

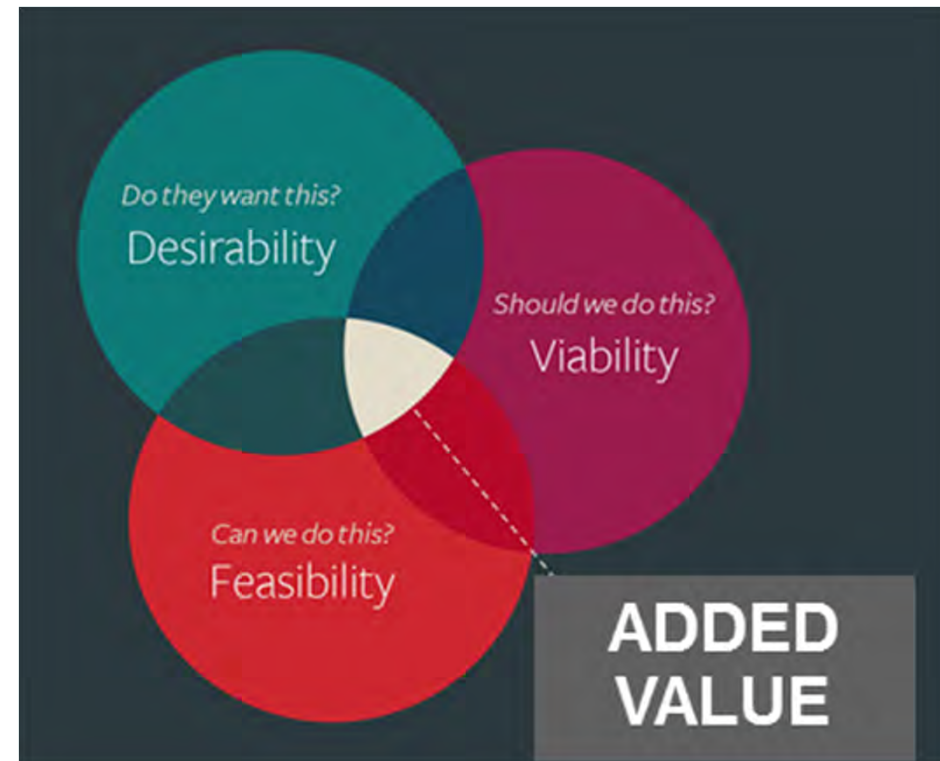
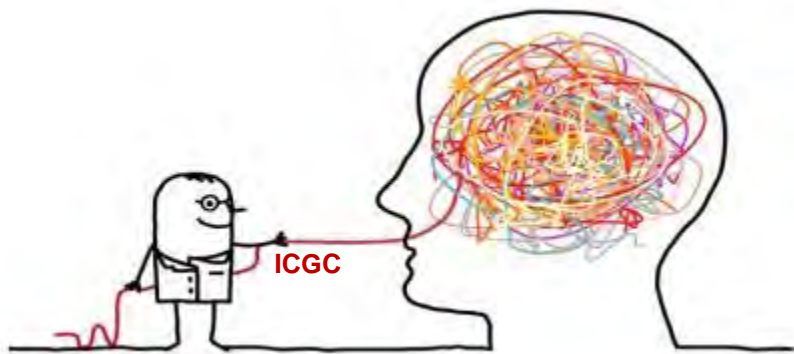
## “Observació de la Terra: Geoinformació i Salut”

Àrea Observació de la Terra (CS\_PCOT)  
Institut Cartogràfic i Geològic de Catalunya  
Dr. Jordi Corbera  
[jordi.corbera@icgc.cat](mailto:jordi.corbera@icgc.cat)



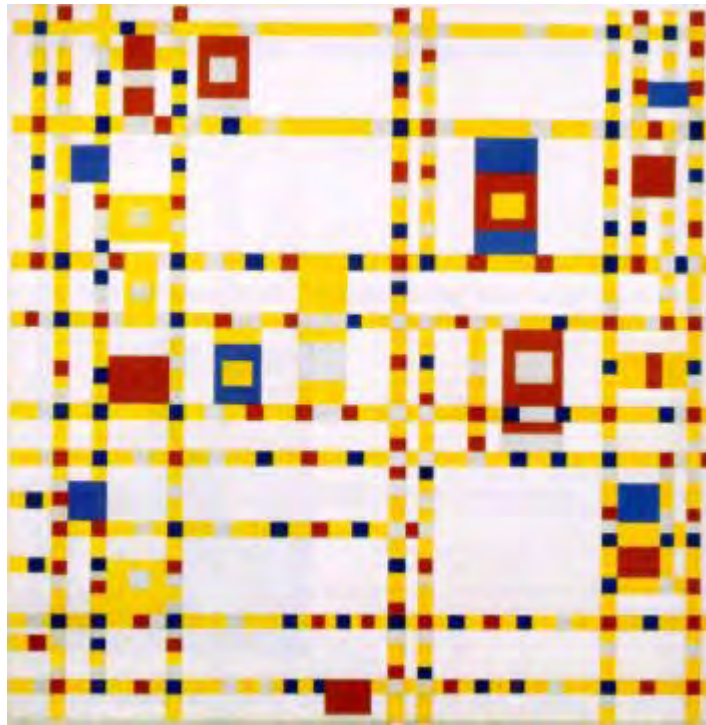
## INNOVACIÓ I OBSERVACIÓ DE LA TERRA

*“The myth of innovation is that brilliant ideas leap fully formed from the minds of geniuses. The reality is that most innovations come from a process of rigorous examination through which great ideas are identified and developed before being realized as new offerings and capabilities.” Tim Brown – Design by Change*

