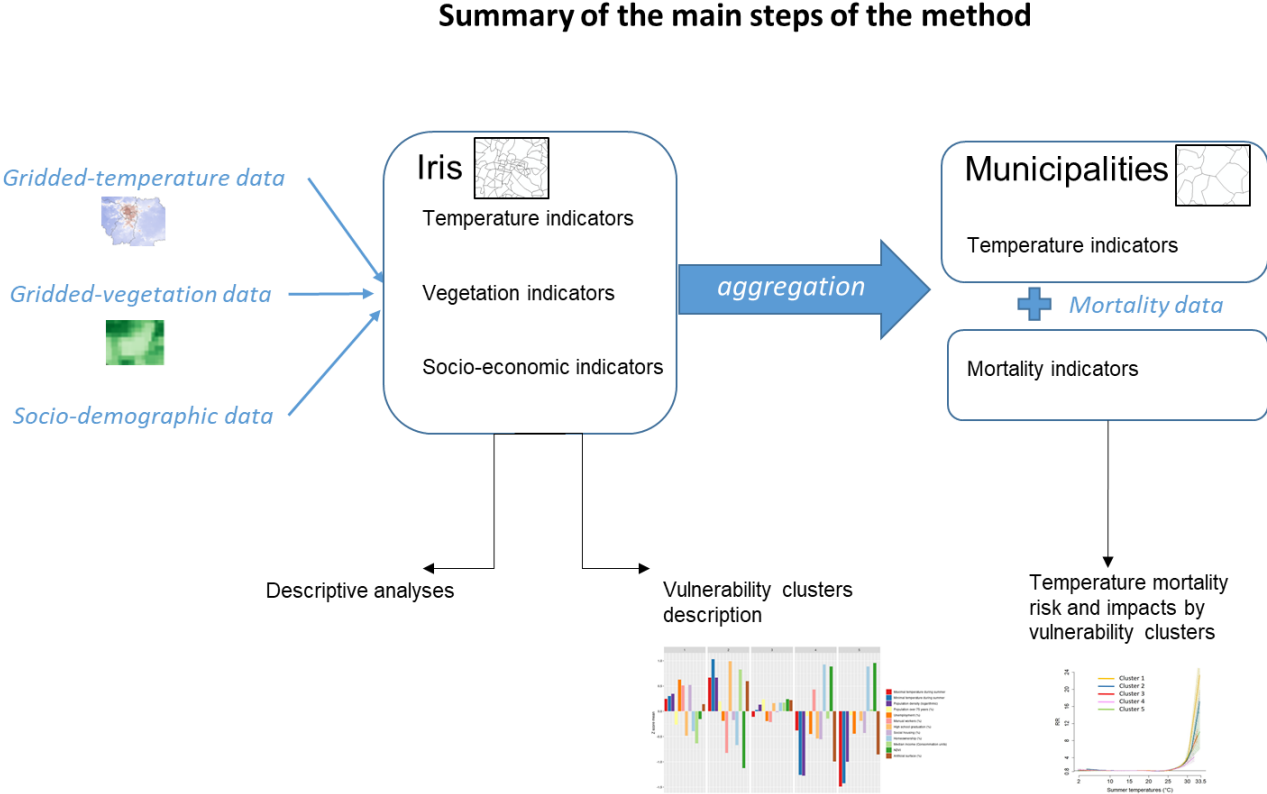


Supplementary materiel

Figure 1 – Summary of the main steps of the method



**Table 1: Reference years and data sources by period**

Variable	Period				Description	Source
	2000-2004	2005-2009	2010-2014	2015-2020		
<b>Population</b>	2006	2008	2013	2018		INSEE
<b>Social housing</b>	2006	2008	2013	2019	Number of rented social housing units / total number of main dwellings	INSEE
<b>Homeownership</b>	2006	2008	2013	2019	Number of owned primary residences / total number of primary residences	INSEE
<b>Population density</b>	2003	2008	2013	2018	Logarithm of population divided by IRIS surface	INSEE
<b>Artificial surface density</b>	2000	2006	2012	2018	Calculated using CORINE land cover data	SANTÉ PUBLIQUE FRANCE
<b>Minimum temperature during summer (T°C)</b>	2000-2005	2005-2010	2010-2015	2015-2020	Modeled average minimum temperatures from April to September	CNRM
<b>Maximum temperature during summer (T°C)</b>	2000-2005	2005-2010	2010-2015	2015-2020	Modeled average maximum temperatures from April to September	CNRM
<b>FDEP</b>	2006	2008	2013	2017	INSERM method based on unemployment rate, median income, high school graduation and laborer rate	INSEE
<b>NDVI</b>	2000-2005	2005-2010	2010-2015	2015-2019	NDVI at IRIS calculated from summer mean NDVI rasters at 30 m resolution	INSERM
<b>Unemployment</b>	2006	2008	2013	2017	Number of unemployed 15-64 / Population 15-64 years	INSEE
<b>High school graduation</b>	2006	2008	2013	2017	Number of over 15-year-olds out of school with at least a high school diploma/total number of over	INSEE

					15-year-olds out of school	
<b>Manual workers</b>	2006	2008	2013	2017	Number of laborers aged 15-64 years (number of working population aged 15-64years)	INSEE
<b>Median income</b>	2006	2008	2013	2018	Median household income per consumption unit	INSEE

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**Table 1: Average values for each indicator per cluster over time (min: max)**

Cluster	Variable	2004 - 2005	2005 - 2009	2010 - 2014	2015-2020
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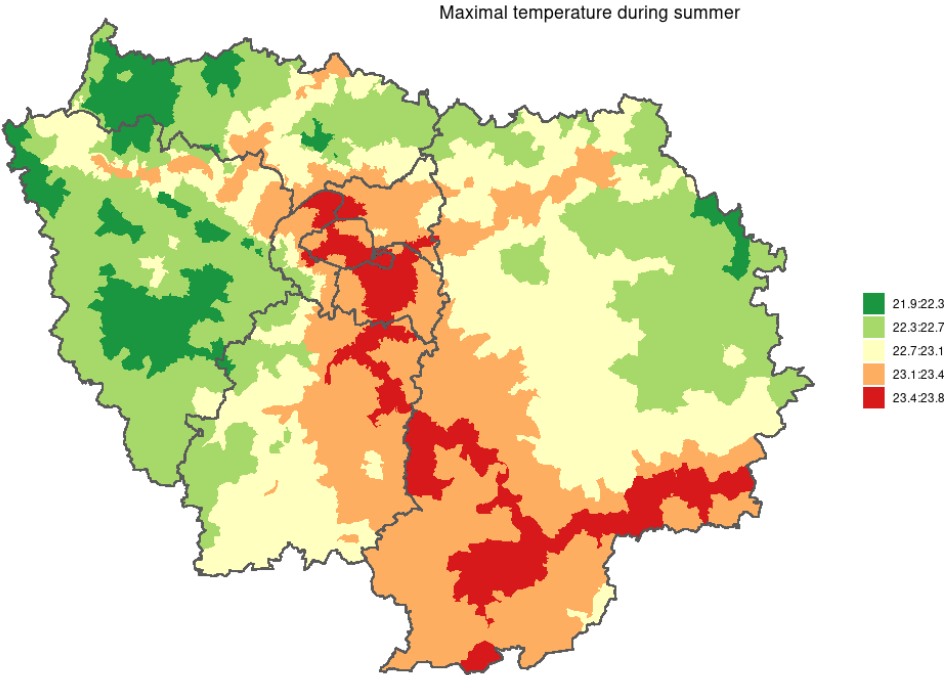
1	Social housing (%)	33 (0:97)	32 (0:97)	33 (0:99)	32 (0:98)
	Logarithm of the population density	8.9 (0:11.7)	8.9 (-0.6:11.8)	9 (0:11.8)	9 (-0.3:11.8)
	NDVI	0.4 (0.1:0.8)	0.4 (0.1:0.8)	0.4 (0.1:0.9)	0.4 (0.1:0.9)
	Homeownership (%)	37 (0:100)	37 (0:100)	36 (0:100)	35 (0:100)
	Median income (€)	16878.1 (5047:44193)	17939.1 (5576:47644)	19231.9 (6200:48972)	20470.4 (6410:56670)
	Artificial surface (%)	62 (0:100)	62 (0:100)	62 (0:100)	62 (0:100)
	High school graduation (%)	40 (7:85)	42 (6:89)	46 (13:100)	50 (5:95)
	Unemployment (%)	14 (0:67)	14 (0:67)	16 (0:79)	16 (0:70)
	Manual worker (%)	21 (0:67)	21 (0:67)	20 (0:67)	19 (0:86)
	Population over 75 (%)	5 (0:100)	5 (0:25)	6 (0:23)	6 (0:63)
	Maximum temperature during summer (T°C)	22 (21:22.6)	22.3 (21.4:22.8)	21.9 (20.9:22.4)	23.3 (22.2:23.8)
	Minimum temperature during summer (T°C)	12.3 (10.3:13.2)	12.6 (10.4:13.6)	12.2 (10.1:13.2)	12.7 (10.4:13.9)
2	Social housing (%)	14 (0:97)	15 (0:98)	15 (0:96)	15 (0:94)
	Logarithm of the population density	9.7 (0:11.6)	9.7 (0:11.5)	9.7 (0:11.5)	9.7 (0:11.5)
	NDVI	0.2 (0:0.6)	0.2 (0:0.7)	0.3 (0:0.7)	0.3 (0:0.7)
	Homeownership (%)	29 (0:80)	29 (0:82)	29 (0:76)	29 (0:81)
	Median income (€)	25853.3 (7089:55321)	28038.3 (8533:59707)	31179.9 (9856:64490)	34582.6 (10830:73040)

