

“Observació de la terra i salut: Amb els ulls de l’ICGC”

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COM TRANSFORMAR LES DADES EN INFORMACIÓ I CONEIXEMENT

Més de 1000 satèl.lits orbiten la Terra per donar suport a comunicacions, navegació, defensa o ciència i observació de la Terra.

Les dades d'observació de la Terra (sempre amb dades in situ per millorar-ne la resolució espai-temporal i validació) s'incorporaran a models de suport a la detecció, seguiment o predicció d'indicadors amb incidència directa o indirecta sobre la salut humana:

- qualitat de l'aire,
- qualitat i quantitat d'aigua,
- contaminació de sols
- **salut masses forestals**
- **contaminació lumínica**
- **materials nocius**
- **verd urbà**
- **temperatures-calor**



SALUT FORESTAL

Imatge	# punts	Mitjana X	Mitjana Y	σ -X	σ -Y
2015-08-02	114	-2.48	2.56	0.98	0.97
2015-11-30	58	2.22	-1.95	1.55	2.89
2016-01-19	66	4.97	-0.18	2.55	2.81
2016-04-18	77	0.91	-6.28	1.93	1.52
2016-06-07	125	-0.80	-0.37	1.72	1.32
2016-07-07	143	1.79	2.04	0.61	0.56
2016-07-27	112	1.15	-2.12	0.67	0.51
2016-08-06	119	2.01	-1.83	0.54	0.57
2016-08-26	141	-0.71	0.70	0.44	0.56

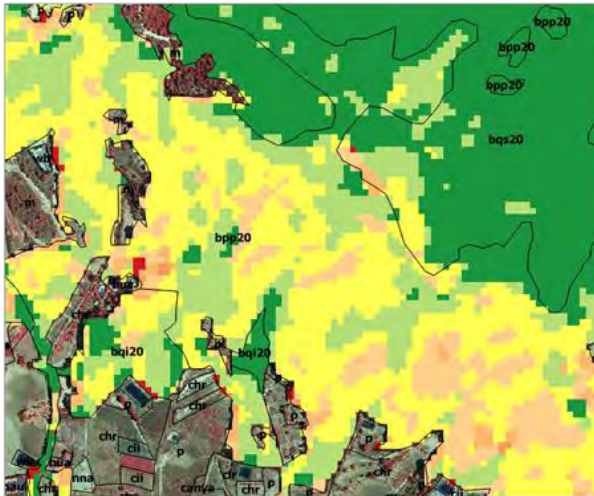
SENTINEL-2 de 02/08/2015

SENTINEL-2 de 26/08/2016

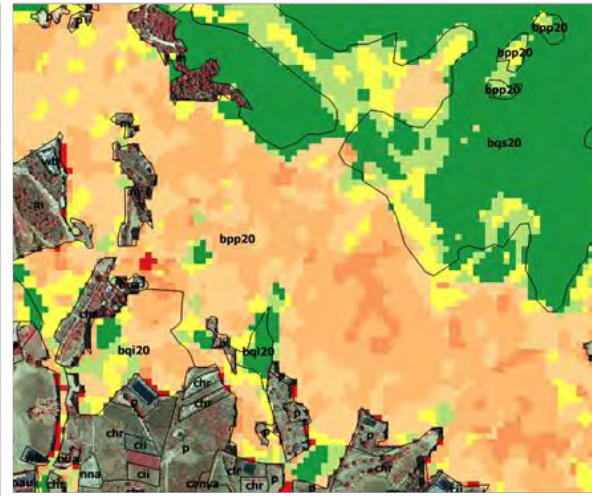
SALUT FORESTAL

Classes EVI	Límits de les classes (2016)	Descripció de les cobertes
1	≤ 0.16	Cobertes sense vegetació com carreteres, sòls nus, edificis, esporàdicament zones de vegetació molt seques
2	0.16 - 0.2	Del 75 % al 100 % de vegetació seca, en alguns casos altres cobertes no vegetals com pistes forestals o sòls nus.
3	0.2 - 0.24	Del 25% al 75% de vegetació seca
4	0.24 - 0.28	Màxim un 25% de vegetació seca
5	0.28 - 0.32	Vegetació menys vigorosa amb arbres aïllats secs
6	0.32 - 0.36	Masses forestals menys vigoroses
7	> 0.36	Masses forestals vigoroses 100%

EVI classificat a Coll Safiguera



02-08-2015



26-08-2016

CONTAMINACIÓ LUMÍNICA



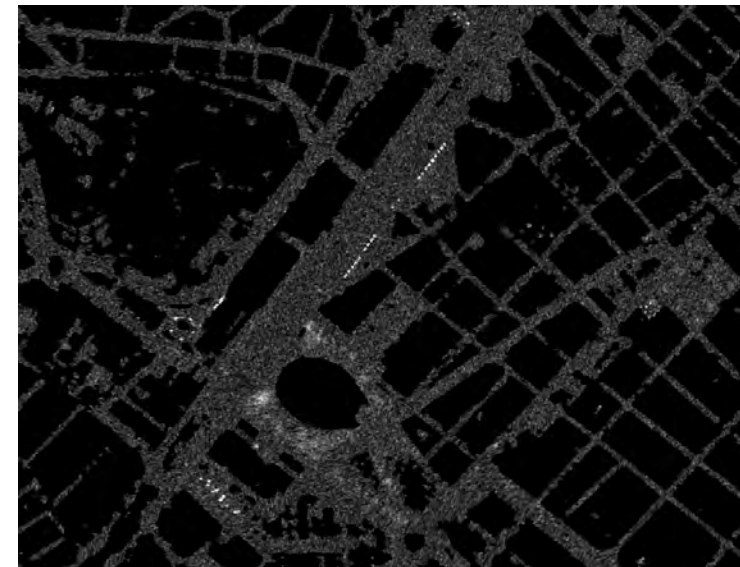
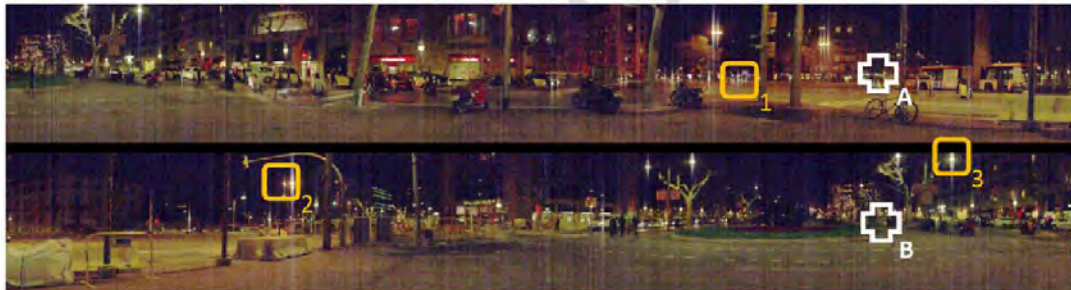
Ground-based hyperspectral analysis of the urban nightscape

Ramon Alamús^a, Salvador Bará^{b,*}, Jordi Corbera^a, Jaume Escofet^c, Vicens Palà^a, Luca Pipia^a, Anna Tardà^a

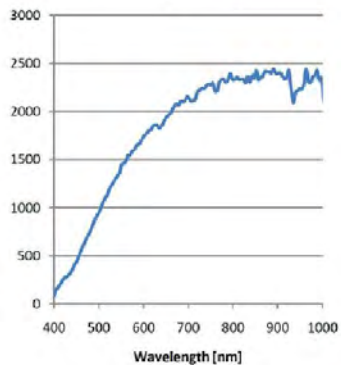
^a Institut Cartogràfic i Geològic de Catalunya (ICGC), Parc de Montjuïc s/n, 08038 Barcelona, Catalunya, Spain

^b Àrea de Òptica, Departamento de Física Aplicada, Universidade de Santiago de Compostela, Santiago de Compostela, Galicia, Spain