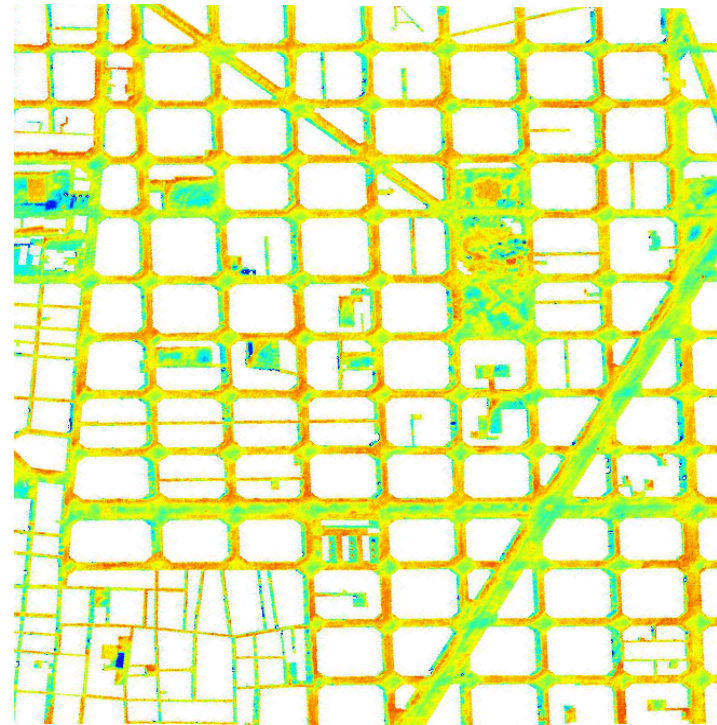


## INNOVACIÓ I OBSERVACIÓ DE LA TERRA

*Piet Mondrian (1943):  
Broadway Boogie Woogie*



*ICGC (2012):  
Thermal Behaviour*

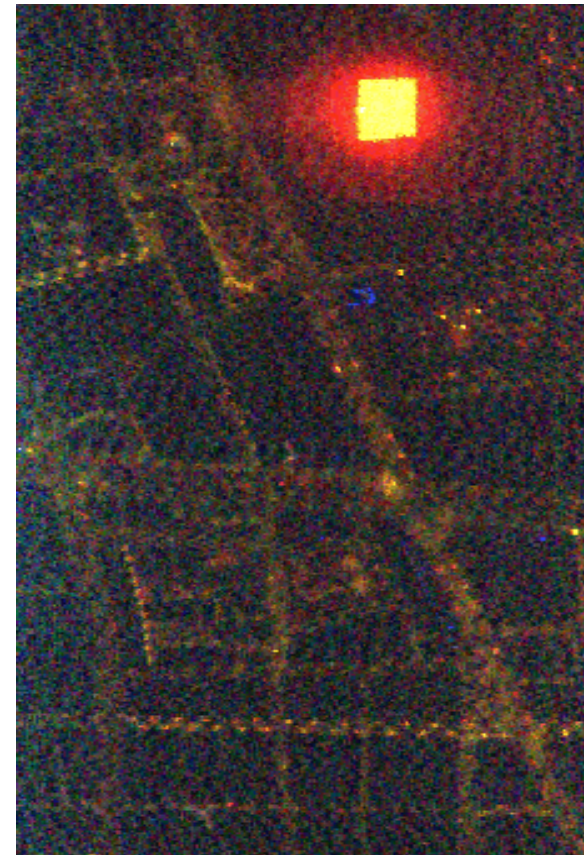


## INNOVACIÓ I OBSERVACIÓ DE LA TERRA

*Paul Klee (1927):  
Coloured Lighting*



*ICGC (2010):  
Hyperspectral VNIR night flight*



## INNOVACIÓ I OBSERVACIÓ DE LA TERRA

*J. Jones (1981):  
Map*

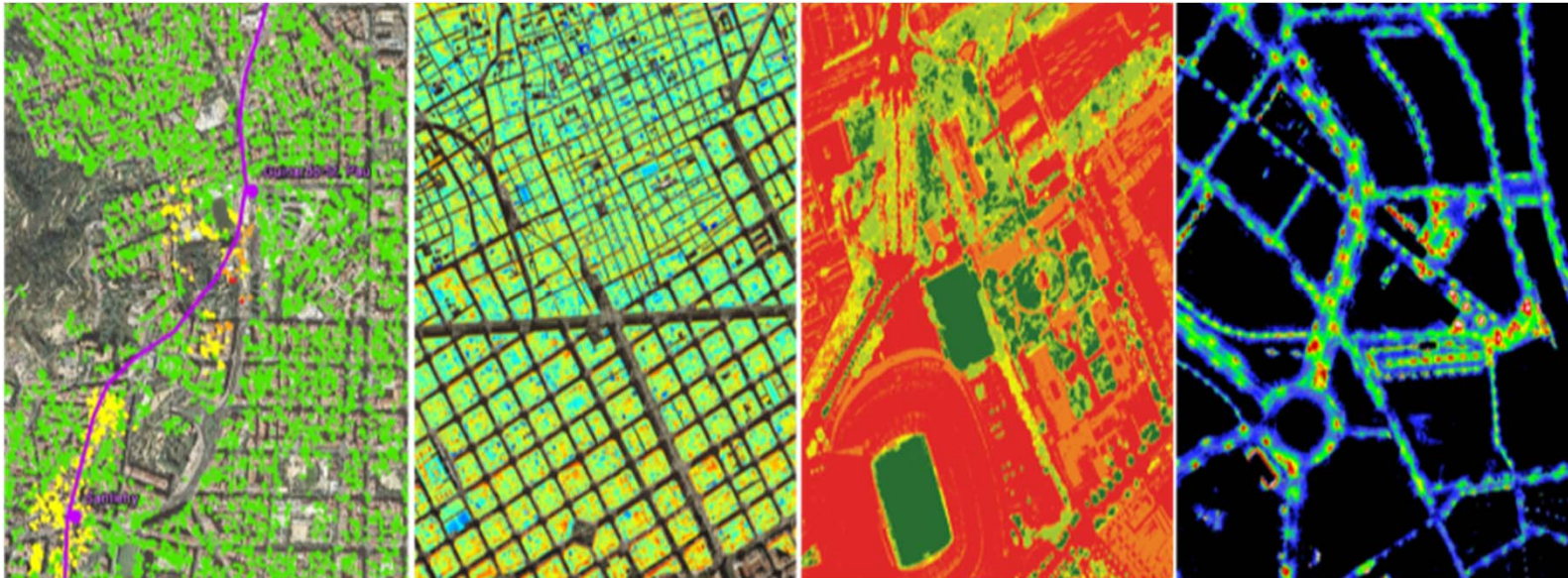


*ICGC (2016):  
LCZ Level 0 from Landsat Imagery*



## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

SCIENCE + TECHNOLOGY + REAL CHALLENGES TO BE SOLVED = ADDED VALUE



## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT PÚBLICA



## HOW TO TRANSFORM DATA INTO INFORMATION AND KNOWLEDGE

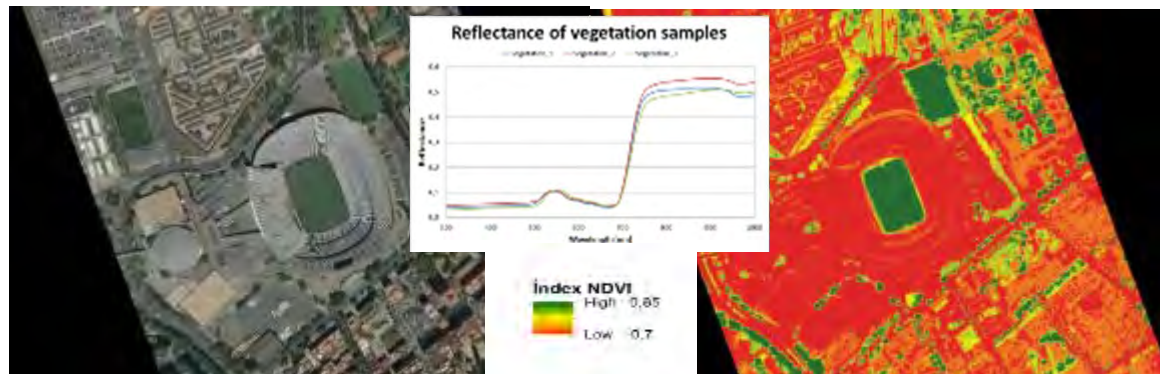
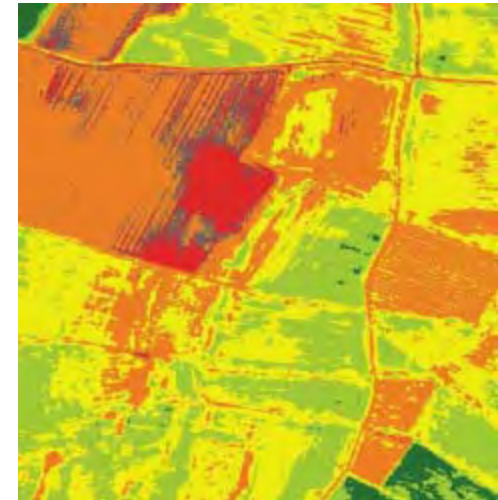
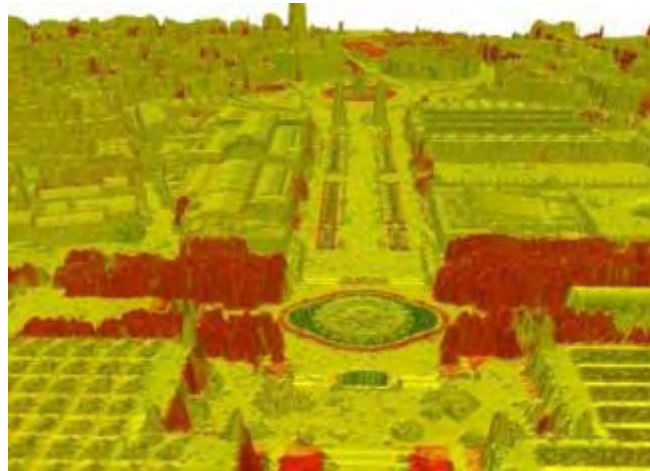