	Artificial surface (%)	81 (0:100)	81 (0:100)	81 (0:100)	81 (0:100)
	High school graduation (%)	66 (14:100)	67 (17:100)	71 (8:100)	74 (9:100)
	Unemployment (%)	11 (0:33)	10 (0:30)	11 (0:44)	11 (0:37)
	Manual worker (%)	8 (0:100)	8 (0:67)	7 (0:35)	7 (0:38)
	Population over 75 (%)	7 (0:50)	7 (0:50)	7 (0:38)	8 (0:53)
	Maximum temperature during summer (T°C)	22.1 (21.3:22.5)	22.4 (21.6:22.7)	22 (21.2:22.3)	23.4 (22.6:23.8)
	Minimum temperature during summer (T°C)	13 (11.3:13.2)	13.2 (11.6:13.6)	12.9 (11.2:13.2)	13.5 (11.6:13.9)
<b>3</b>	Social housing (%)	19 (0:99)	19 (0:98)	19 (0:97)	19 (0:98)
	Logarithm of the population density	8.5 (0:11.1)	8.5 (0:11)	8.5 (-0.4:11.1)	8.5 (-0.5:11)
	NDVI	0.4 (0:0.8)	0.4 (0:0.8)	0.5 (0:0.9)	0.5 (0:0.9)
	Homeownership (%)	50 (0:100)	50 (0:100)	50 (0:100)	49 (0:100)
	Median income (€)	23295.3 (5842:45753)	24757.2 (6455:50528)	26739.8 (6406:57560)	28236.4 (6920:60170)
	Artificial surface (%)	66 (0:100)	65 (0:100)	65 (0:100)	65 (0:100)
	High school graduation (%)	52 (10:88)	54 (11:88)	58 (11:100)	61 (18:100)
	Unemployment (%)	10 (0:33)	9 (0:43)	11 (0:55)	11 (0:50)
	Manual worker (%)	14 (0:66)	13 (0:100)	13 (0:100)	12 (0:50)
	Population over 75 (%)	7 (0:40)	7 (0:40)	7 (0:41)	8 (0:55)

	Maximum temperature during summer (T°C)	21.9 (21:22.6)	22.2 (21.4:22.8)	21.7 (20.9:22.3)	23.1 (22.2:23.8)
	Minimum temperature during summer (T°C)	12 (10:13.2)	12.2 (10.4:13.6)	11.8 (9.9:13.2)	12.4 (10:13.9)
4	Social housing (%)	6 (0:95)	6 (0:93)	6 (0:91)	6 (0:89)
	Logarithm of the population density	5.2 (0:10.9)	5.2 (0.5:10.6)	5.3 (0.4:10.8)	5.3 (0:10.2)
	NDVI	0.5 (0.2:0.8)	0.6 (0.2:0.8)	0.6 (0.3:0.8)	0.6 (0.3:0.8)
	Homeownership (%)	68 (0:96)	68 (0:96)	68 (0:98)	67 (0:97)
	Median income (€)	20820.6 (8191:32312)	22315.7 (9316:34334)	24370.9 (9040:35020)	25195.3 (9670:36760)
	Artificial surface (%)	13 (0:100)	13 (0:100)	13 (0:100)	13 (0:100)
	High school graduation (%)	39 (6:75)	41 (6:78)	46 (7:100)	49 (8:100)
	Unemployment (%)	8 (0:31)	8 (0:31)	9 (0:36)	10 (0:56)
	Manual worker (%)	20 (2:53)	20 (0:52)	19 (0:60)	18 (0:57)
	Population over 75 (%)	5 (0:18)	6 (0:18)	6 (0:18)	6 (0:19)
	Maximum temperature during summer (T°C)	21.8 (21:22.4)	22.1 (21.3:22.7)	21.7 (20.9:22.4)	23 (22.2:23.7)
	Minimum temperature during summer (T°C)	10.7 (10.1:12.5)	10.9 (10.1:12.8)	10.5 (9.7:12.3)	11 (10.3:13.1)
5	Social housing (%)	9 (0:87)	9 (0:88)	9 (0:91)	9 (0:87)