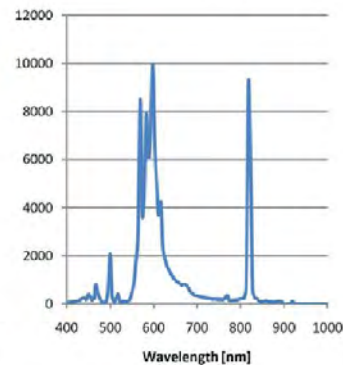
^c Departament d'Òptica i Optometria, Universitat Politècnica de Catalunya, Terrassa, Catalunya, Spain



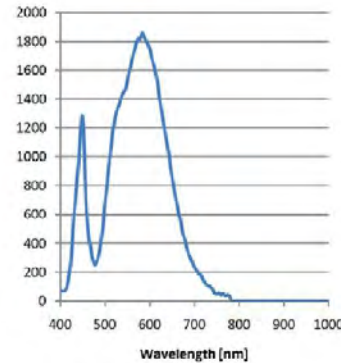
1 - Halogen Lamp



2 - Sodium Lamp



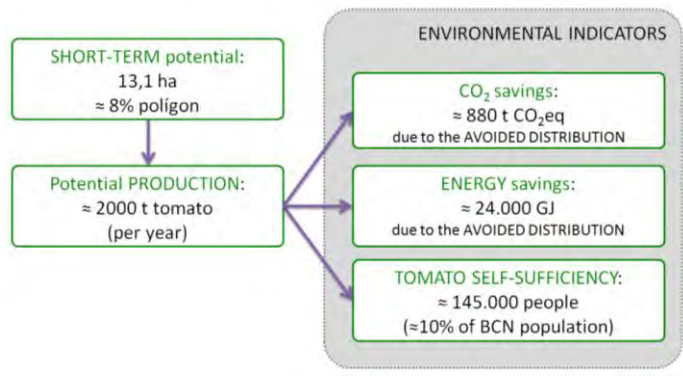
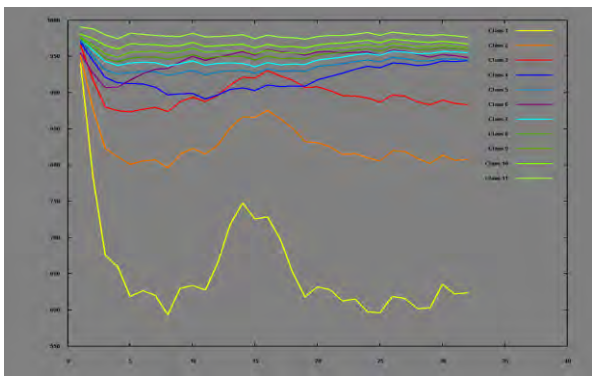
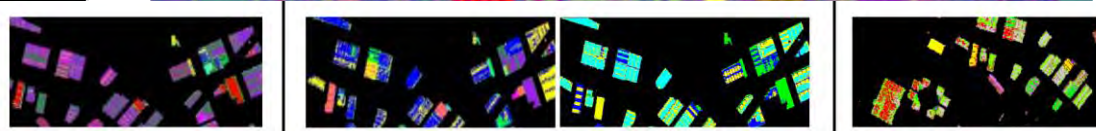
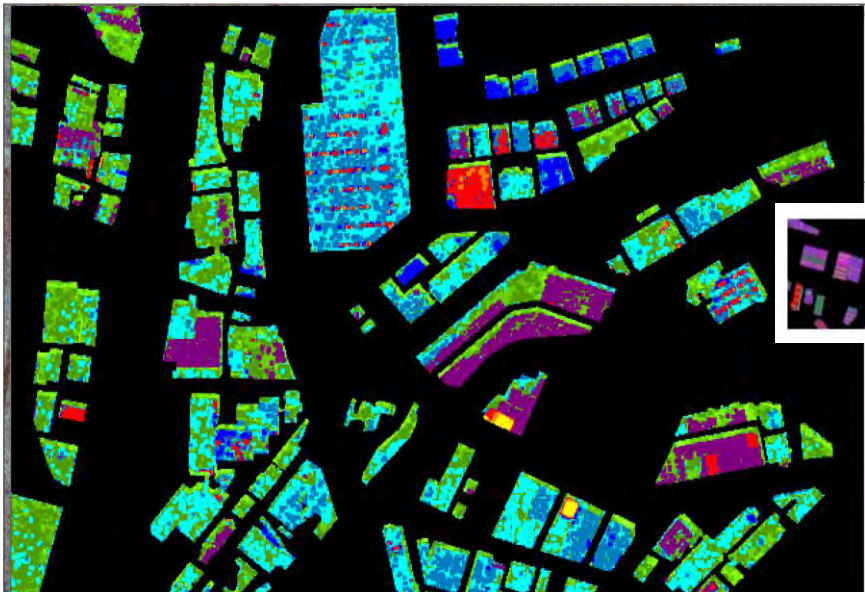
3 - LED Lamp



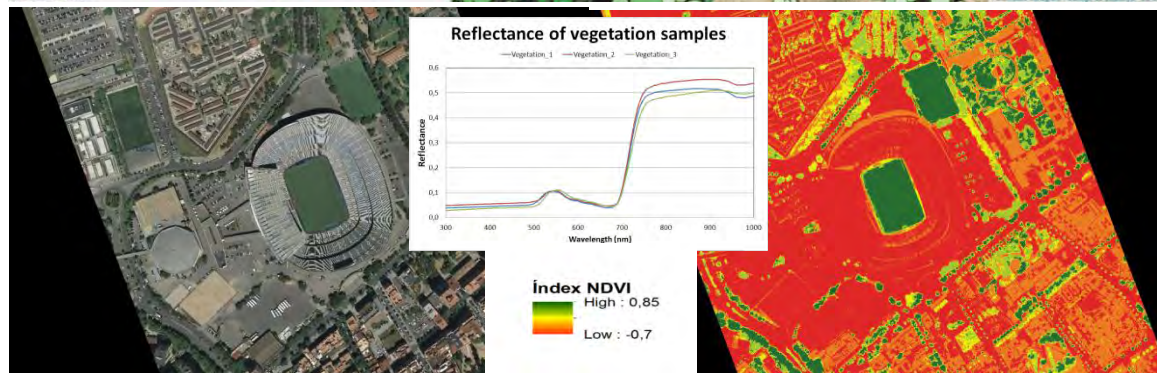
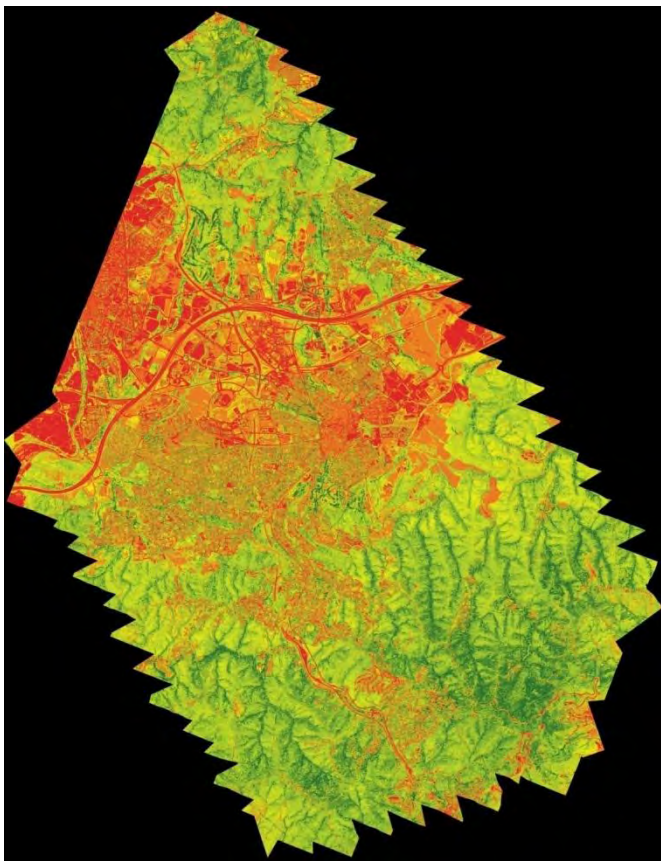
(Melatonin Suppression Active Spectrum)