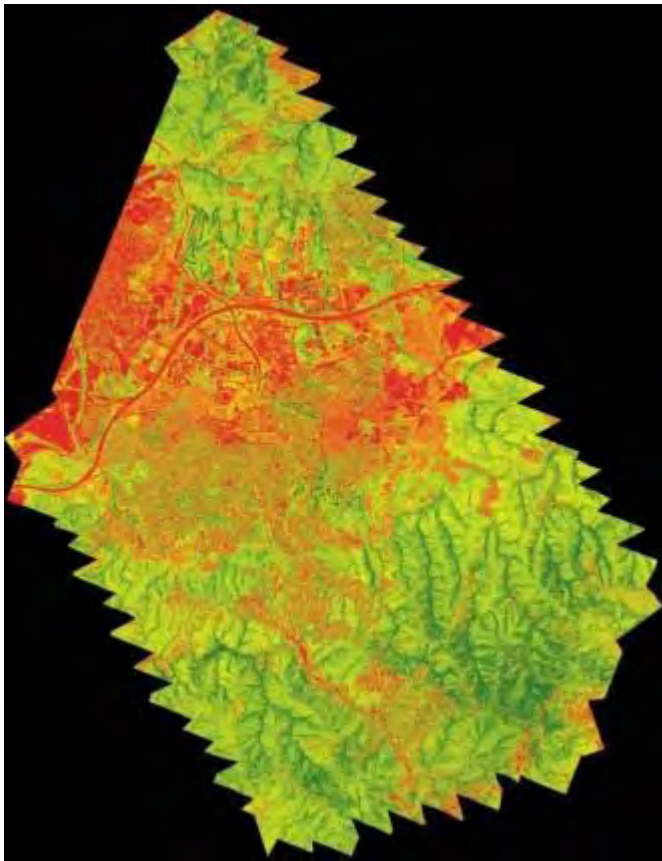
Més de 1000 satèl.lits orbiten la Terra per donar suport a comunicacions, navegació, defensa o ciència i observació de la Terra. Entre aquests darrers, fent un seguiment de l'atmosfera i la superfície terrestre, i així tenir un millor coneixement, seguiment i predicció de fenòmens i indicadors medi ambientals clau

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 en eines de suport a la decisió: qualitat de l'aire, qualitat i quantitat d'aigua, temperatures, contaminació de sols  
....



## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

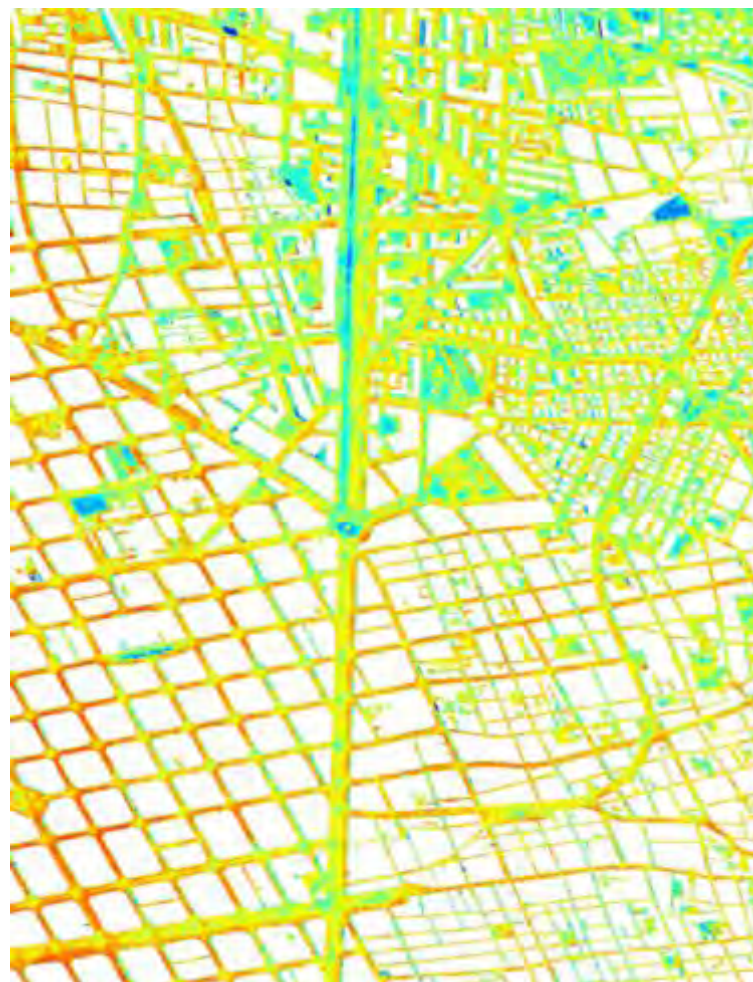
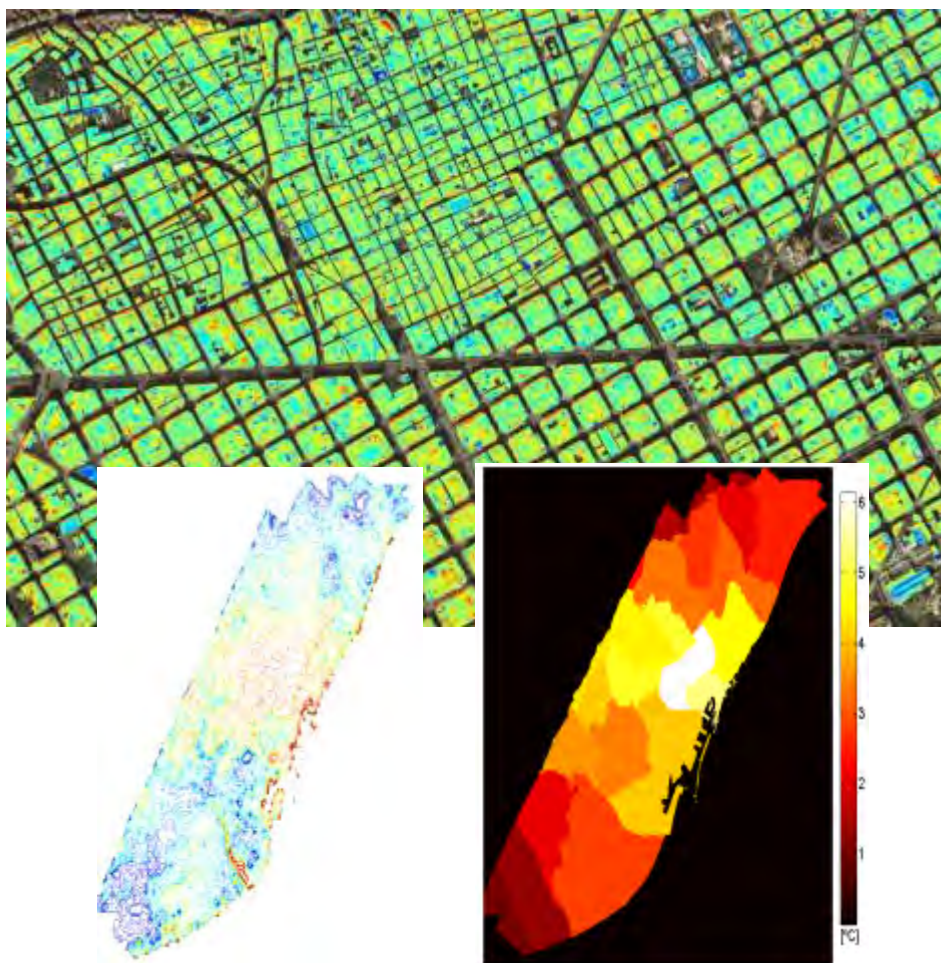
*Urban green could be derived from ICGC's sensors with a GSD < 50 cm. Urban green knowledge in terms of allocation and health represent a key input in terms of urban sustainability and impacts of heat waves events*



