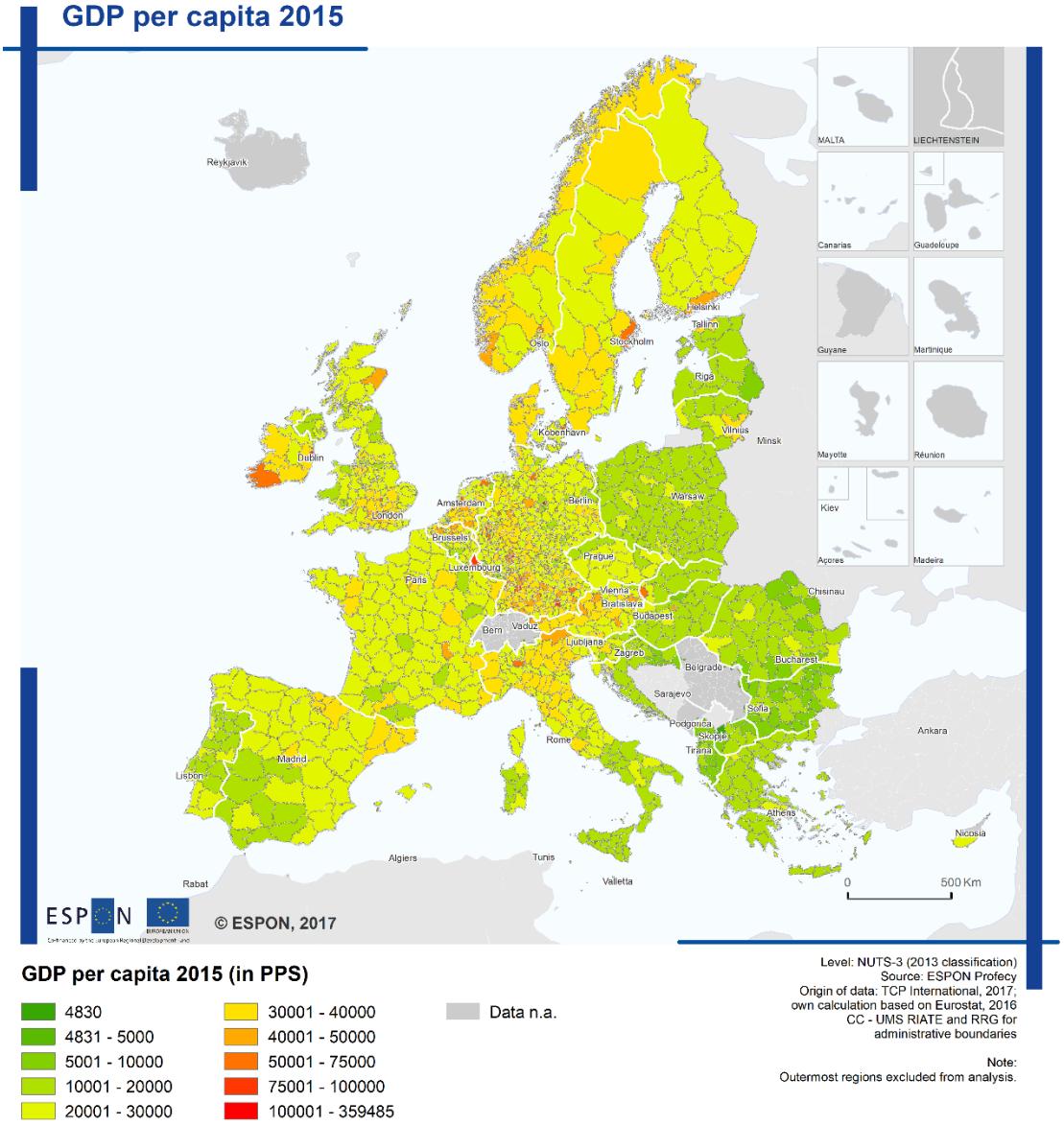
Population losses (out-migration)	*Population gains (in-migration)*	
-90000 - -50000	0 - 10000	Data n.a.
-50000 - -30000	10000 - 20000	
-30000 - -20000	20000 - 30000	
-20000 - -10000	30000 - 50000	
-10000 - 0	50000 - 90000	