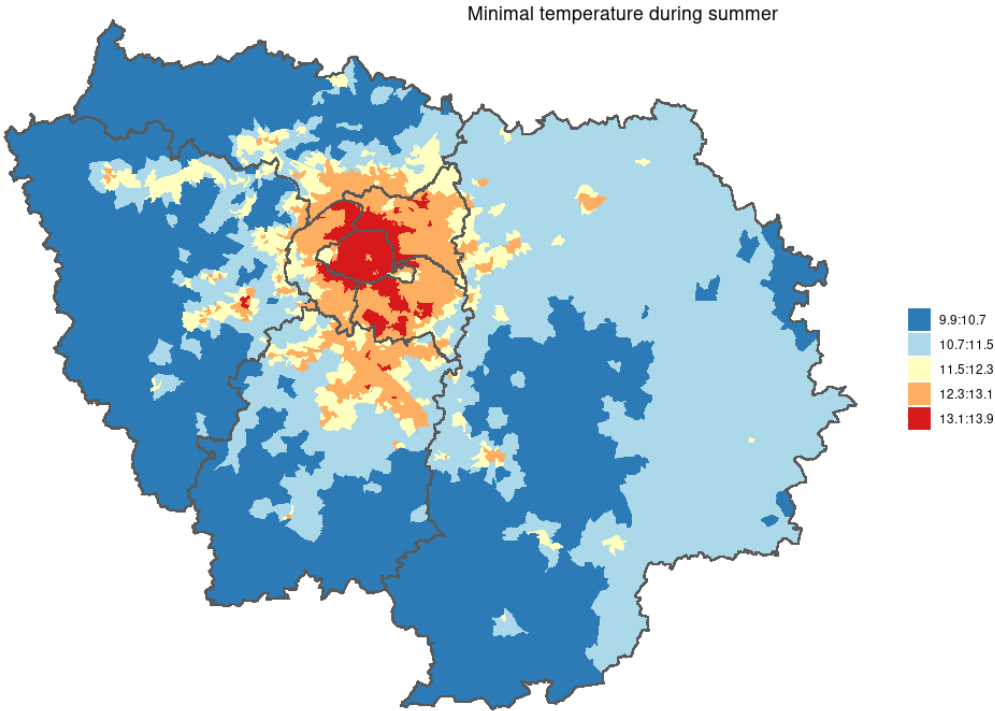
Logarithm of the population density	5.8 (0:10.2)	5.8 (0:10.3)	5.9 (0:10.4)	5.9 (1.1:10.5)
NDVI	0.5 (0.3:0.8)	0.6 (0.3:0.8)	0.6 (0.3:0.8)	0.6 (0.3:0.8)
Homeownership (%)	68 (0:95)	68 (0:94)	67 (0:91)	66 (0:91)
Median income (€)	22865.1 (7316:40524)	24516.8 (7738:44221)	26645.6 (8394:44048)	26915.6 (8970:38910)
Artificial surface (%)	19 (0:100)	19 (0:100)	19 (0:100)	19 (0:100)
High school graduation (%)	45 (4:88)	47 (13:89)	51 (5:80)	55 (11:80)
Unemployment (%)	8 (2:33)	8 (2:36)	9 (2:43)	10 (0:32)
Manual worker (%)	17 (2:68)	16 (2:54)	15 (0:44)	14 (0:67)
Population over 75 (%)	5 (0:20)	5 (0:19)	6 (0:14)	7 (0:18)
Maximum temperature during summer (T°C)	21.4 (20.7:22.1)	21.8 (21.1:22.4)	21.4 (20.7:22.1)	22.6 (21.9:23.3)
Minimum temperature during summer (T°C)	10.6 (9.9:12.4)	10.9 (10.1:12.8)	10.5 (9.7:12.4)	10.8 (10:12.7)

**Figure 2 – Maximum temperature during summer for 2015-2020**



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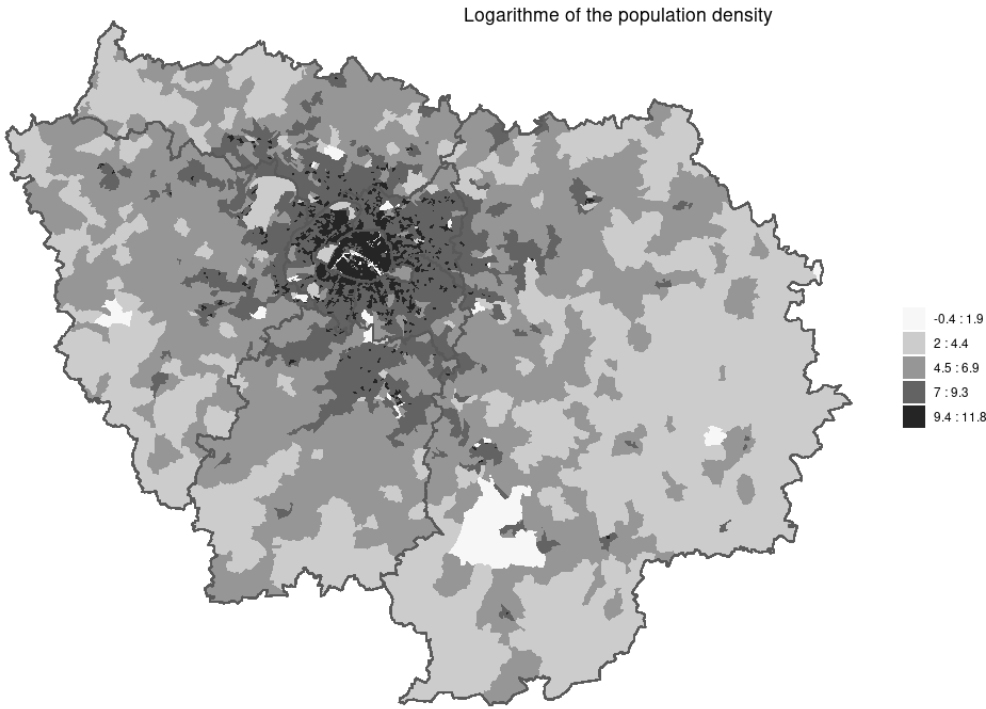
**Figure 3 – Minimum temperature during summer for 2015-2020**



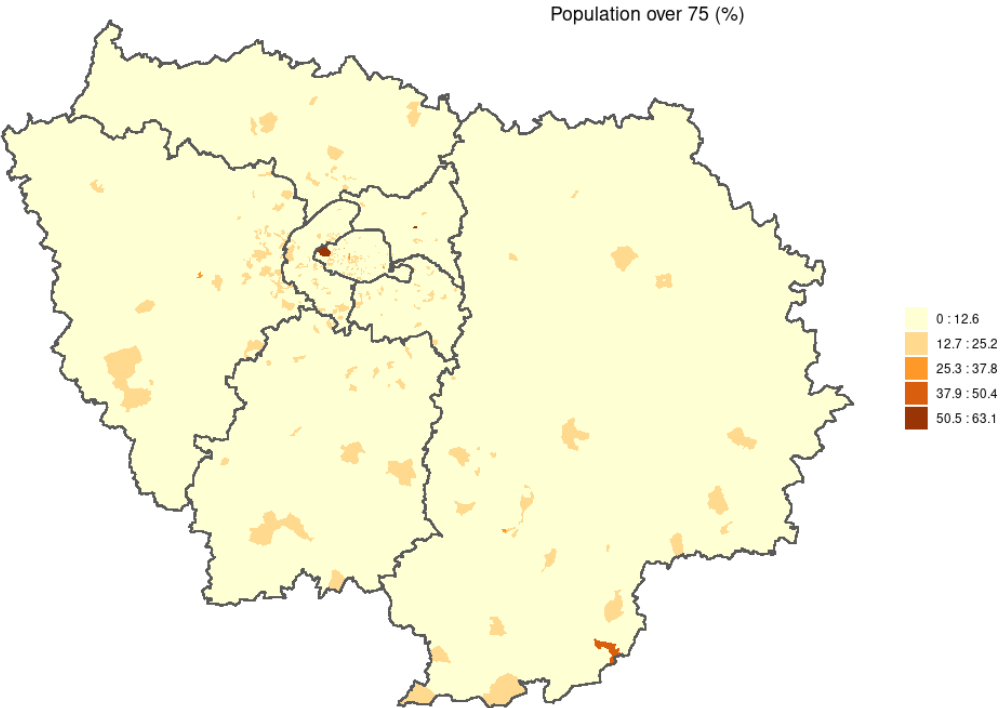
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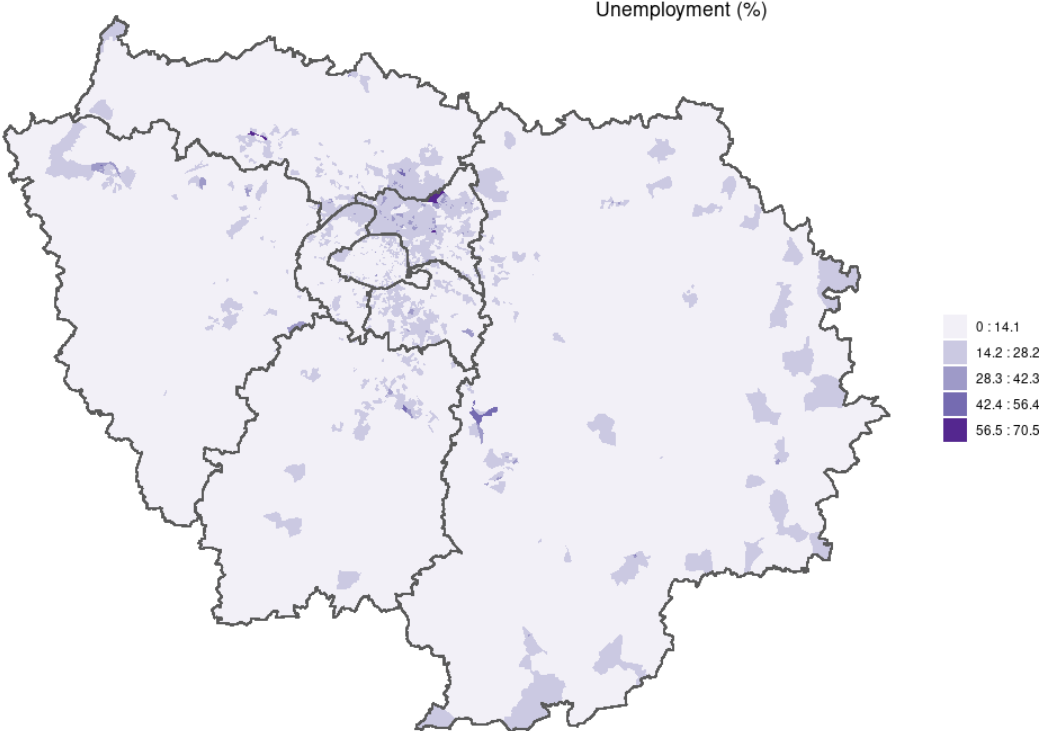
**Figure 4 – Population density**