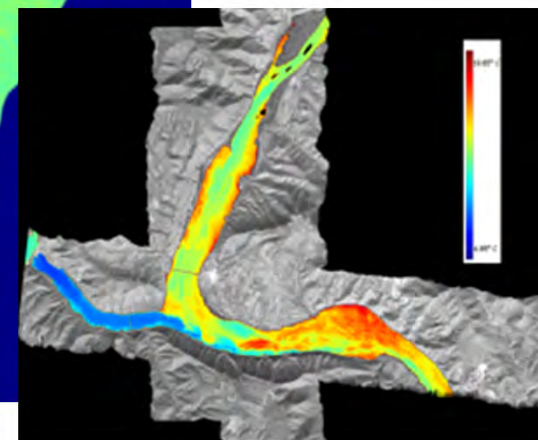
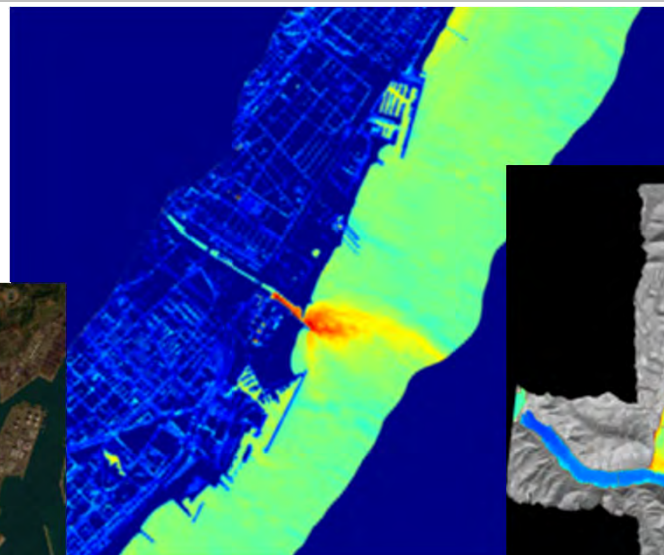
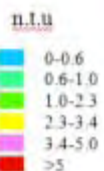
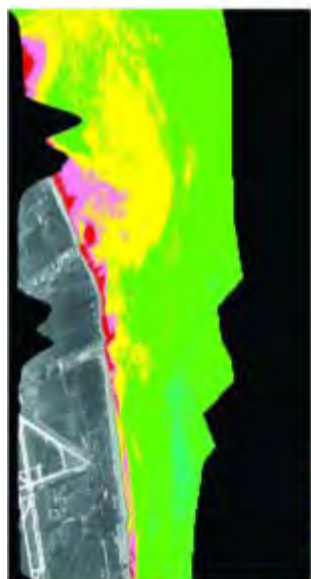


## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

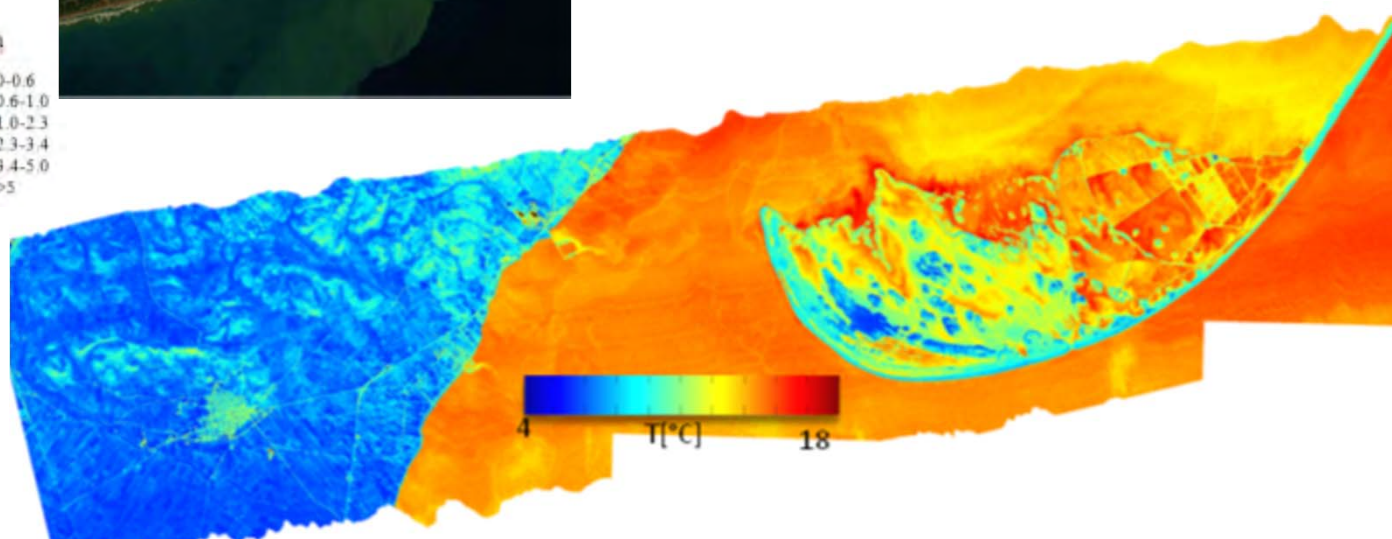
*On a synoptic, reactive and a very high resolution level, urban environments could be sensed and modelled to derive and analyze urban heat island phenomena*