Level: NUTS-3 (2013 classification)
Source: ESPON Profecy
Origin of data: TCP International, 2017; Eurostat, 2016
CC - UMS RIATE and RRG for administrative boundaries

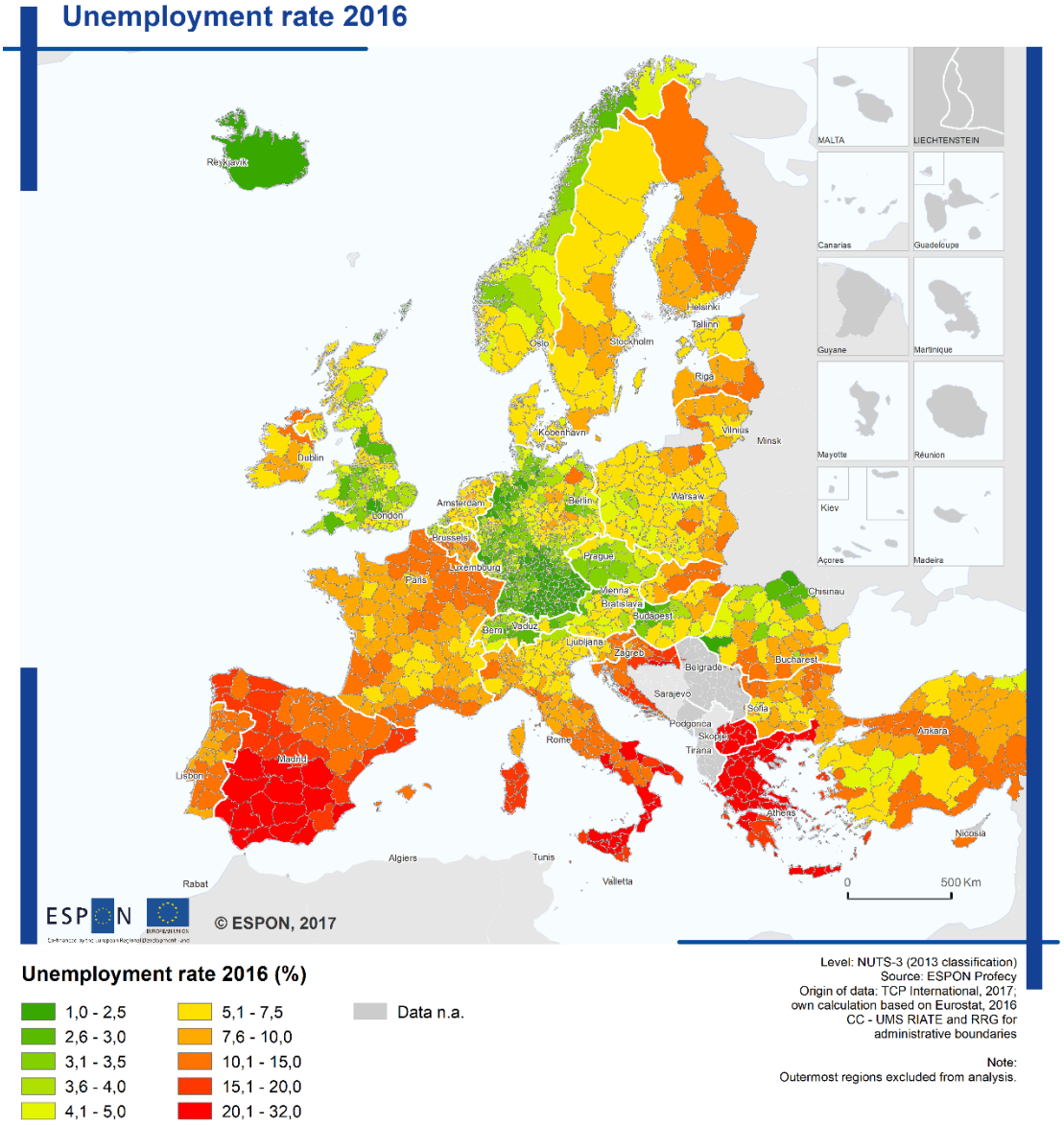
Note:
Outermost regions excluded from analysis.