COBERTES, MATERIALS I USOS

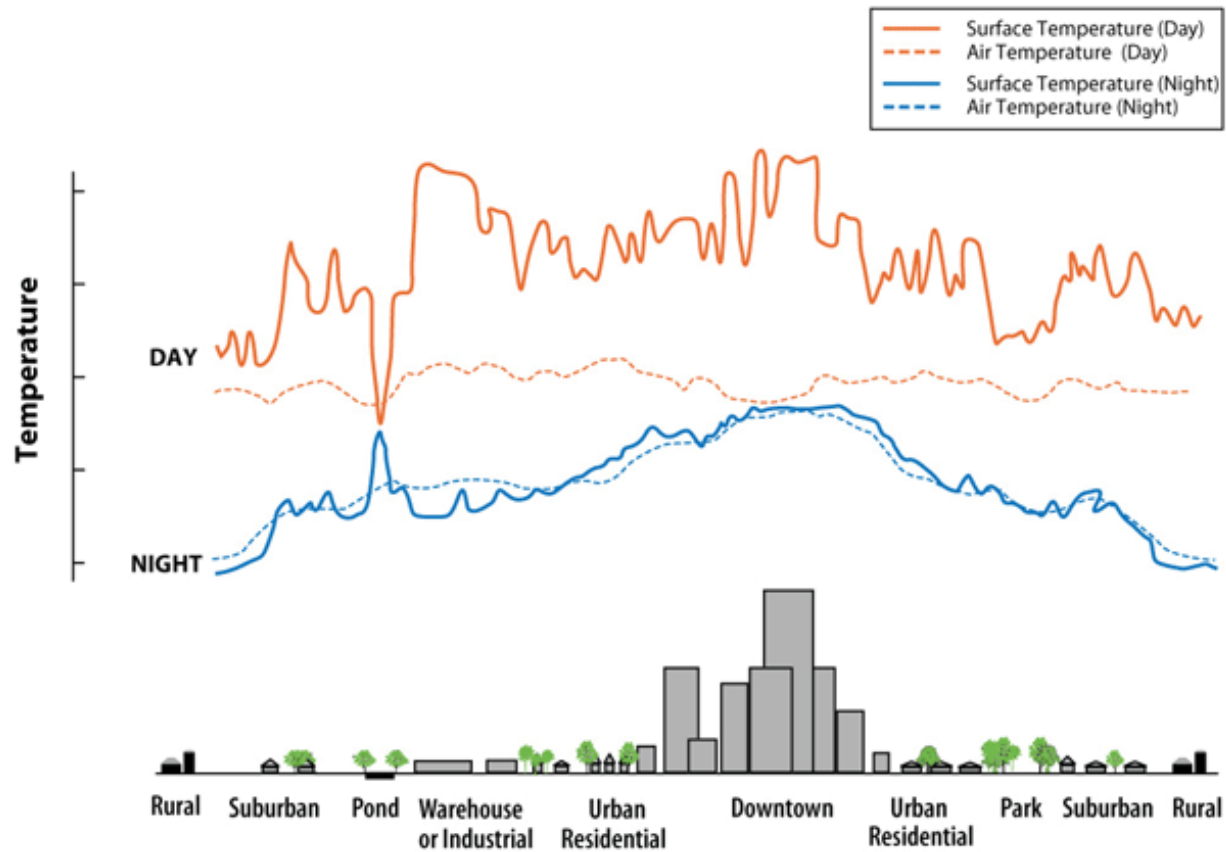
On a research level, we are mixing the hyperspectral information from VNIR and TIR to classified covers and thermal behavior to evaluate the availability and potential uses of covers in particular for vertical farming



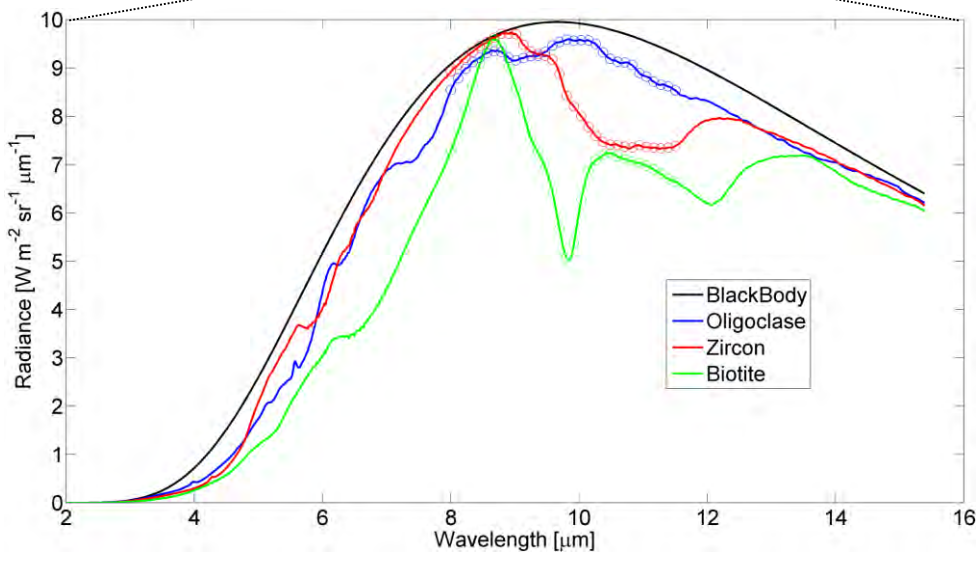
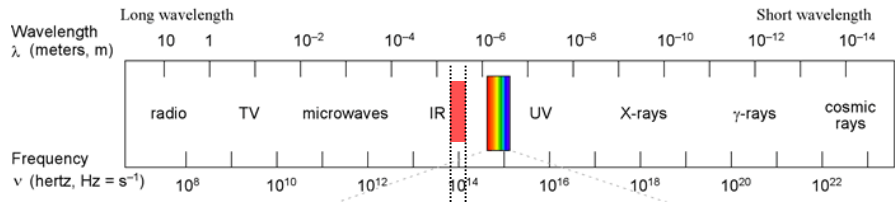
EL VERD