**Figure 5 – Population over 75 years old (%) for 2015-2020**

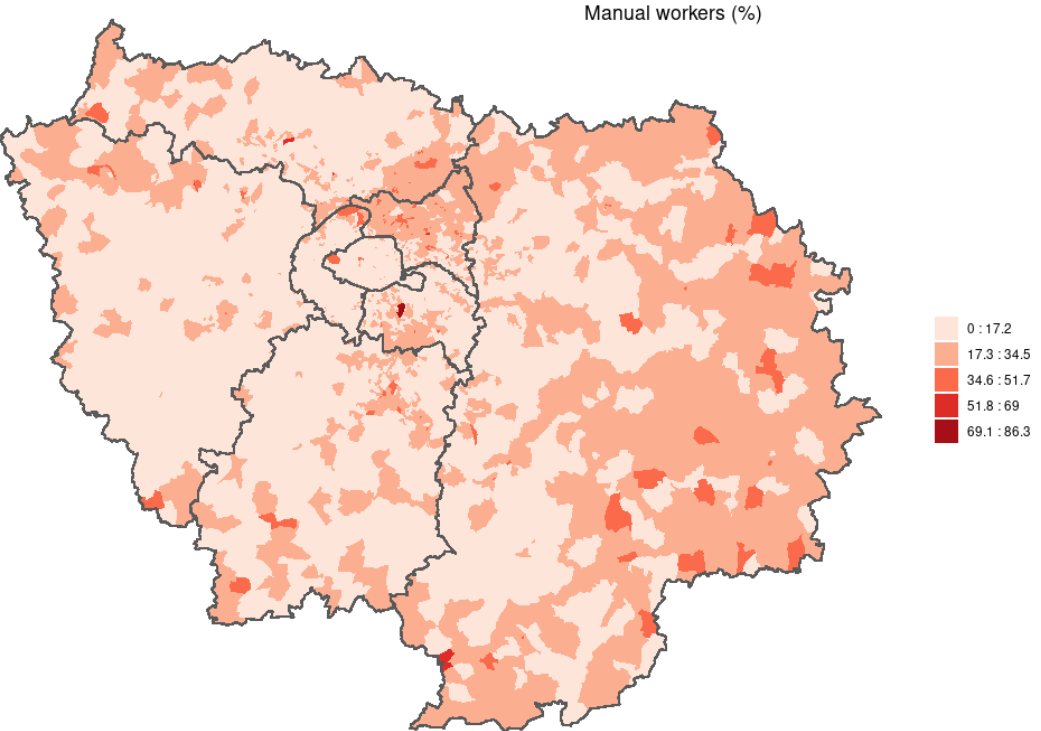


**Figure 6 - Unemployment (%) for 2015-2020**



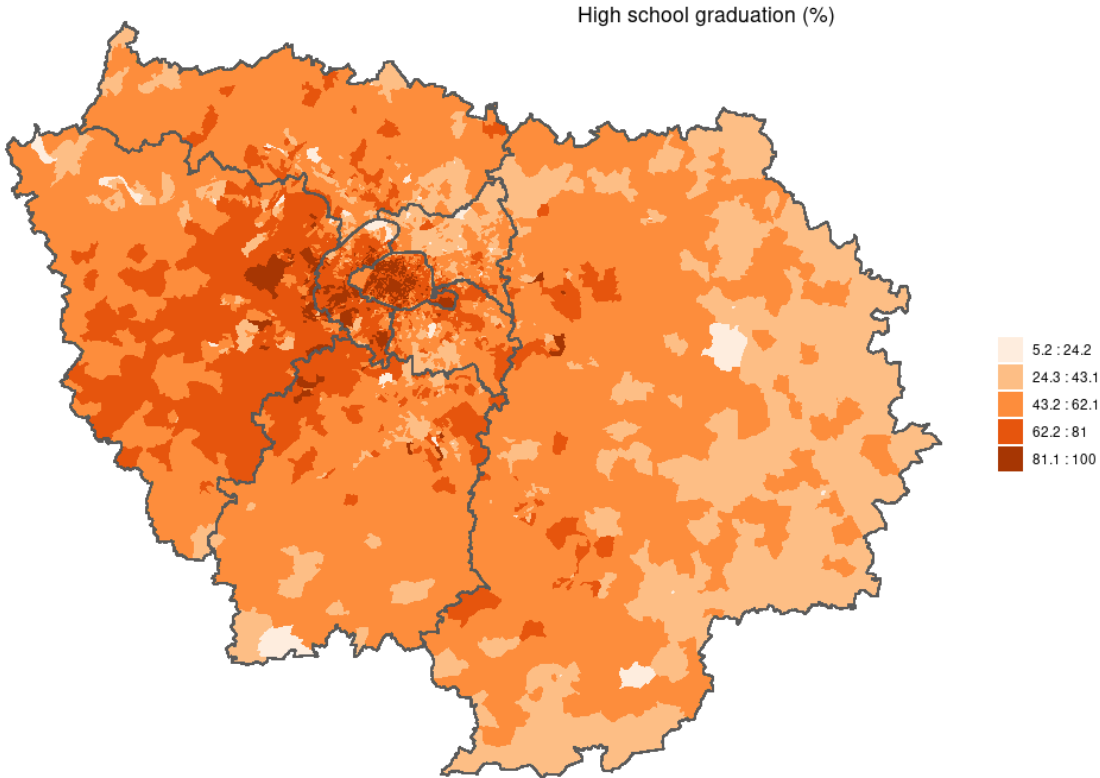
22

**Figure 7 - Manual workers (%) for 2015-2020**



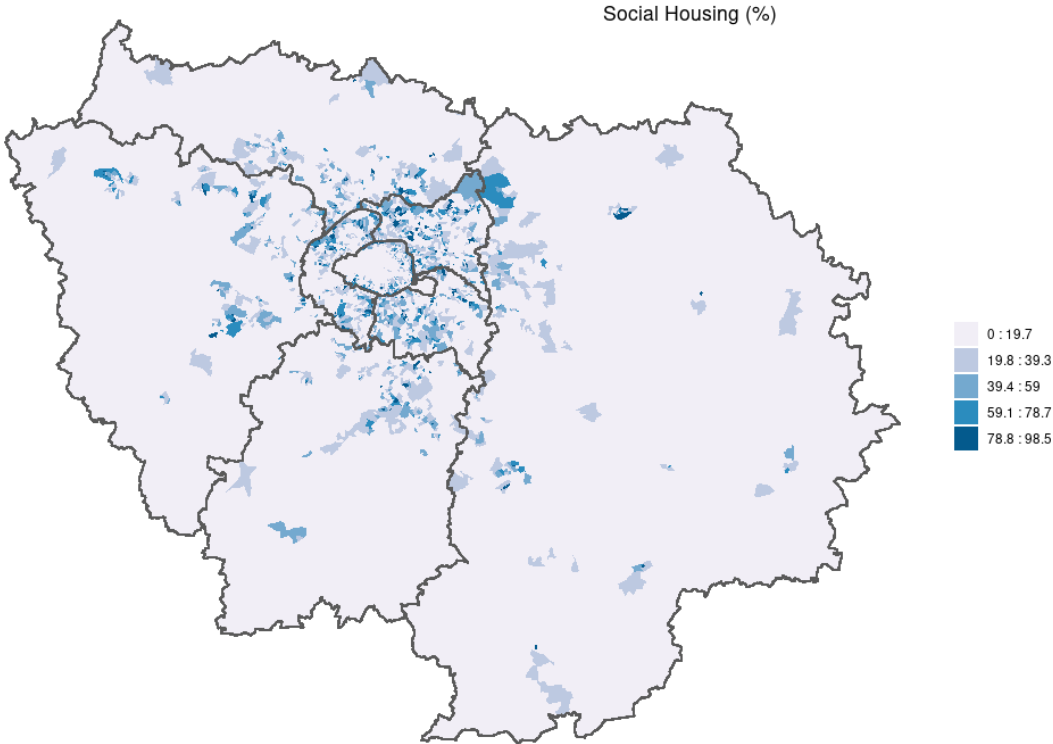
24