Net migration for 2015, except for DE8 (Mecklenburg-Vorpommern), Greece, Poland, Portugal, Slovenia, UKD (Greater Manchester), UKH (East of England), UKI (London), UKJ2 (Surrey) for which 2014 data are displayed.

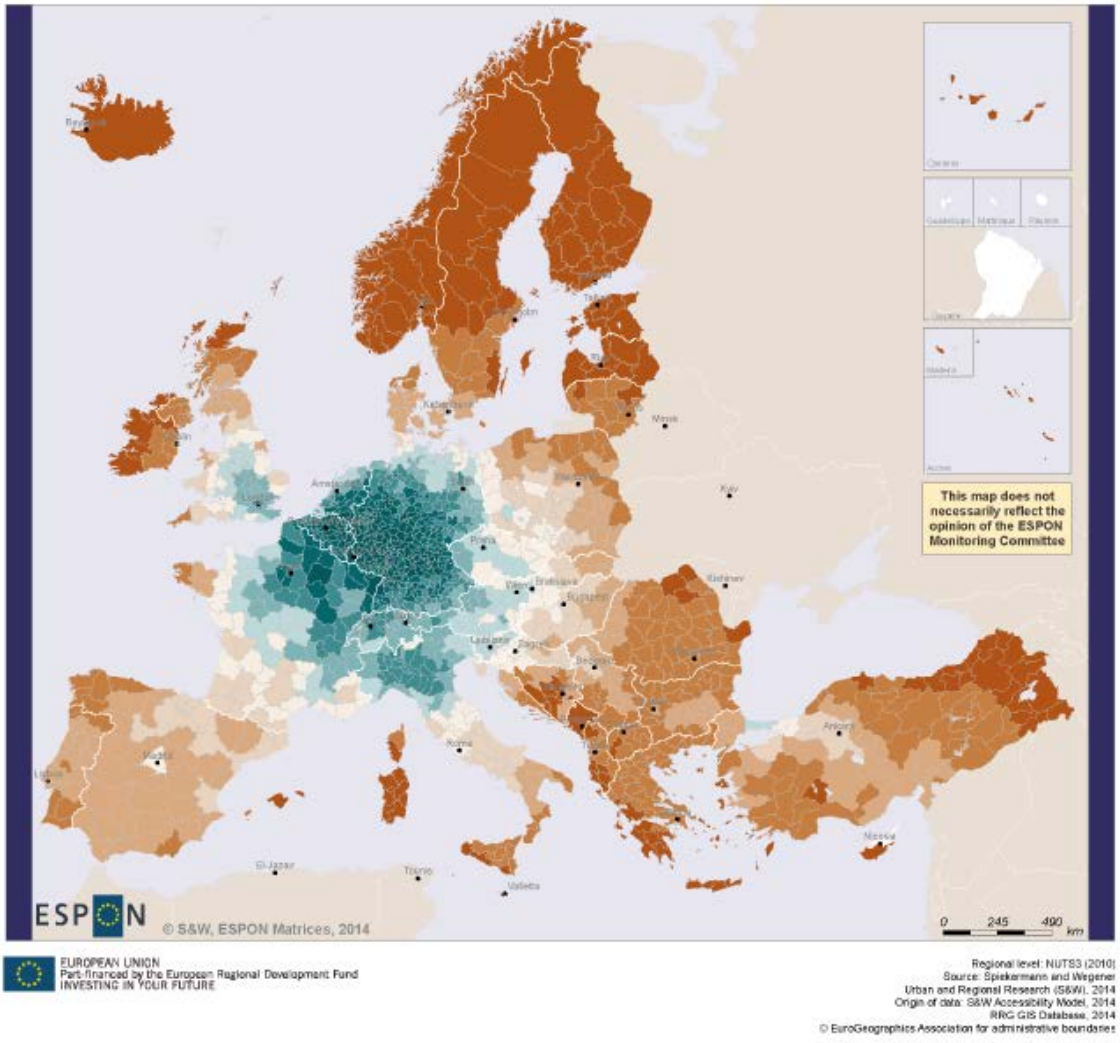
Map 1.52: GDP per capita 2015.