EFECTE ILLA DE CALOR



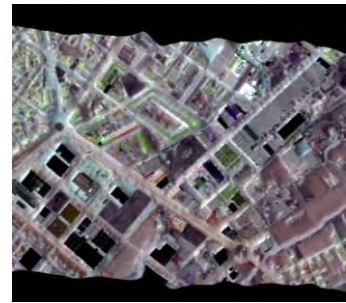
EFECTE ILLA DE CALOR



32 TIR Bands : 8-11.5 μ m



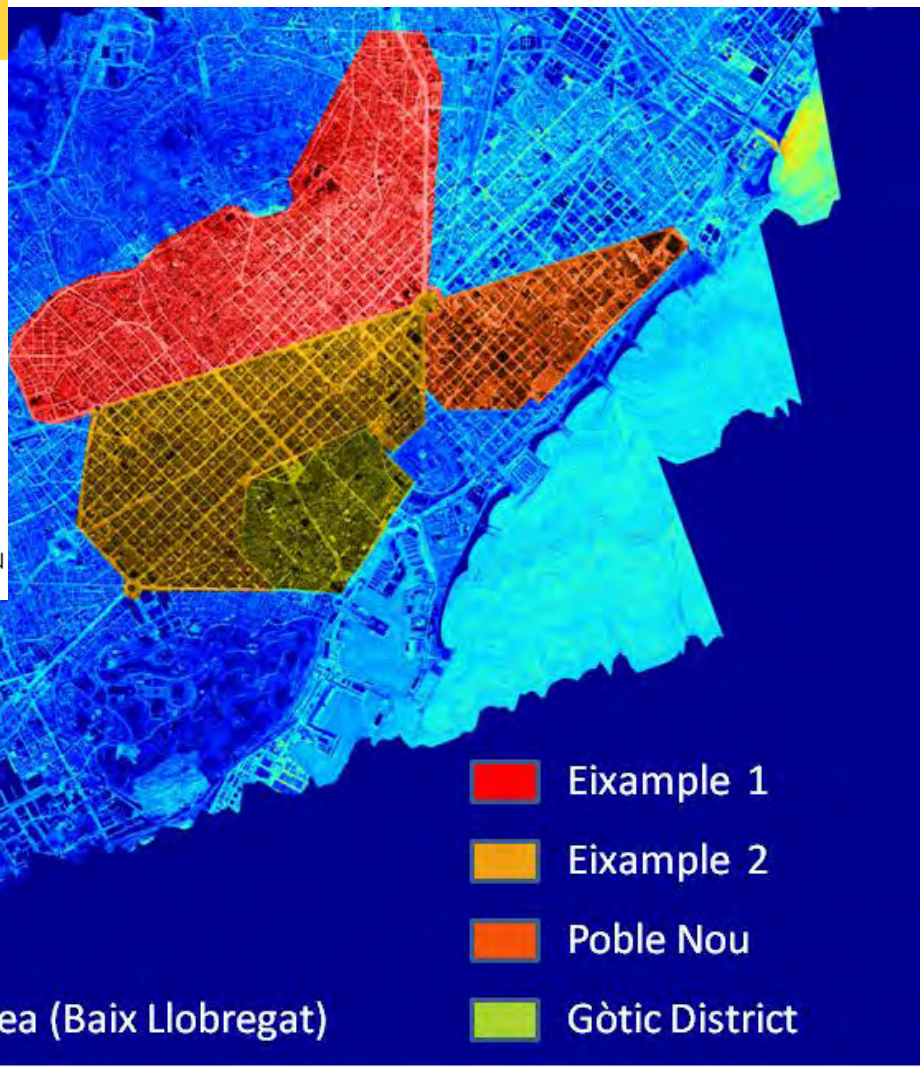
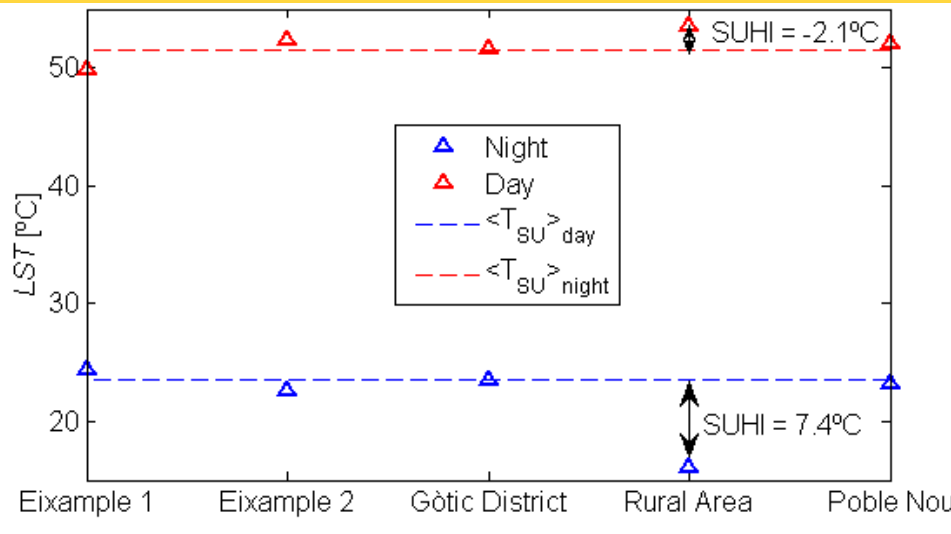
$$f(ATM, T, \epsilon)$$