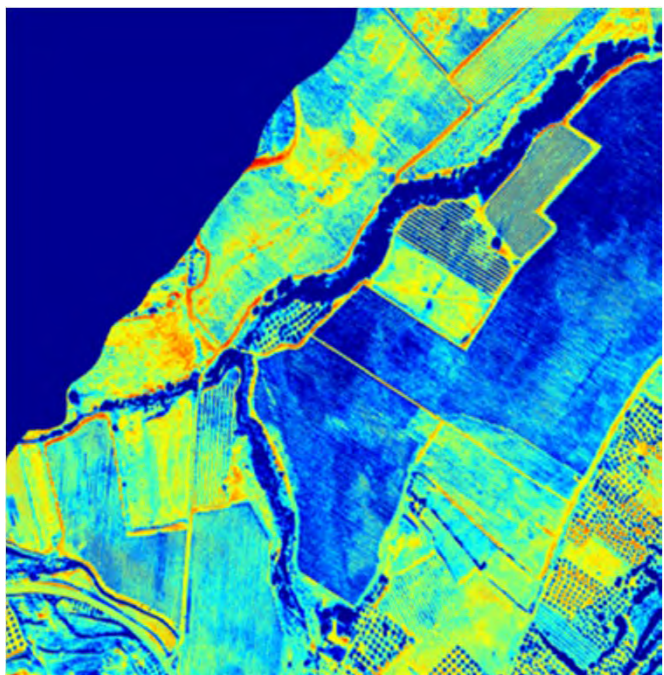
# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT



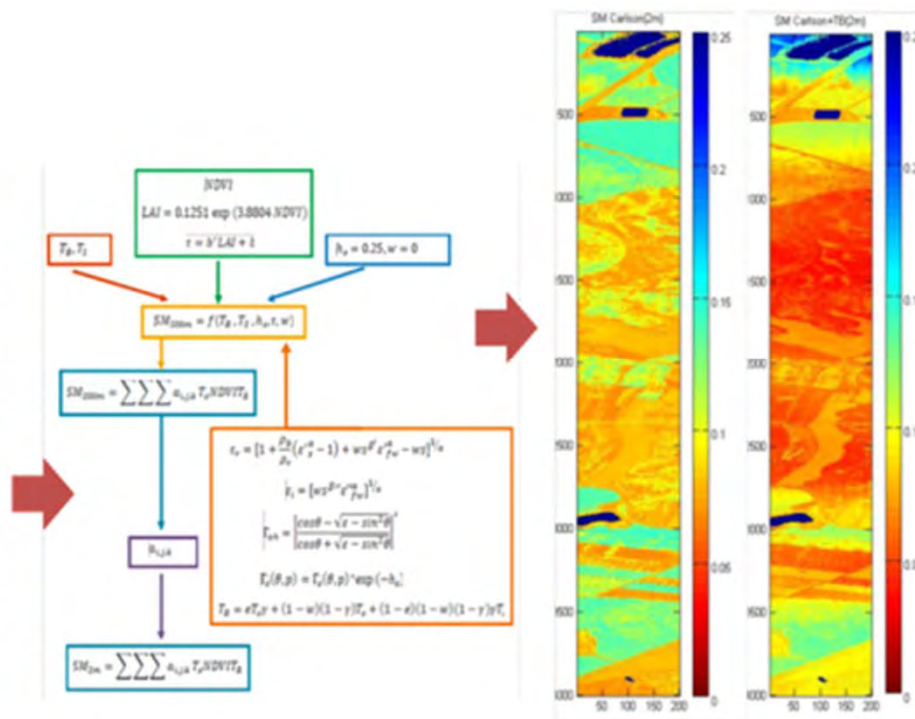
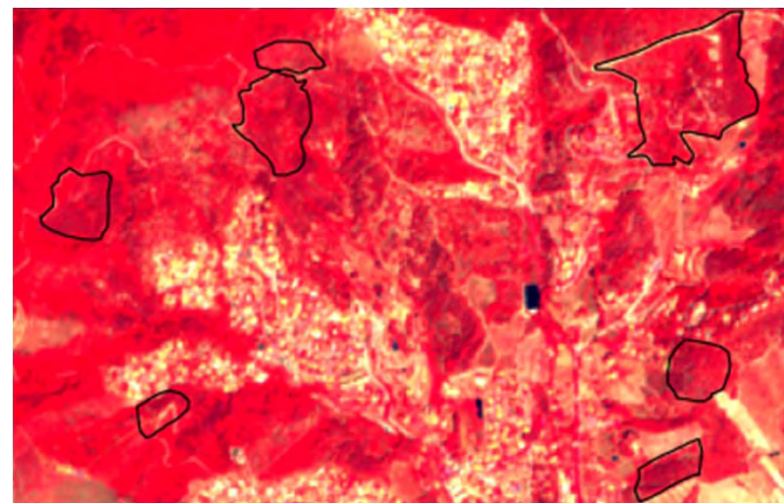
Data fusion capacity from earth observation platforms and spectrums to suit spatial-temporal requirements on coastal areas



# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

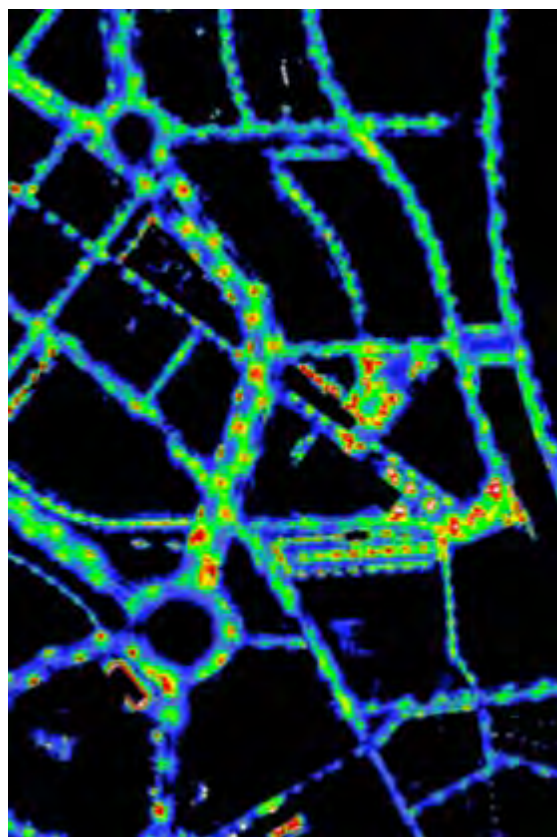


$$CWSI = 1 - \frac{ET_d}{K_c ET_{REF,d}}$$



## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

any	VSAP	HM	FLU	VMCC	Total	propis	comuns
2012	8472	37736	9753	2815	58776	28146	30630
2014	4839	36871	2148	772	44630	14706	30630
Variació [%]	43%↓	2%↓	78%↓	73%↓	24%↓	-	-



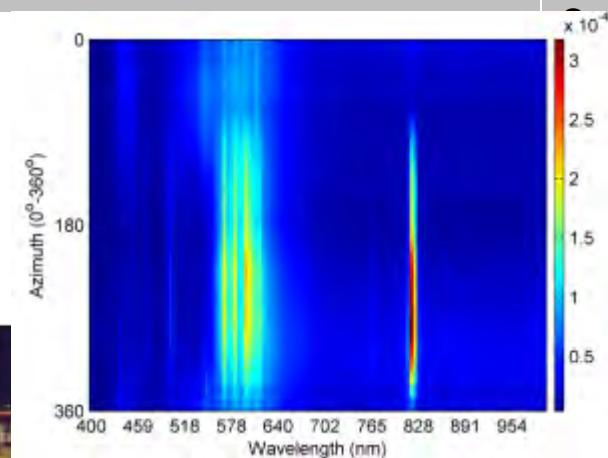
### Classification



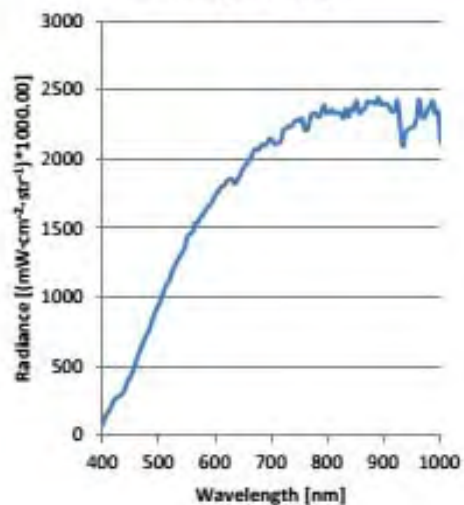
The analysis of luminance at night is performed **by ICGC in conditions of little or null moonlight, so that the radiation captured by airborne sensors can be directly associated to artificial –human lighting.** Own ICGC models allow us to retrieve values of luminance at candles per square meter (cd / m<sup>2</sup>)



