atmosphere

MDPI

Supplementary Materials:

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Table S1. The scales of air quality indices: USA, EU, and Belgium (BelAQI).

U.S. AQI							
AQI Categories	**O_3 (ppm)**		**PM (μg/m³)**		**NO_2 (ppb)**	**SO_2 (ppb)**	**CO (ppm)**
	(8-h)	**(1-h)**	**2.5 (24-h)**	**10 (24-h)**	**(1-h)**	**(1-h)**	**(8-h)**
Good	0–0.054		0–12.0	0–54	0–53	0–35	0–4.4
Moderate	0.055–0.070		12.1–35.4	55–154	54–100	36–75	4.5–9.4
Unhealthy for Sensitive Groups	0.071–0.085	0.125–0.164	35.5–55.4	155–254	101–360	76–185	9.5–12.4
Unhealthy	0.086–0.105	0.165–0.204	55.5–150.4	255–354	361–649	186–304	12.5–15.4
Very Unhealthy	0.106–0.200	0.205–0.404	150.5–250.4	355–424	650–1249	305–604 (24-h)	15.5–30.4
Hazardous	-	0.405–0.604	250.5–500.4	425–604	1250–2049	605–1004 (24-h)	30.5–50.4
EU AQI							
AQI Categories	**O_3 (μg/m³) Max (24-h)**		**PM (μg/m³)**		**NO_2 (μg/m³) Max (24-h)**	**SO_2 (μg/m³) Max (24-h)**	
			2.5 (24-h)	**10 (24-h)**			
Good	0–50		0–10	0–20	0–40	0–100	
Fair	50–100		10–20	20–40	40–90	100–200	
Moderate	100–130		20–25	40–50	90–120	200–350	
Poor	130–240		25–50	50–100	120–230	350–500	
Very poor	240–380		50–75	100–150	230–340	500–750	
Extremely poor	>380		>75	>150	>340	>750	
BelAQI							
AQI Categories	**O_3 (μg/m³) Max (24-h)**		**PM (μg/m³)**		**NO_2 (μg/m³) Max (24-h)**		
			2.5 (24-h)	**10 (24-h)**			
Excellent	0–25		0–5	0–10	0–10		
Very good	26–50		6–10	11–20	21–50		
Good	51–70		11–15	21–30	51–70		
Adequate	71–120		16–25	31–40	71–120		
Medium	121–160		26–35	41–50	121–150		
Poor	161–180		36–40	51–60	151–180		
Very poor	181–240		41–50	61–70	181–200		
Bad	241–280		51–60	71–80	201–250		
Very bad	281–320		61–70	81–100	251–300		
Execrable	>320		>70	>100	>300		

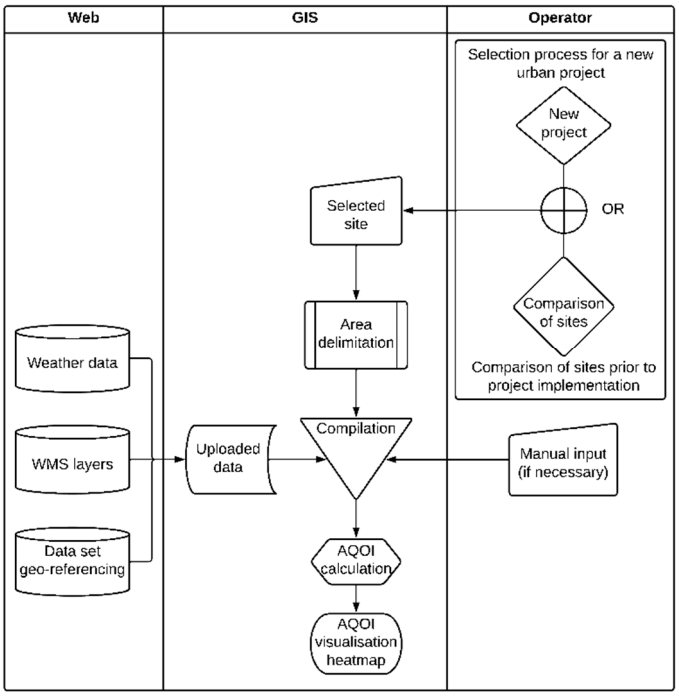


Figure S1. Flow scheme of the AQOI calculation with a GIS.