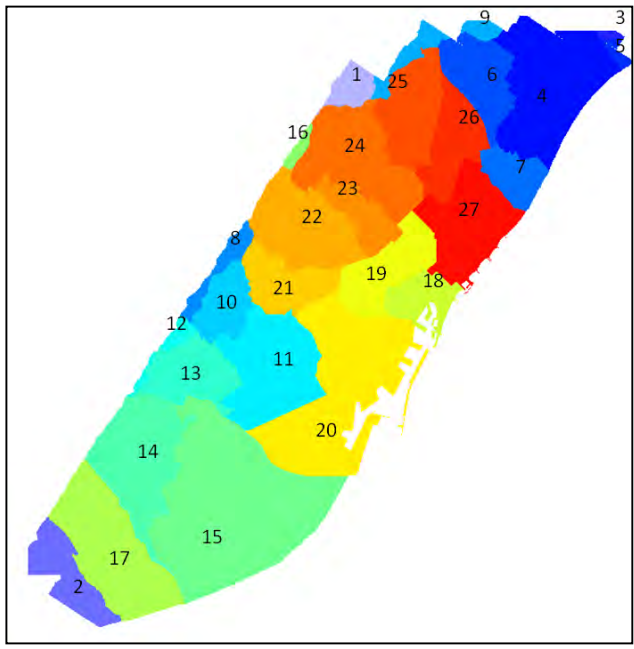
Emissivity Spectrum

Temperature

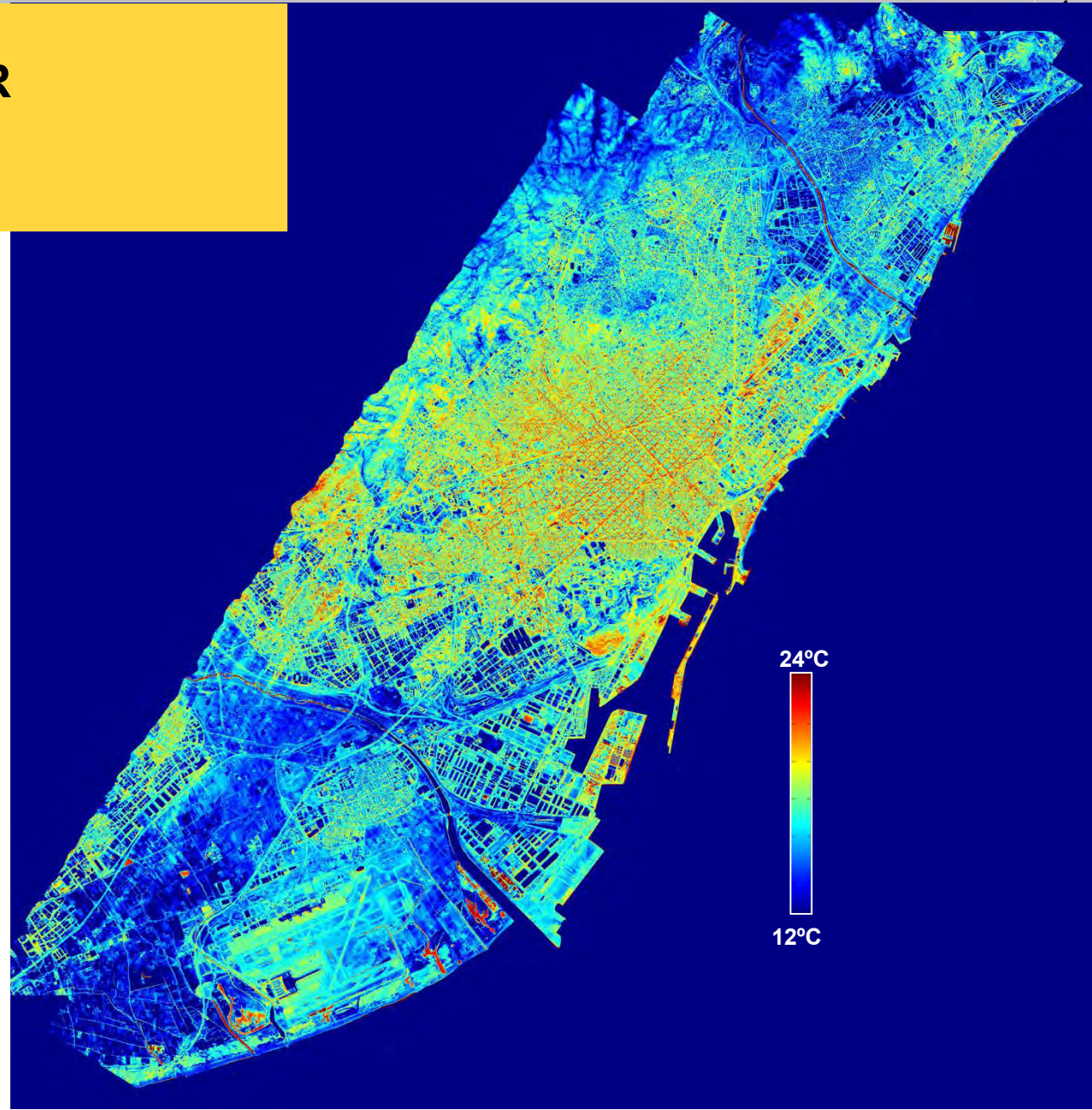
EFFECTE ILLA DE CALOR



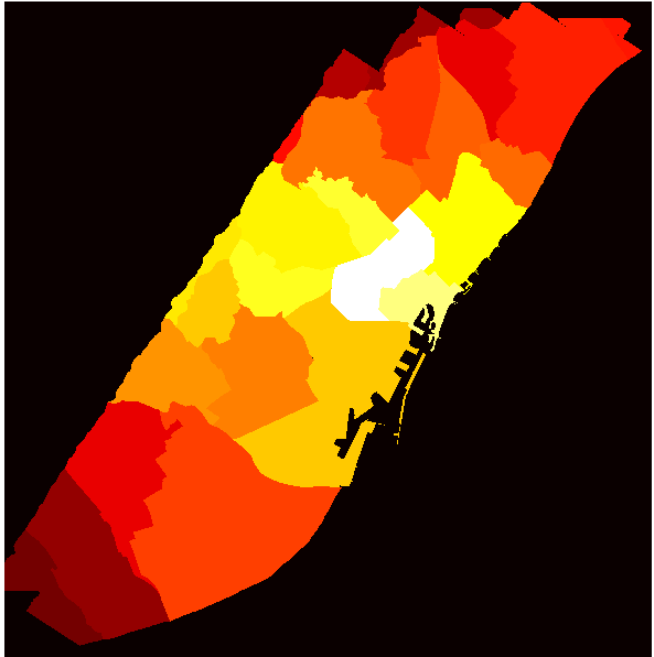
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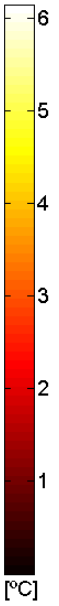
Winter 2012



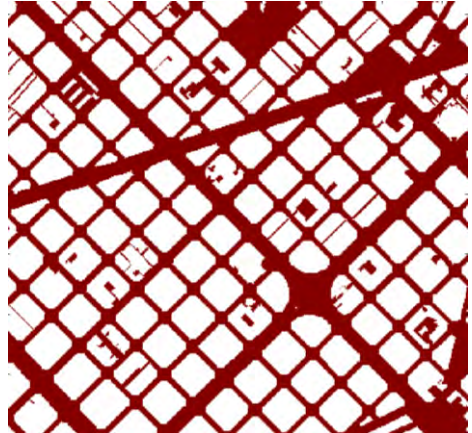
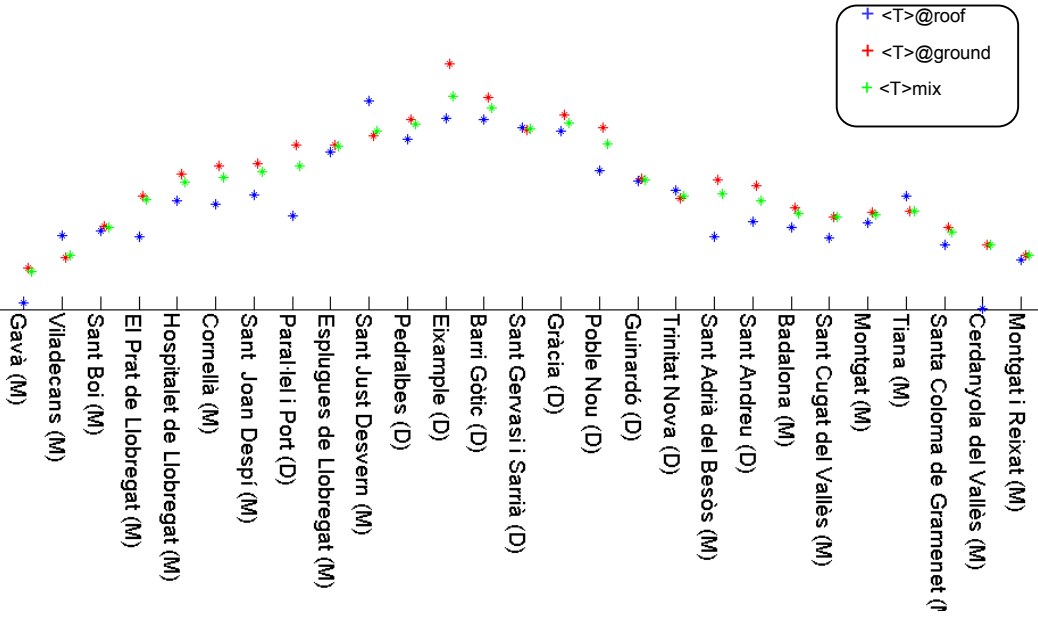
EFFECTE ILLA DE CALOR



Winter 2012

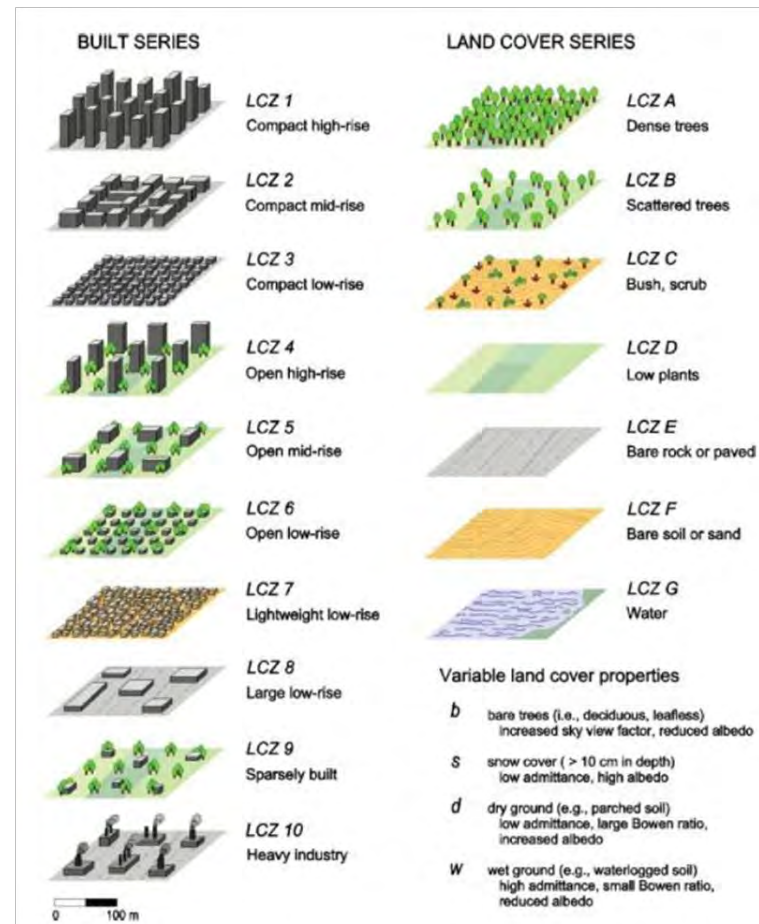


$\langle T \rangle_{Urban} - \langle T \rangle_{Rural}$ [°C]