**Figure 8 - High school graduation (%) for 2015-2020**



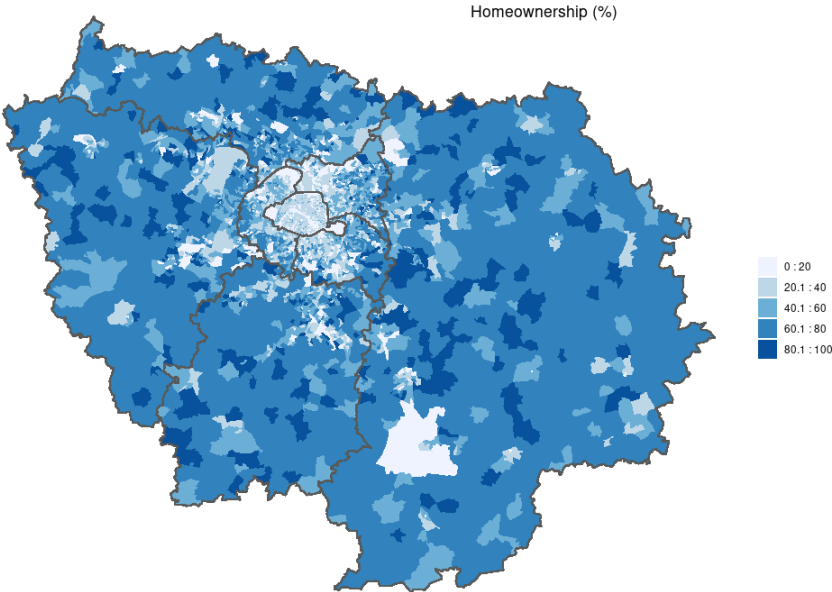
25

**Figure 9 - Social housing (%) for 2015-2020**



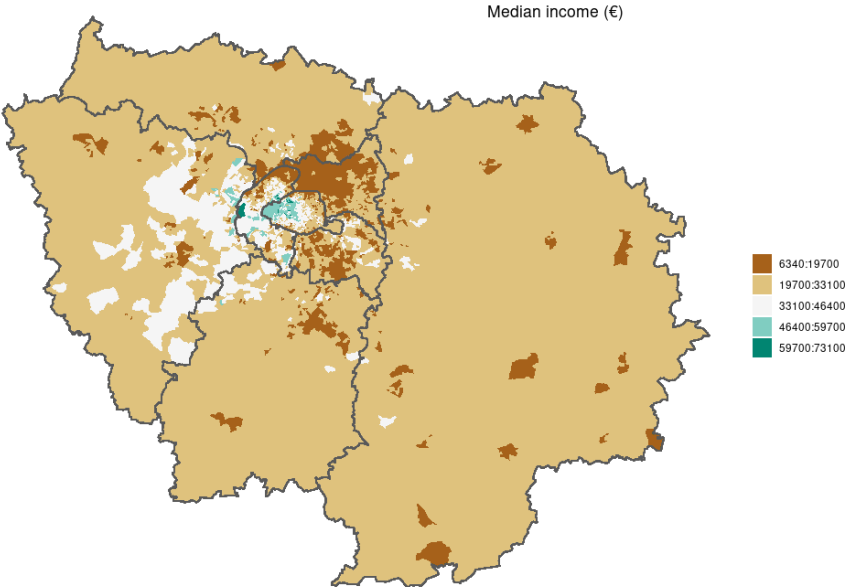
26

**Figure 10 - Homeownership (%) for 2015-2020**



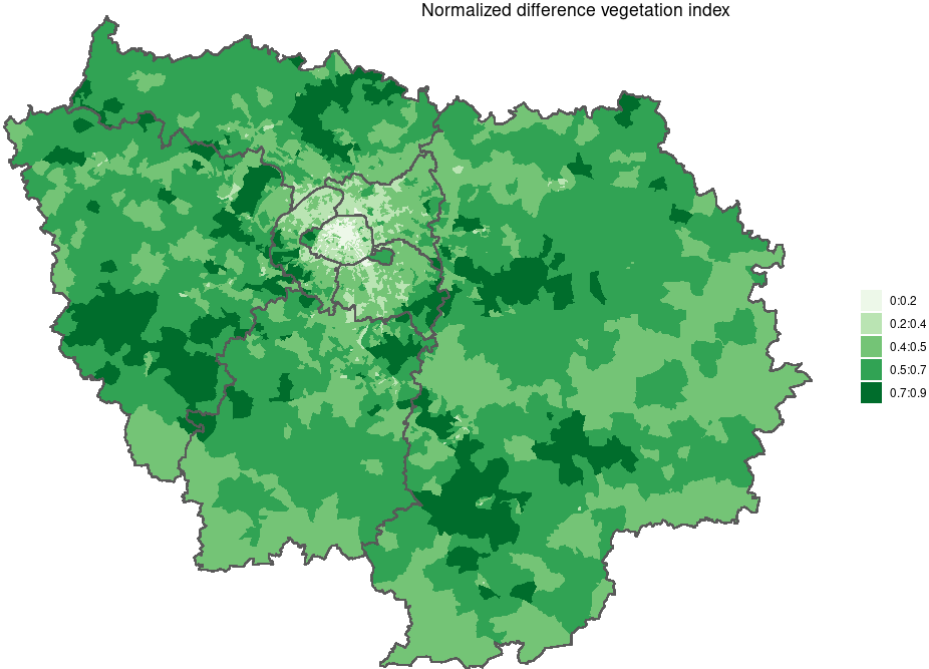
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**Figure 11 - Median income for 2015-2020**