Table S2. Descriptor for "Assignment" variable used in Belgium.

"Annex"	"Administration"	"School"
"Castel"	"Building"	"Prison"
"Water tower"	"Shop"	"Fire station"
"Water treatment plant"	"Culture/sport/hobby center"	"Train station"
"Habitation"	"Community house"	"Hospital"
"Nursing home"	"Police"	"Industrial plant"
"Gas station"		

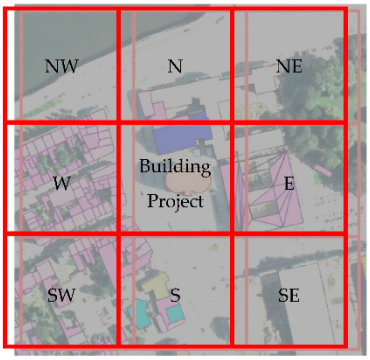
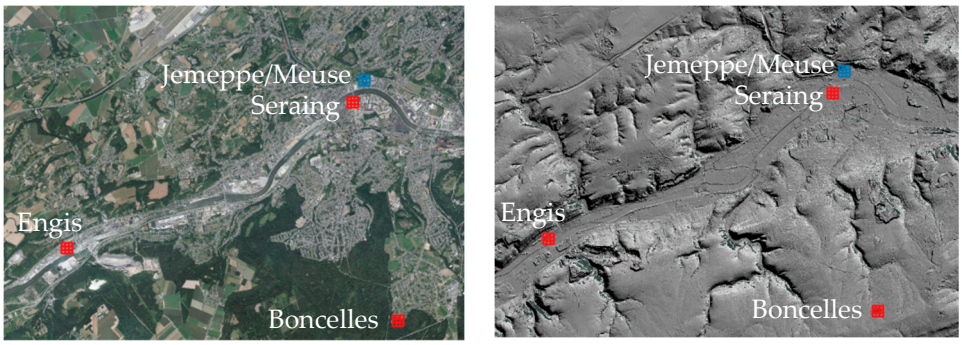


Figure S2. IC divided into nine s-IC with, in its center, the building project; names of the different s-IC refer to the cardinal points to the building project.



(**a**) (**b**)

Figure S3. Situation of Seraing, Engis, Jemeppe/Meuse, and Boncelles (data Source: Service public de Wallonie—http://geoportail.wallonie.be (accessed on 30 September 2019). Visualization with QGIS V3.16.7).

Table S3. Minimum and maximum parameter values.

Parameters	Minimum (best case)	Maximum (worst case)
Topography (Tp)	–1.0	2.0
Building (Bp)	–4.2	1.0
Road (Rp)	0.0	11.8
Vegetation (Vp)n	–1.3	1.8
External sources (ESp)	0.0	15.0

Table S4. Parameters and AQOI values for each site.

Parameters	Seraing	Jemeppe/Meuse	Engis	Boncelles
Topography (Tp)	0.7226	0.6667	0.7098	0
Building (Bp)	0.8291	0.1204	0.2039	0.035
Road (Rp)	0.883	0.8703	0.9195	0.8391
Vegetation (Vp)	0.4195	0.3655	0.4226	0.346
External sources (ESp)	0.2294	0.1802	0.9516	0.1374
AQOI	3.0836	2.2031	3.2074	1.3575

Table S5. Impact factor calculated for Engis following Equation (18). Values of BelAQI index; RR value represents the increase in daily mortality from 0 μg/m³ concentration (%); the frequency of the index is repeated for each year.

BelAQI	RR (%)	2013	2014	2015	2016	2017	2018	2019
1	0	0	0	0	0	0	0	0
2	0.615	15	7	25	33	19	17	37
3	1.23	95	116	111	114	99	100	107
4	1.845	144	154	141	156	181	164	159
5	3.075	52	47	50	38	39	51	34
6	4.305	30	14	15	10	13	14	7
7	4.92	11	9	8	10	6	14	8
8	6.15	10	7	8	0	6	3	9
9	7.38	7	4	4	1	2	2	2
10	8.61	1	5	2	0	0	0	2
Impact		*305*	*220*	*200*	*100*	*137*	*162*	*157*