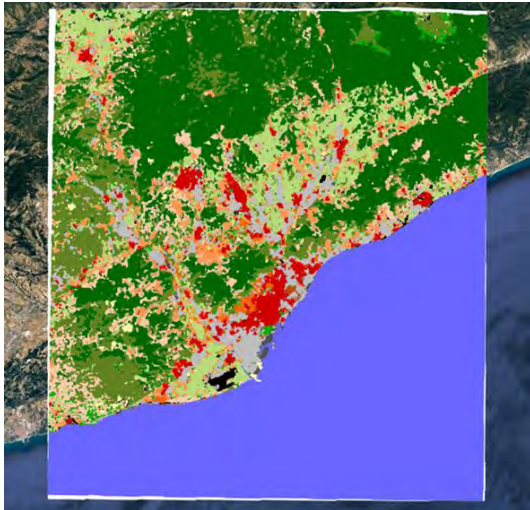
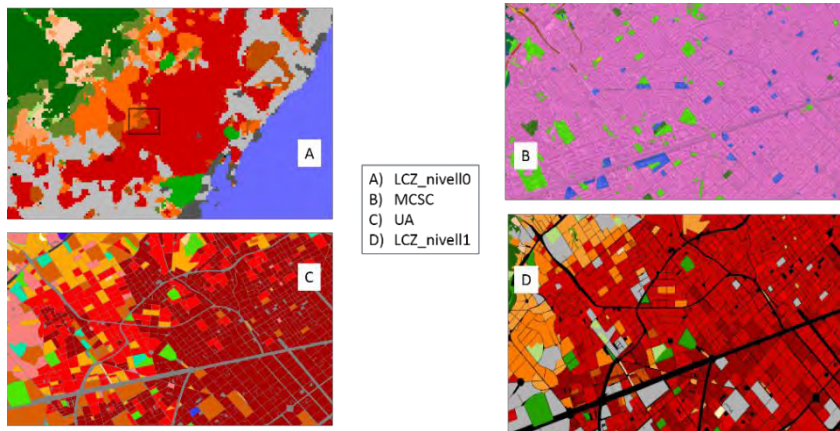


LOCAL CLIMATE ZONES

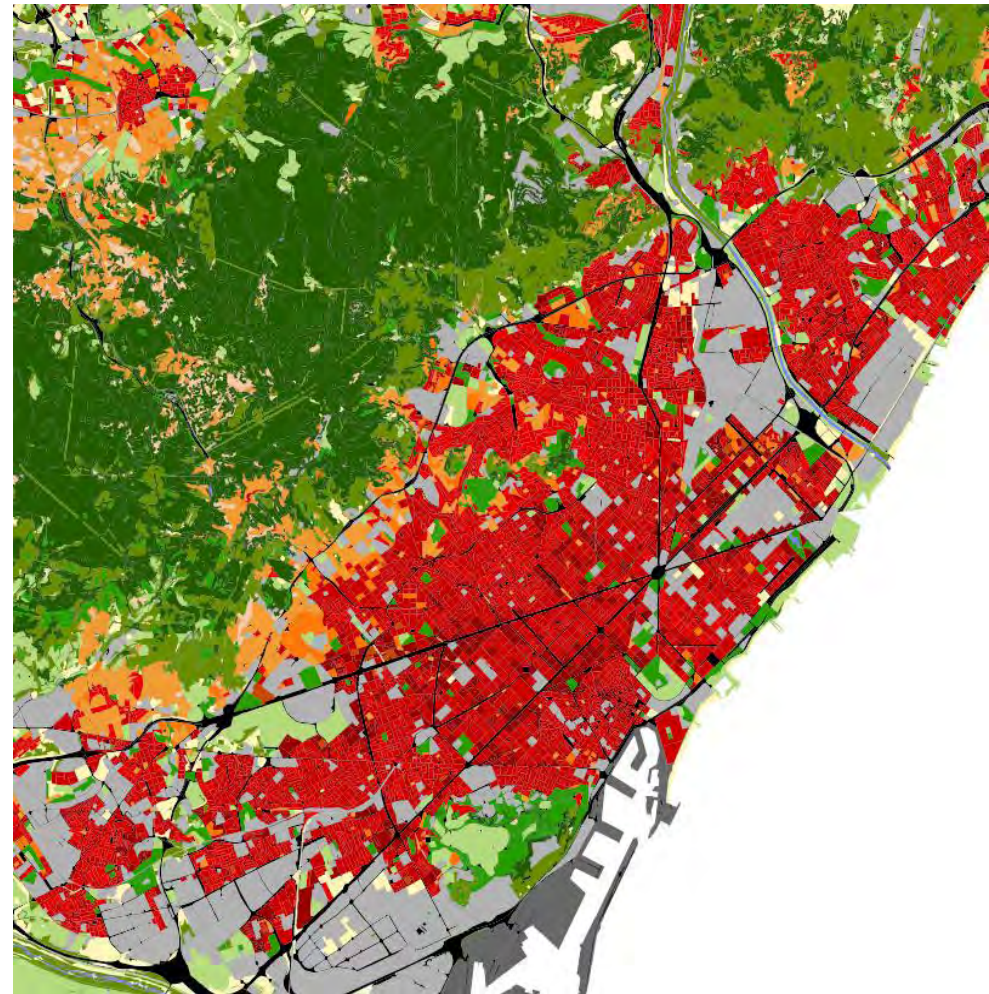
Local climate zone (LCZ)	Sky view factor ^a	Aspect ratio ^b	Building surface fraction ^c	Impervious surface fraction ^d	Pervious surface fraction ^e	Height of roughness elements ^f	Terrain roughness class ^g
LCZ 1 Compact high-rise	0.2–0.4	> 2	40–60	40–60	< 10	> 25	8
LCZ 2 Compact midrise	0.3–0.6	0.75–2	40–70	30–50	< 20	10–25	6–7
LCZ 3 Compact low-rise	0.2–0.6	0.75–1.5	40–70	20–50	< 30	3–10	6
LCZ 4 Open high-rise	0.5–0.7	0.75–1.25	20–40	30–40	30–40	>25	7–8
LCZ 5 Open midrise	0.5–0.8	0.3–0.75	20–40	30–50	20–40	10–25	5–6
LCZ 6 Open low-rise	0.6–0.9	0.3–0.75	20–40	20–50	30–60	3–10	5–6
LCZ 7 Lightweight low-rise	0.2–0.5	1–2	60–90	< 20	<30	2–4	4–5
LCZ 8 Large low-rise	>0.7	0.1–0.3	30–50	40–50	<20	3–10	5
LCZ 9 Sparsely built	> 0.8	0.1–0.25	10–20	< 20	60–80	3–10	5–6
LCZ 10 Heavy industry	0.6–0.9	0.2–0.5	20–30	20–40	40–50	5–15	5–6
LCZ A Dense trees	<0.4	>1	<10	<10	>90	3–30	8
LCZ B Scattered trees	0.5–0.8	0.25–0.75	<10	<10	>90	3–15	5–6
LCZ C Bush, scrub	0.7–0.9	0.25–1.0	<10	<10	>90	<2	4–5
LCZ D Low plants	>0.9	<0.1	<10	<10	>90	<1	3–4
LCZ E Bare rock or paved	>0.9	<0.1	<10	>90	<10	<0.25	1–2
LCZ F Bare soil or sand	>0.9	<0.1	<10	<10	>90	< 0.25	1–2
LCZ G Water	>0.9	<0.1	<10	<10	>90	–	1