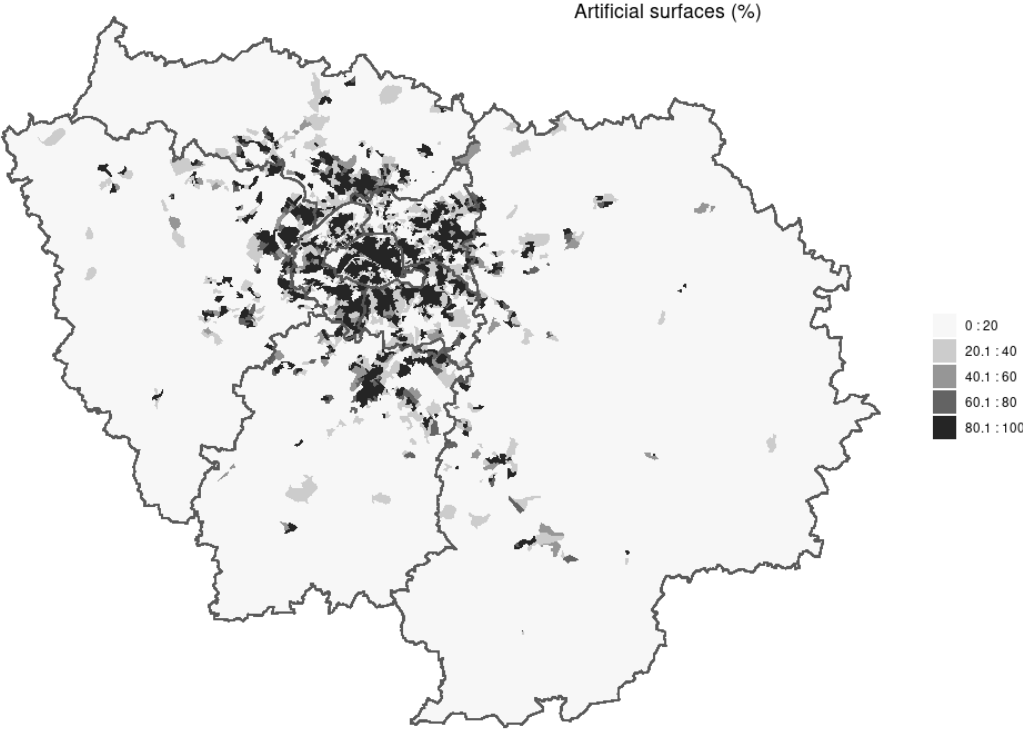
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**Figure 12 - Normalized difference vegetation index for 2015-2020**



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**Figure 13 - Artificial surface (%) for 2015-2020**



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Figure 14 Correlation matrix of all indicators