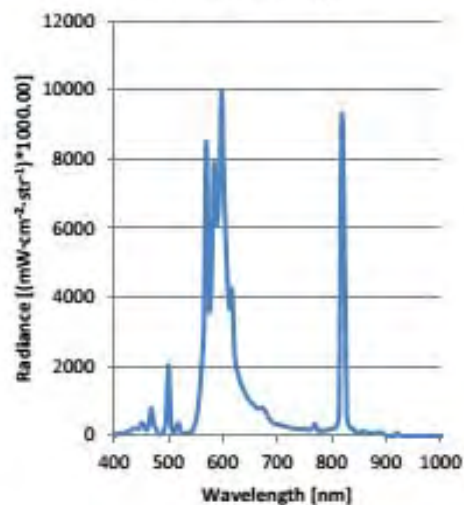
# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT



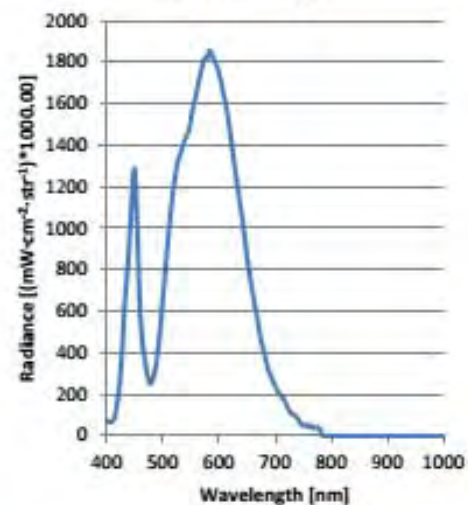
1 - Halogen Lamp



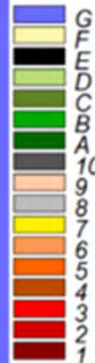
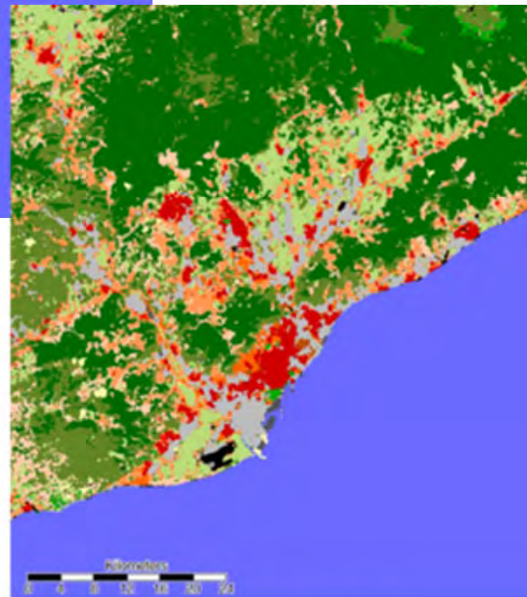
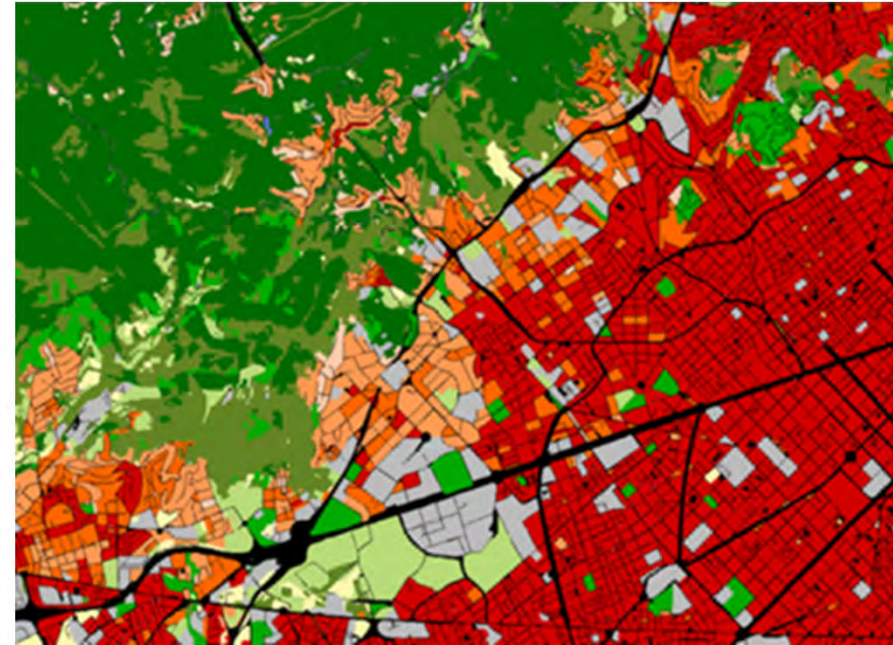
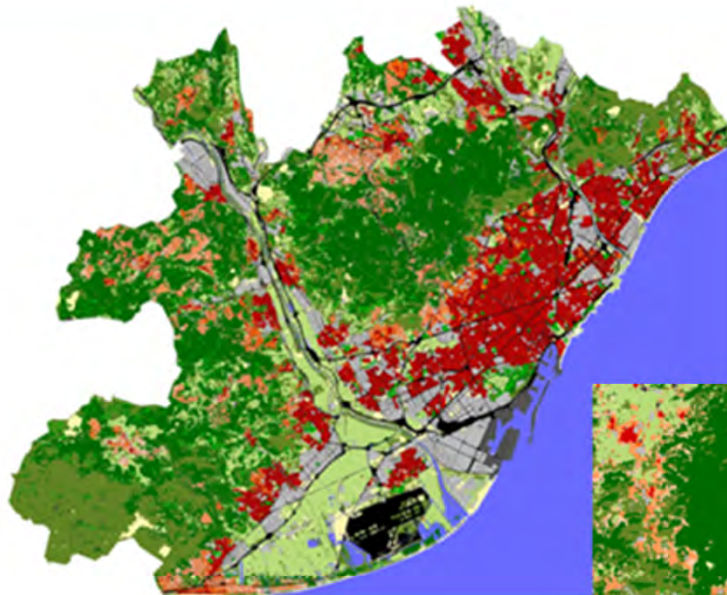
2 - Sodium Lamp