Map 1.53: Unemployment rate 2016.



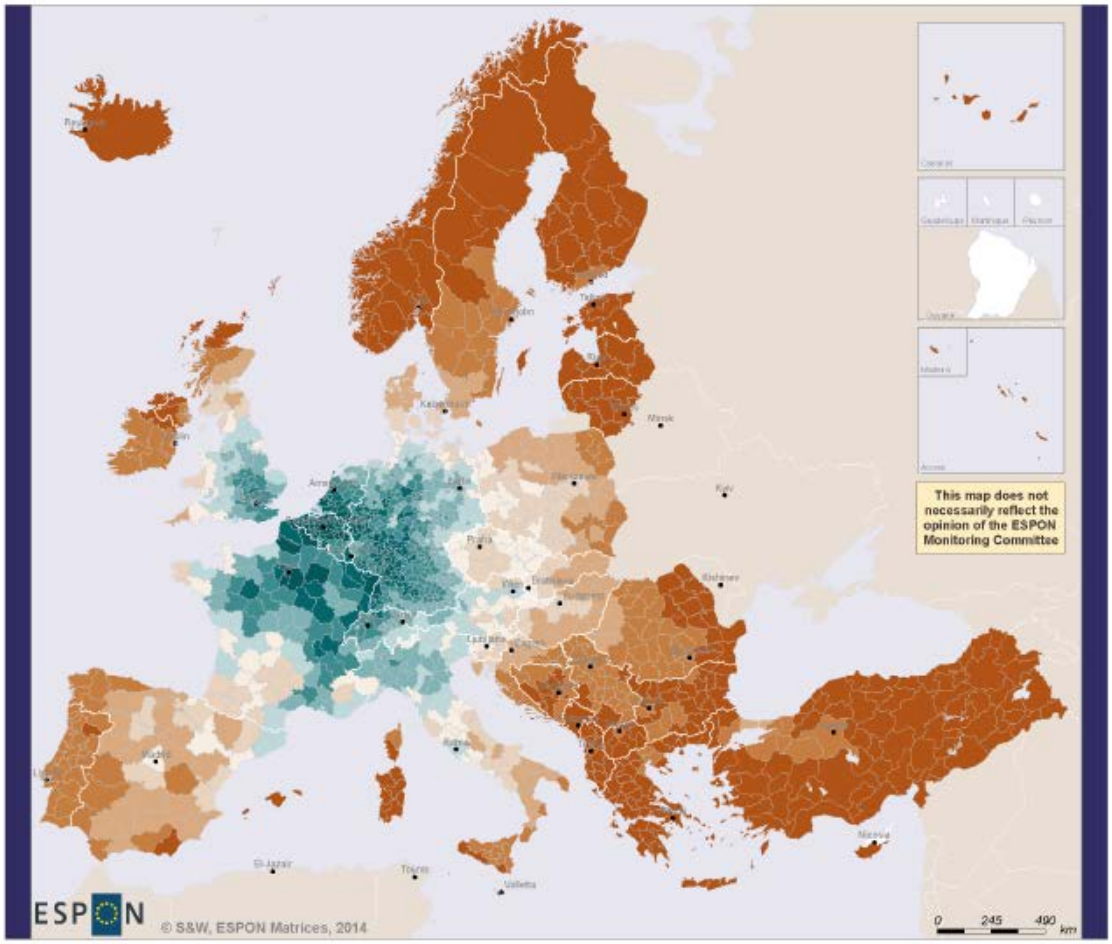
Map 1.54: Accessibility potential road, 2014 (ESPON Matrices).