LOCAL CLIMATE ZONES



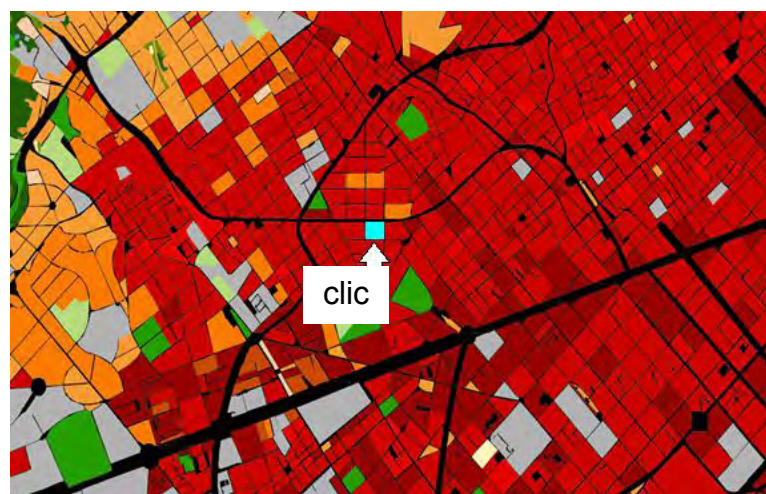
LCZ nivell 0 methodology from Landsat8/Sentinel2 imagery (Raster format results GSD=150m)



LCZ nivell 1 (Land Cover Land Use, Urban Atlas, DSM)
-preliminary results- (vector shapes)

LOCAL CLIMATE ZONES

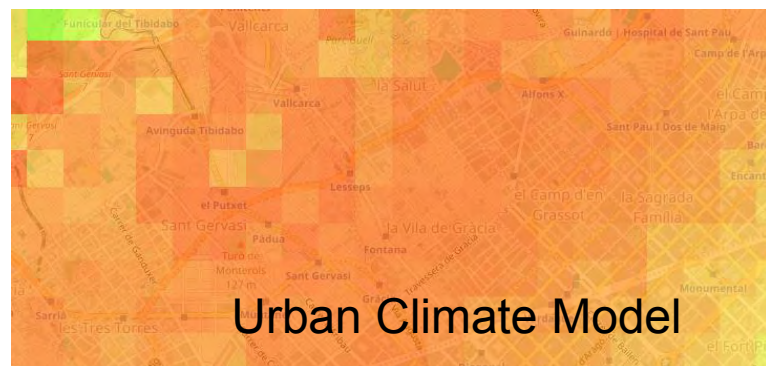
A new International Standard to mapping cities according its resilience to climate trends



LEVEL	
EXCELLENT	
FINE	
GOOD	
BAD	
VERY BAD	

+

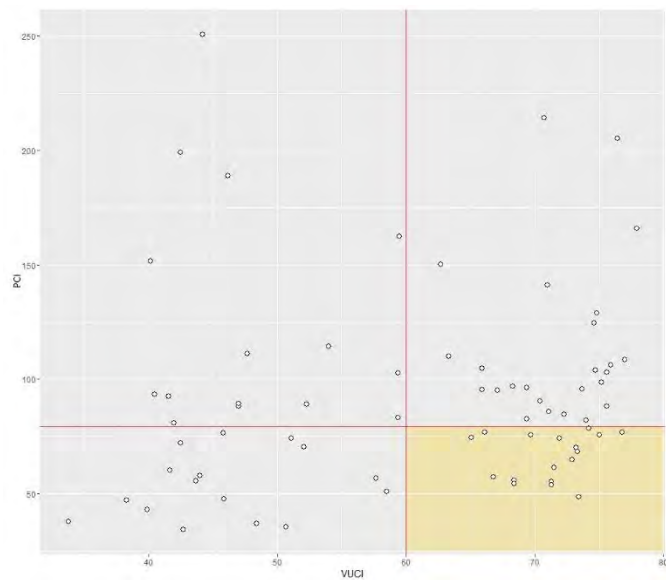
Risk = Vulnerability (LCZ) x Dangerousity (Climate M.) x [Exposition]



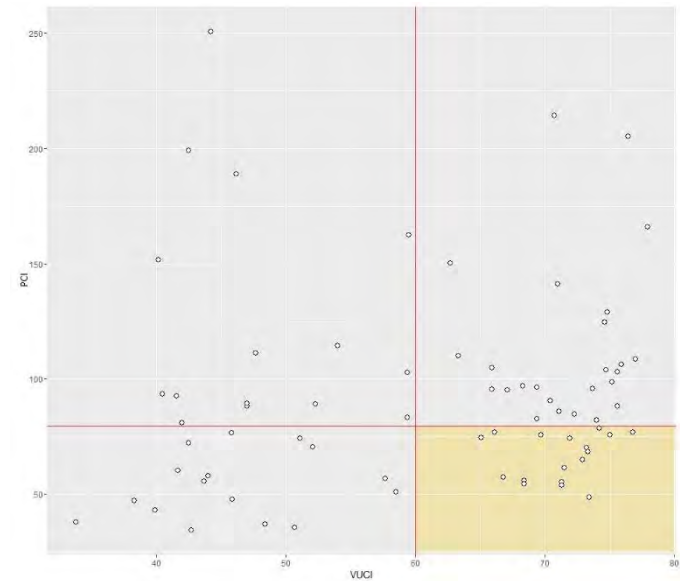
Urban Climate Model

LCZ + Climate model Model = RISC	Exposició 1	Exposició 2
SCENARIO METEO 1		
SCENARIO METEO 2		
SCENARIO METEO #		

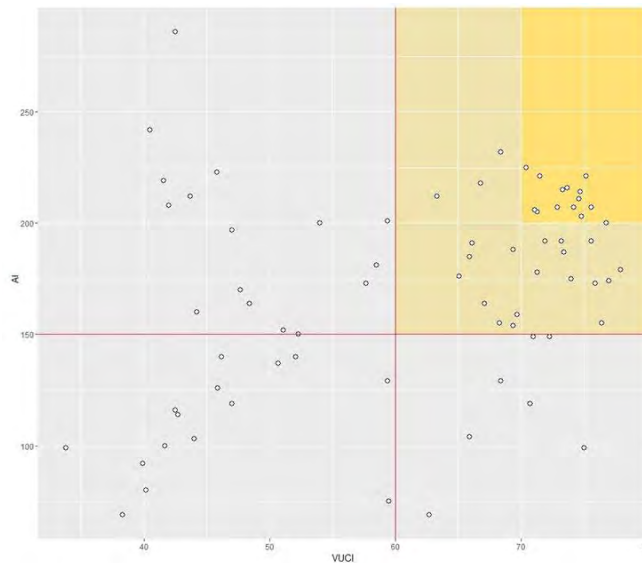
LOCAL CLIMATE ZONES



Per capita income / LCI (vulnerability index)