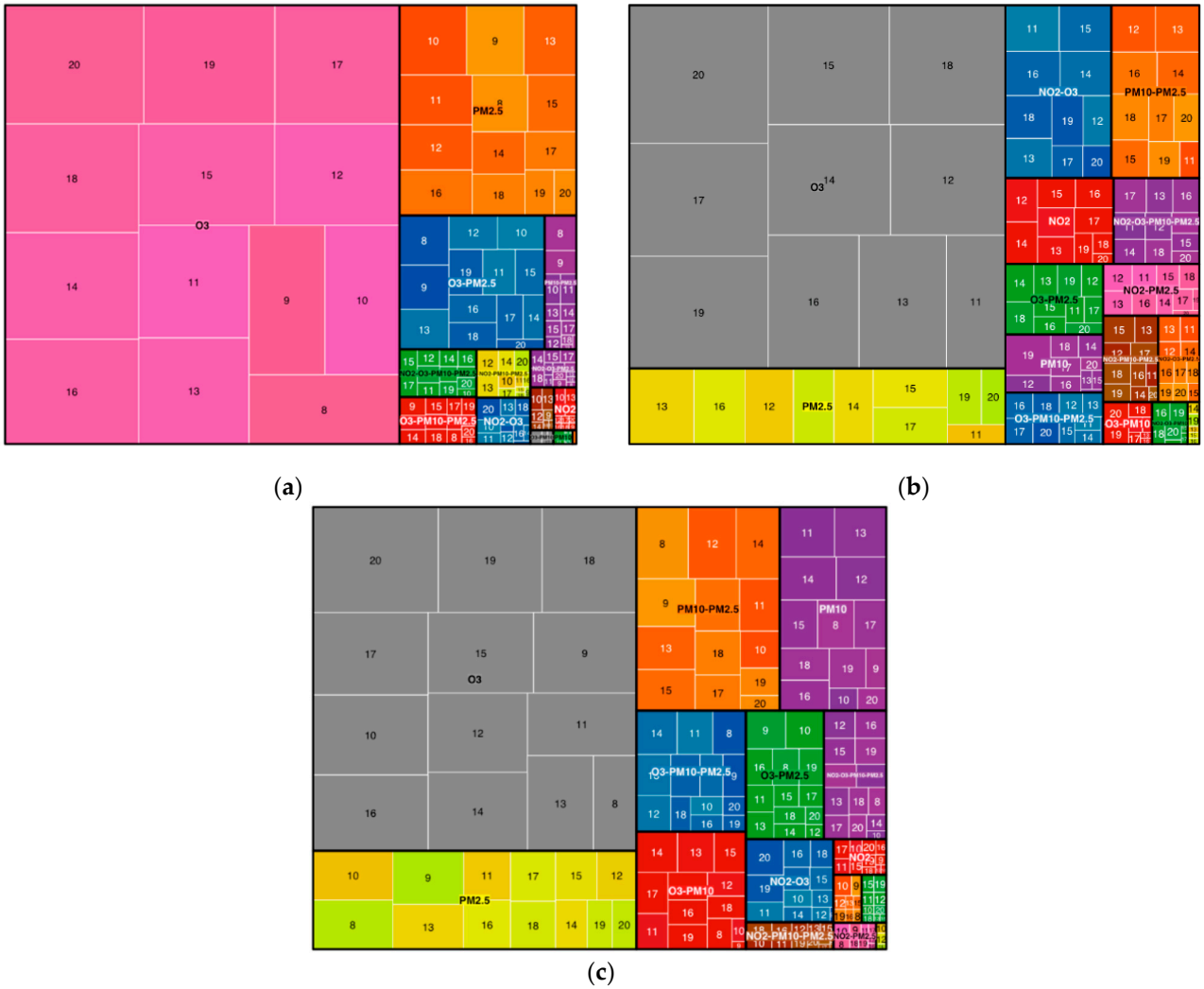


Figure S4. Pollutants responsible for the index according to the BelAQI calculation method. The colored areas show the presence of the pollutant responsible, and the subdivisions represent the years (e.g., pink 20 for (**a**) = occurrence of O_3 in 2020). (**a**) Habay air quality stations (2008 to 2020); (**b**) Val Benoit air quality station (2011 to 2020); (**c**) Engis air quality station (2008 to 2020).