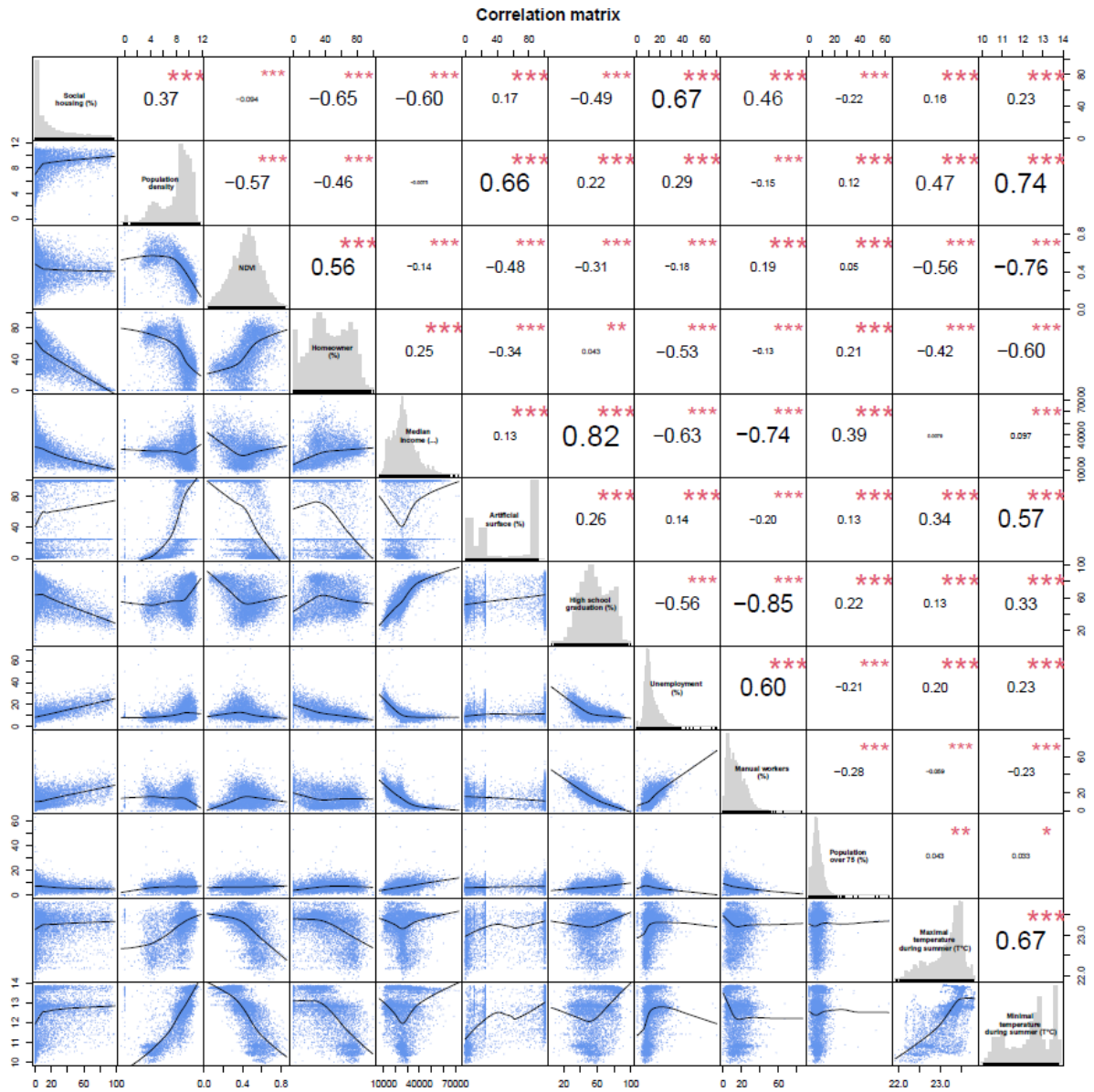
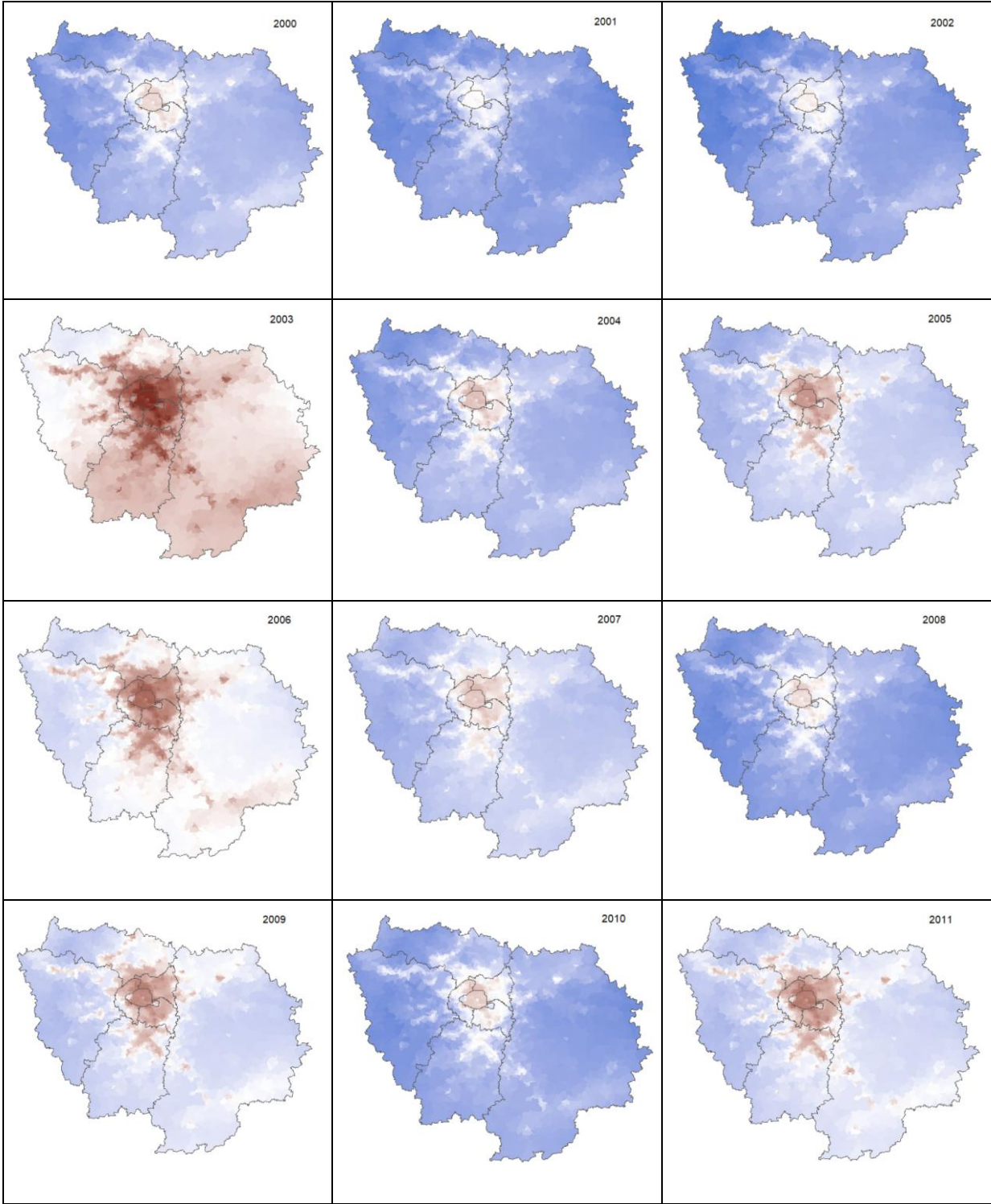
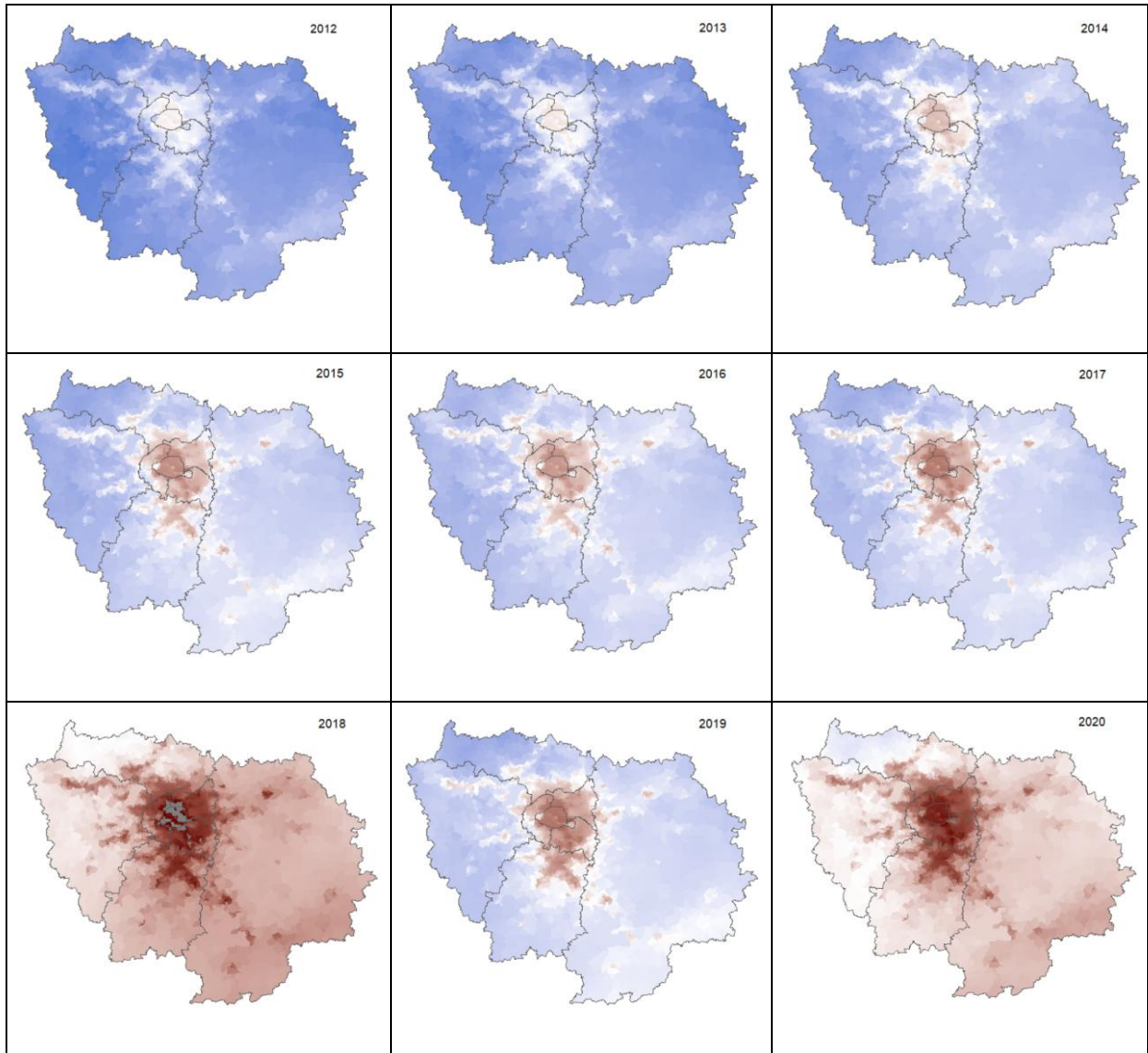