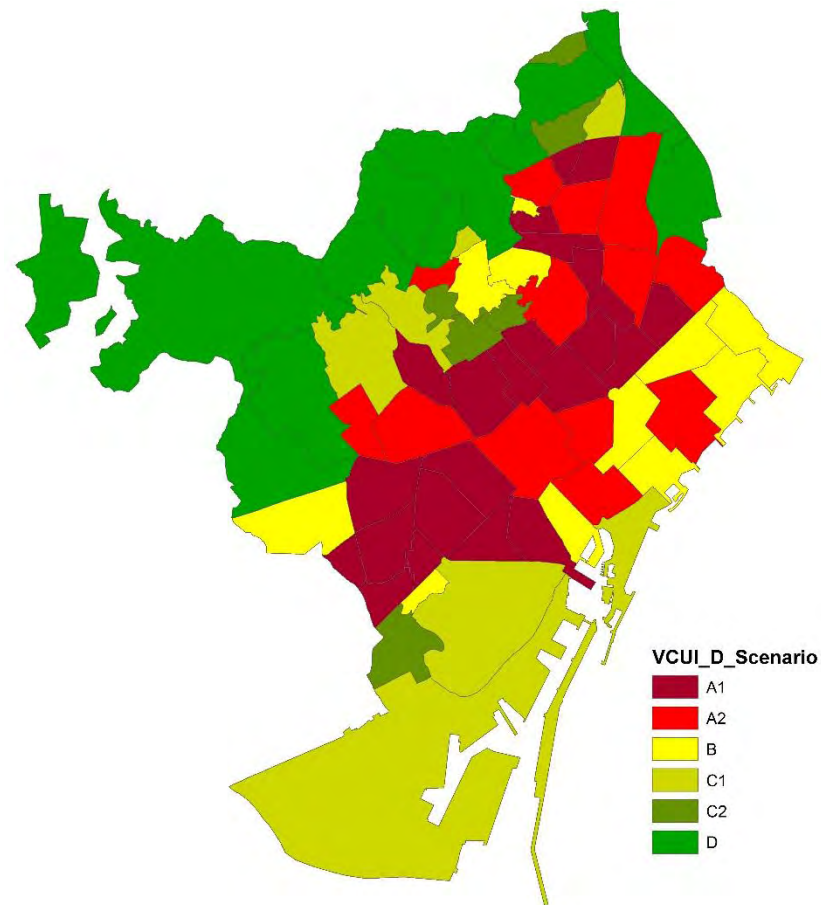
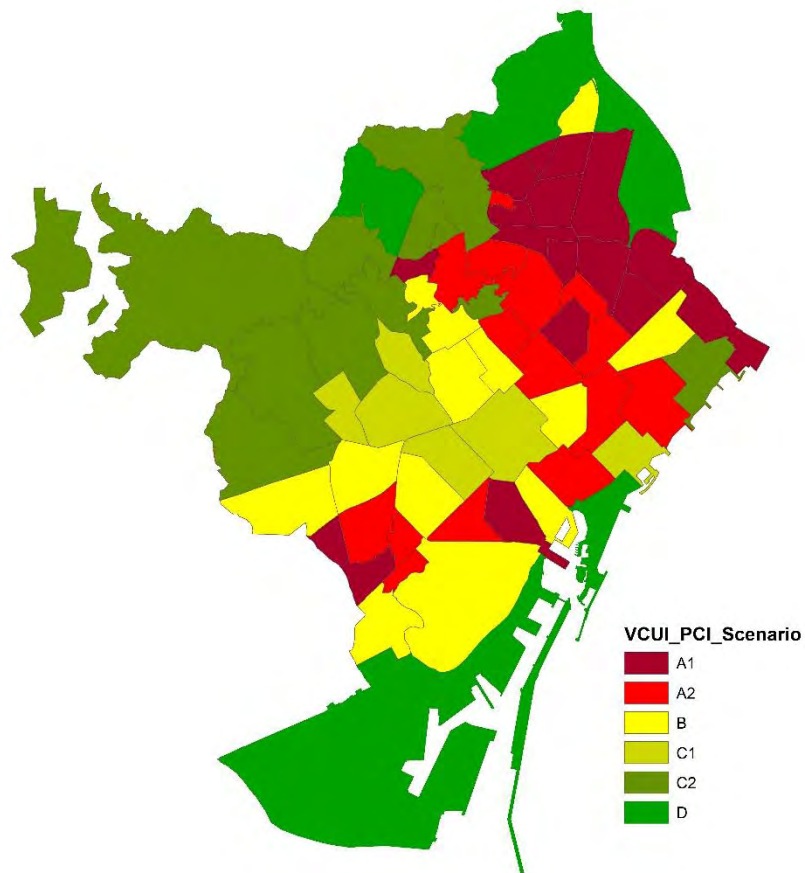


Population density / LCI (vulnerability index)

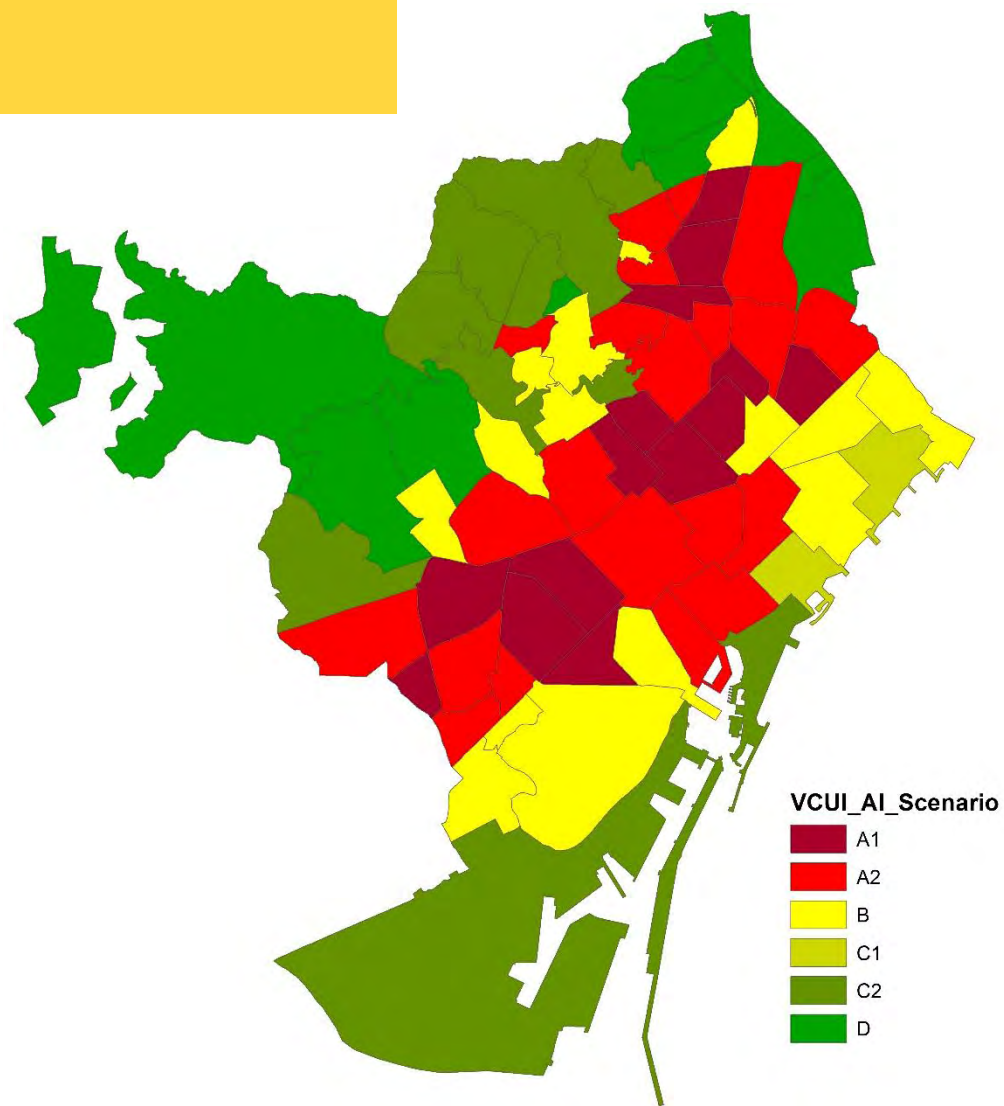


Aging index (AI) / LCI (vulnerability index)

LOCAL CLIMATE ZONES



LOCAL CLIMATE ZONES



**GRÀCIES PER LA VOSTRA
ATENCIÓ**



Tremp des de 786 km d'alçada – Sentinel 2