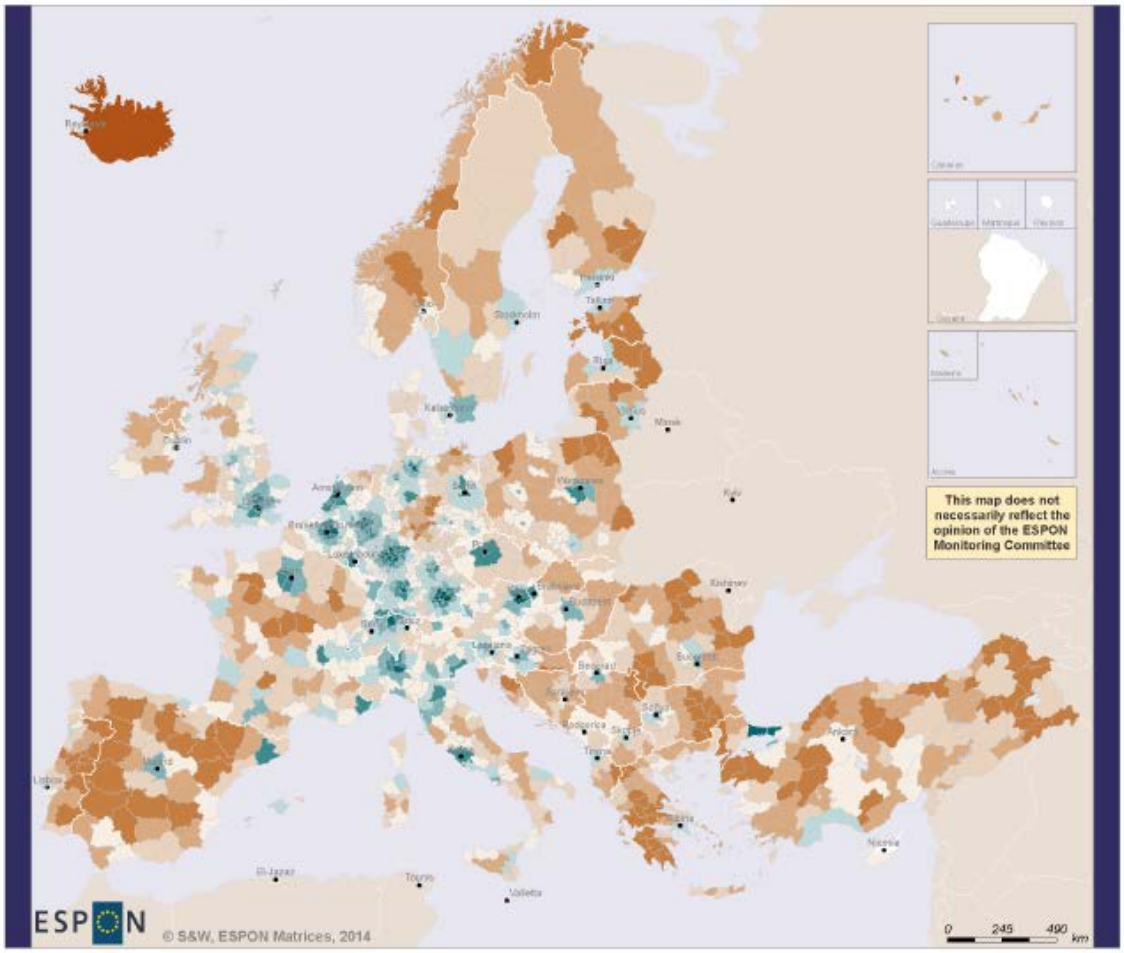
Potential accesibility indicators:

Although the maps in the map gallery show the standardized potential accessibility indices, we use the unstandardized raw indicator numbers for the delineation of inner peripheries in Delineation 2, since we need to re-standardize the numbers to the average of the NUTS-3 region neighbours.

Map 1.55: Accessibility potential rail, 2014 (ESPON Matrices).



Map 1.56: Accessibility potential air, 2014 (ESPON Matrices).