Figure 15 - Maps of the April-September mean temperature per year






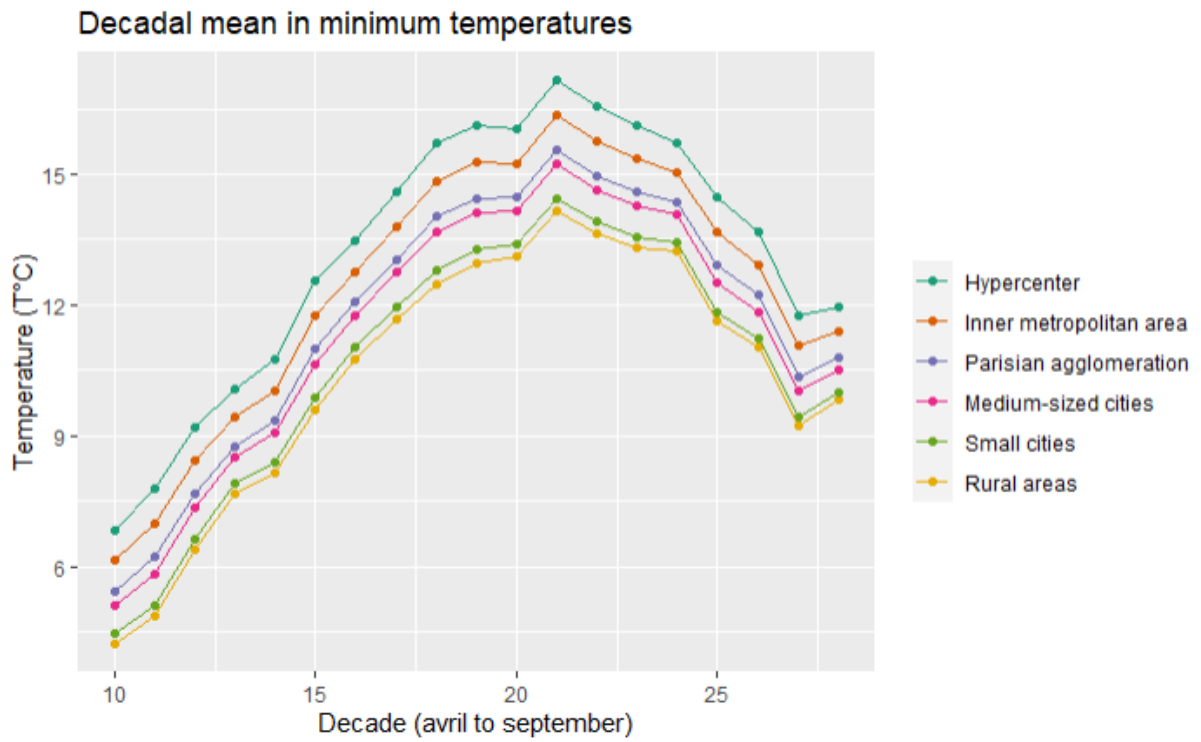
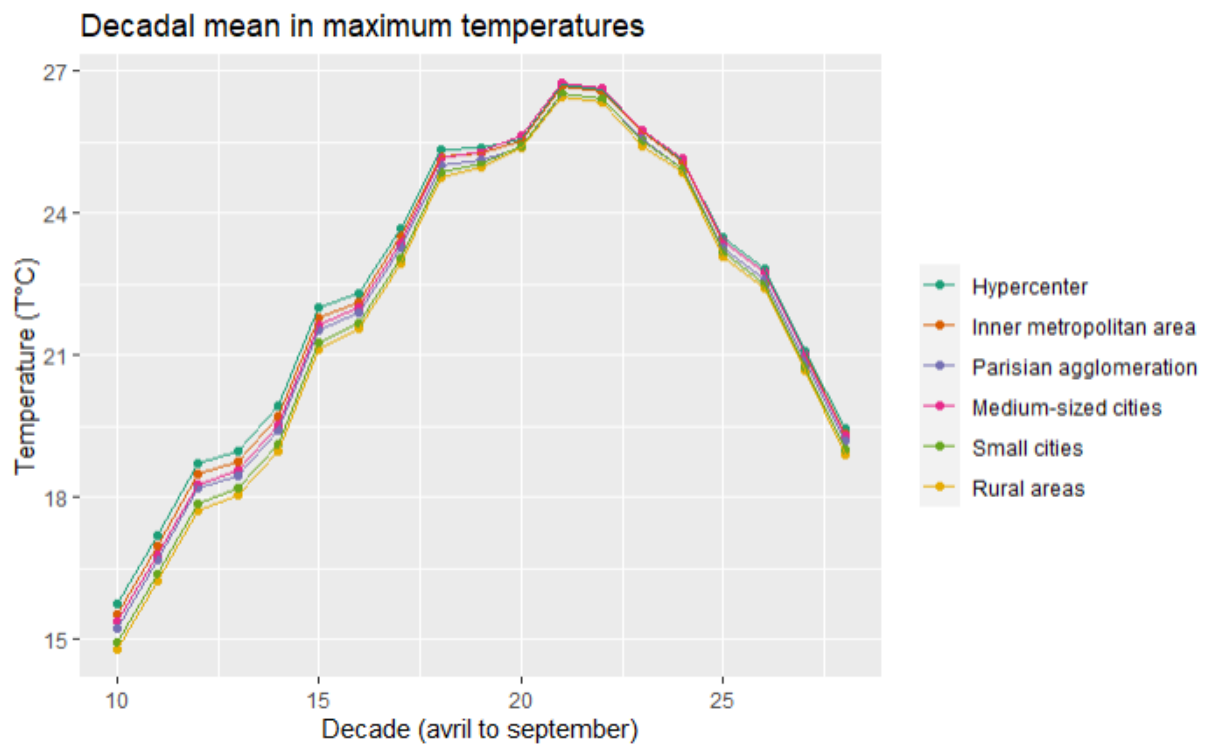
Temperature (°C)   
15 16 17 18 19 20



Figure 16- Decadal mean temperature by territorial division



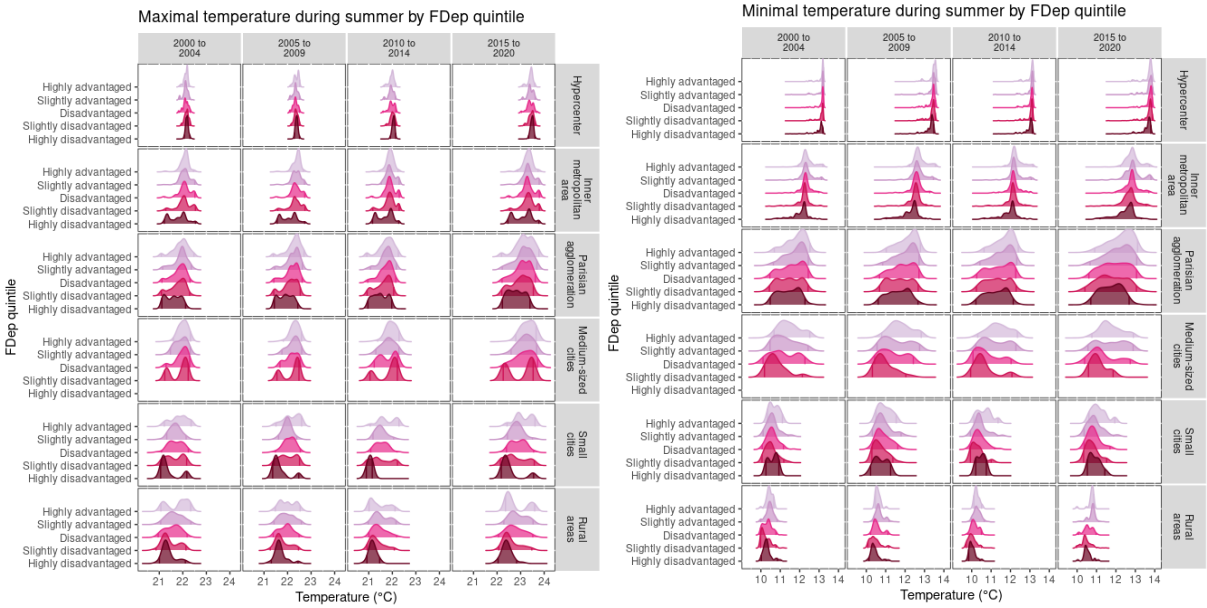
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**Figure 17 - Distribution of minimum and maximum temperatures during summer by social deprivation (based on Fdep quintile) and territorial division**



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**Figure 18 - Heat-related mortality risk attributable to temperatures for each cluster**