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Regional level: NUTS3 (2010)
Source: Spiekermann and Wegener Urban and Regional Research (S&W), 2014
Origin of data: S&W Accessibility Model, 2014
RRG GIS Database, 2014
S&W Flight Network Database, 2014
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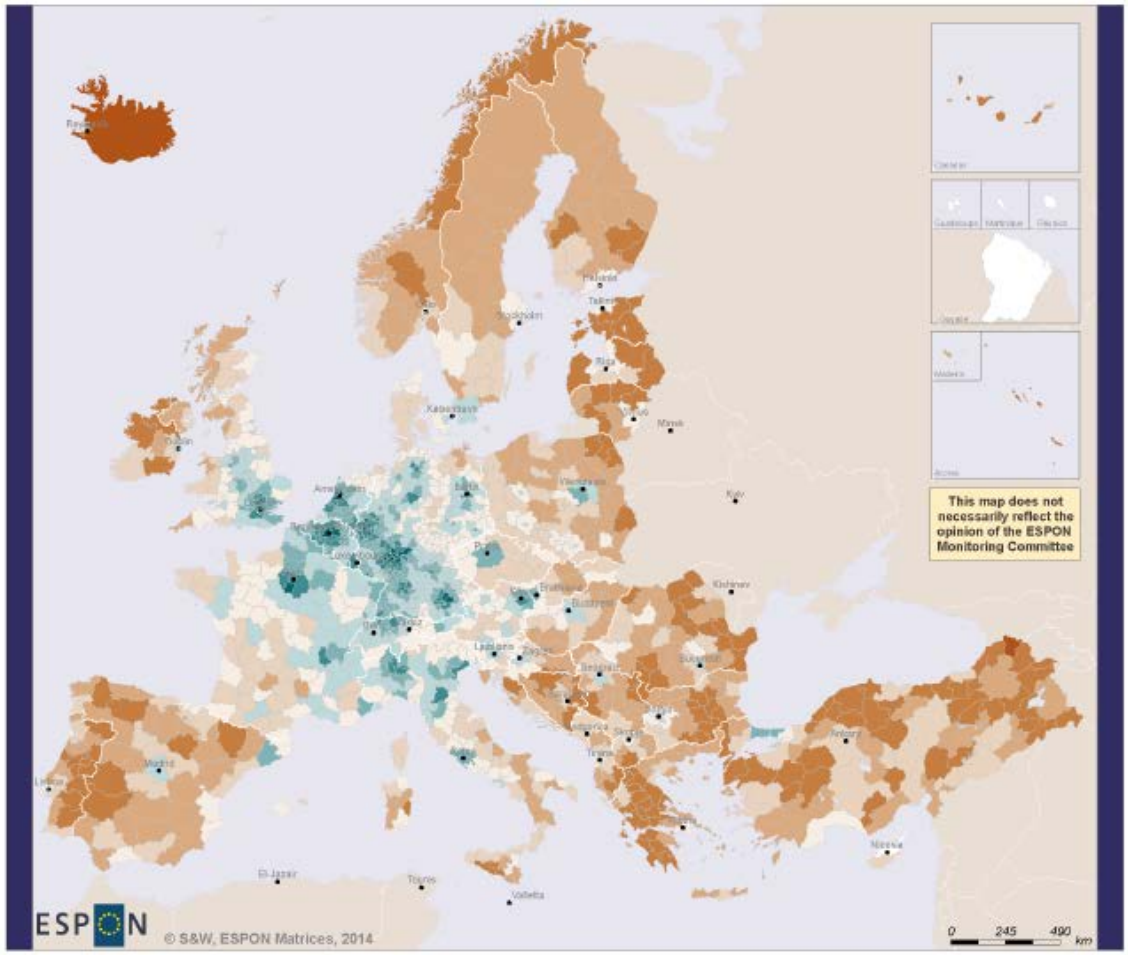
Accessibility potential, air (ESPON = 100)

2014

0 - 20	100 - 120
20 - 40	120 - 140
40 - 60	140 - 160
60 - 80	160 - 180
80 - 100	180 - ...
	no data

Map 1.57: Accessibility potential multimodal, 2014 (ESPON Matrices).



ESPON 2020 – More information

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