3 - LED Lamp



# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT



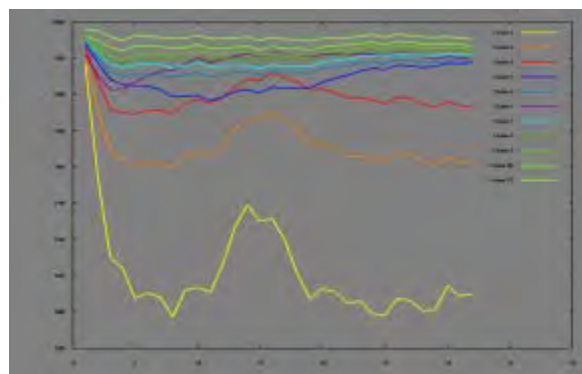
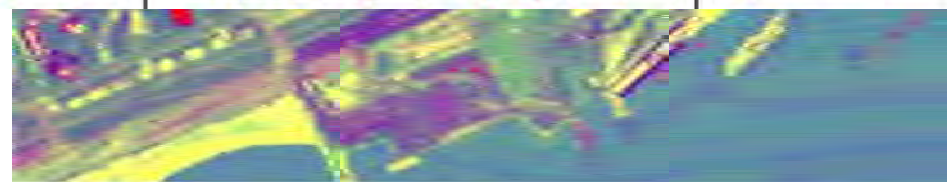
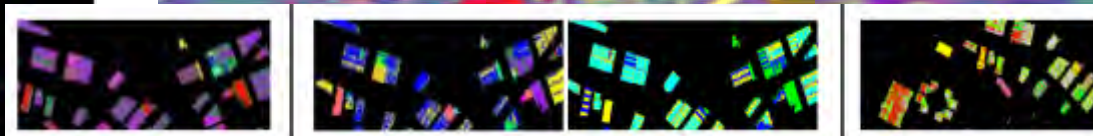
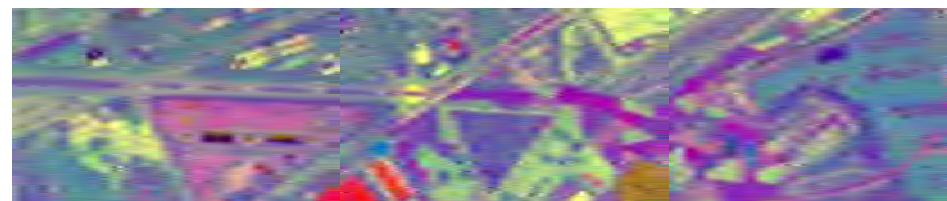
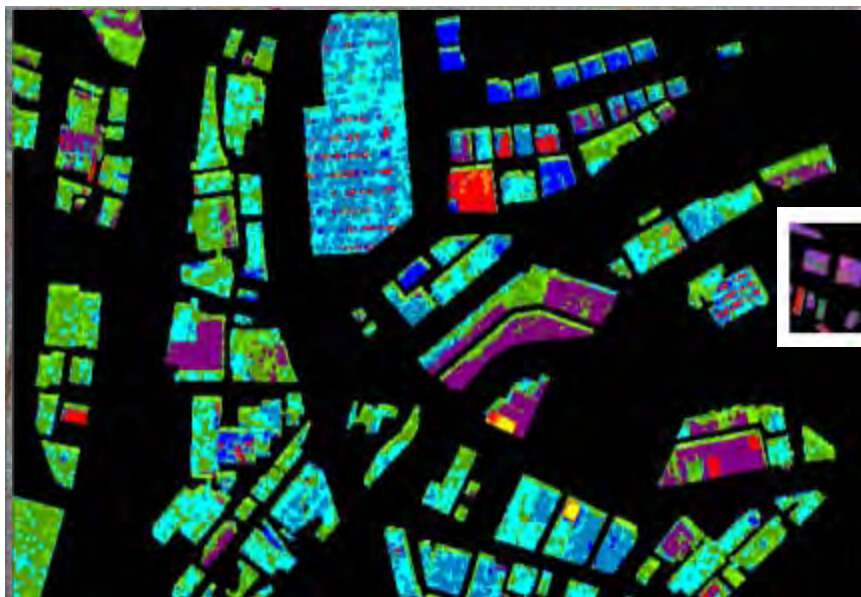
Local climate zone (LCZ)	Sky view factor*	Aspect†	Building surface fraction*	Impervious surface fraction*	Porosity surface fraction*	Height of roughness elements†	Terrain roughness class†
LCZ 1 Compact high-rise	0.2-0.4	> 2	40-60	40-60	< 10	> 25	8
LCZ 2 Compact mid-rise	0.3-0.6	0.75-2	40-70	50-60	< 20	10-25	6-7
LCZ 3 Compact low-rise	0.2-0.6	0.75-1.5	40-70	20-50	< 20	3-10	6
LCZ 4 Open high-rise	0.3-0.7	0.75-1.25	20-40	20-40	20-40	> 15	7-8
LCZ 5 Open mid-rise	0.5-0.8	0.5-0.75	20-40	20-50	20-40	10-25	5-6
LCZ 6 Open low-rise	0.6-0.9	0.2-0.75	20-40	20-50	20-40	3-10	5-6
LCZ 7 Lightweight low-rise	0.3-0.5	1-3	40-60	< 20	> 10	1-4	4-5
LCZ 8 Large low-rise	> 0.7	0.5-0.3	20-50	40-50	> 20	2-10	5
LCZ 9 Sparingly built	> 0.8	0.1-0.25	10-20	< 20	60-80	2-10	3-4
LCZ 10 Heavy industry	0.6-0.9	0.2-0.5	20-30	20-40	40-50	1-15	5-6
LCZ A Dense trees	> 0.4	> 1	< 10	< 10	> 90	2-20	8
LCZ B Scattered trees	0.5-0.8	0.25-0.75	< 10	< 10	> 90	5-15	5-6
LCZ C Bare earth	0.7-0.9	0.25-1.8	< 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 sand	> 0.9	< 0.1	< 10	> 80	< 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

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

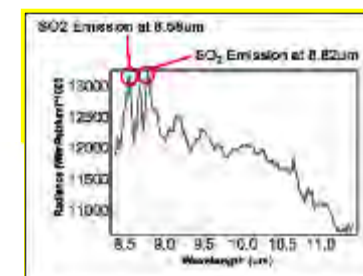
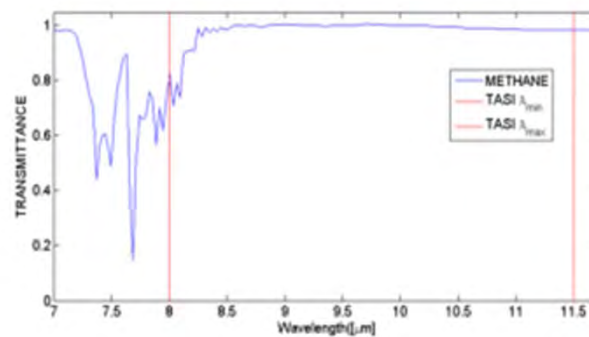
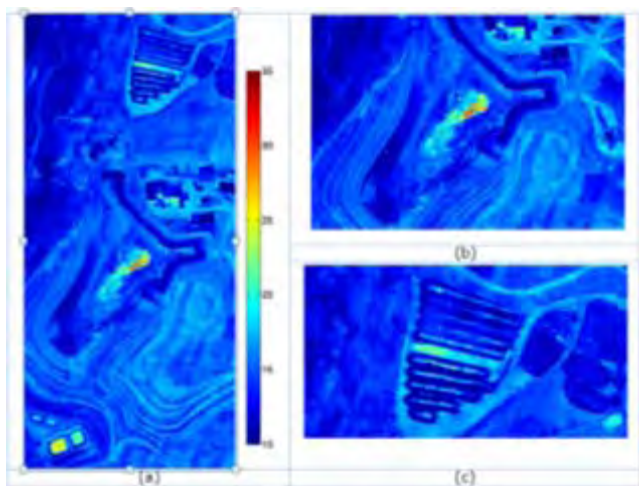
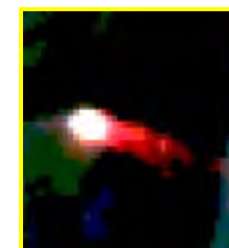
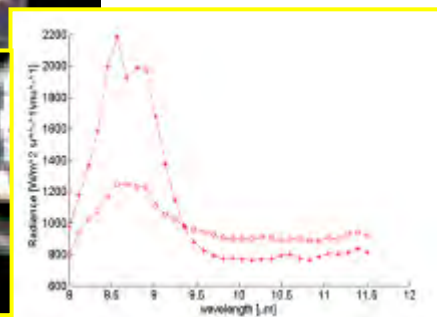
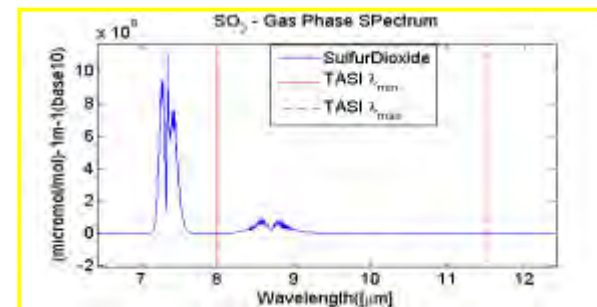


## OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

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



# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT



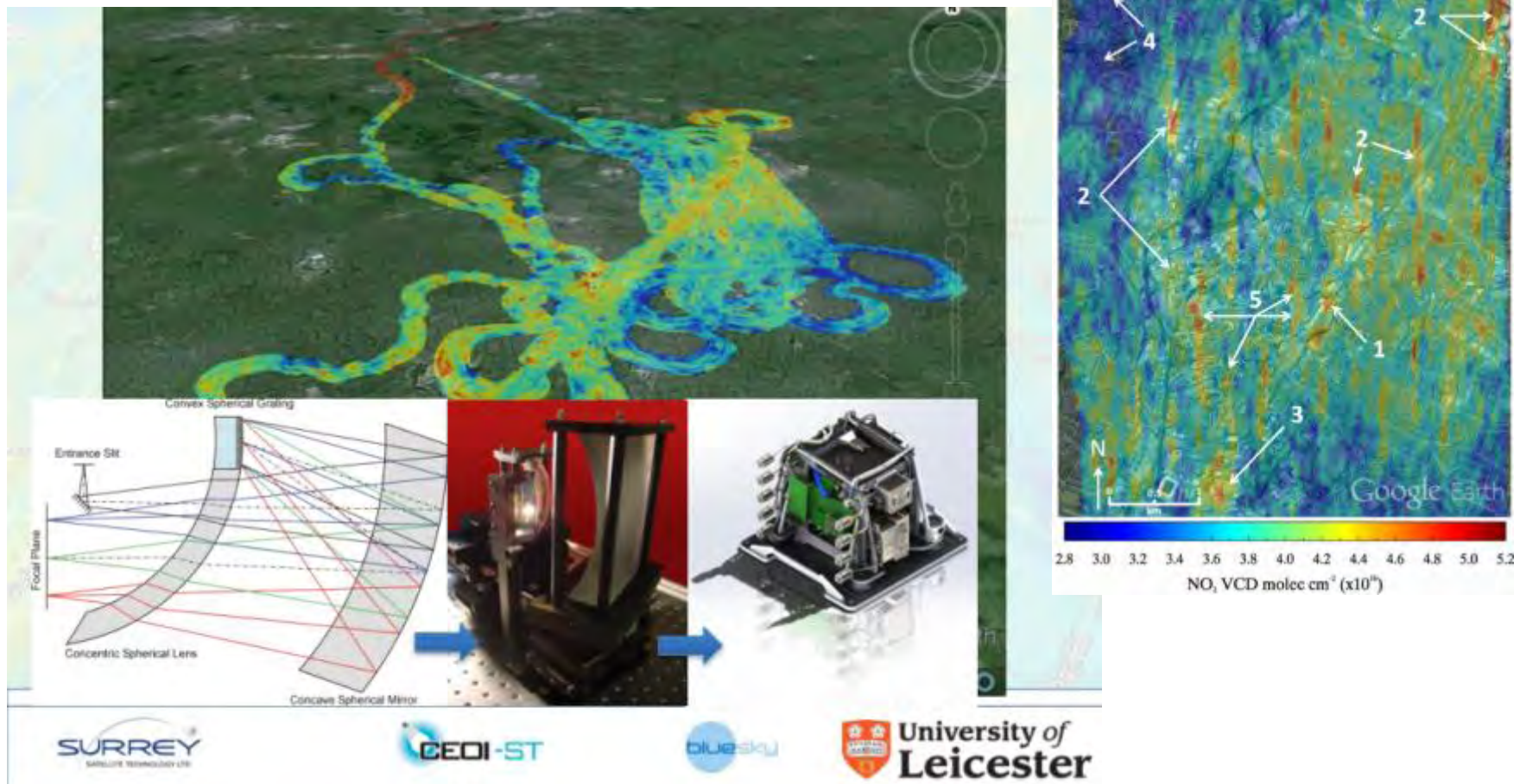
Earth Observation offers a non invasive approach to detect suspicious activities



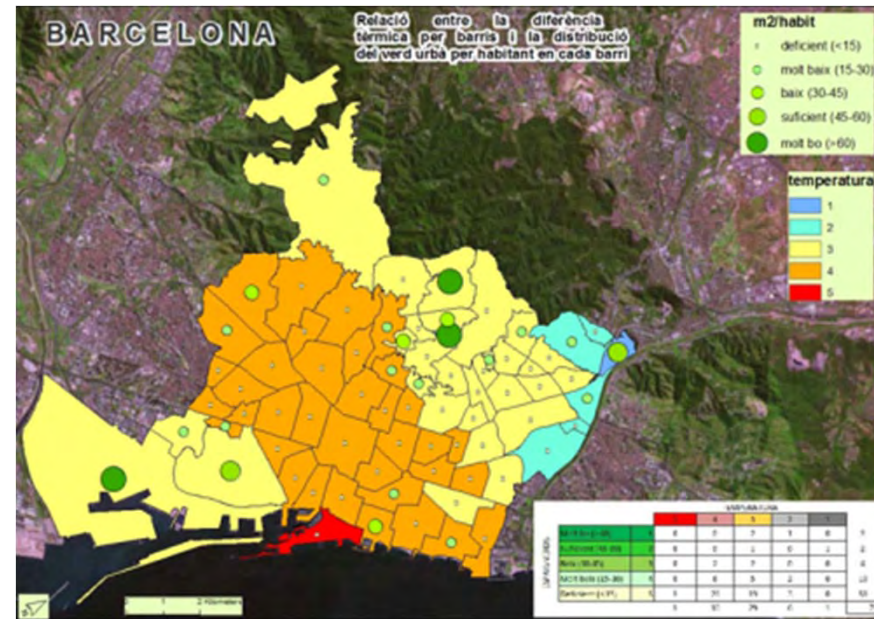


# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT

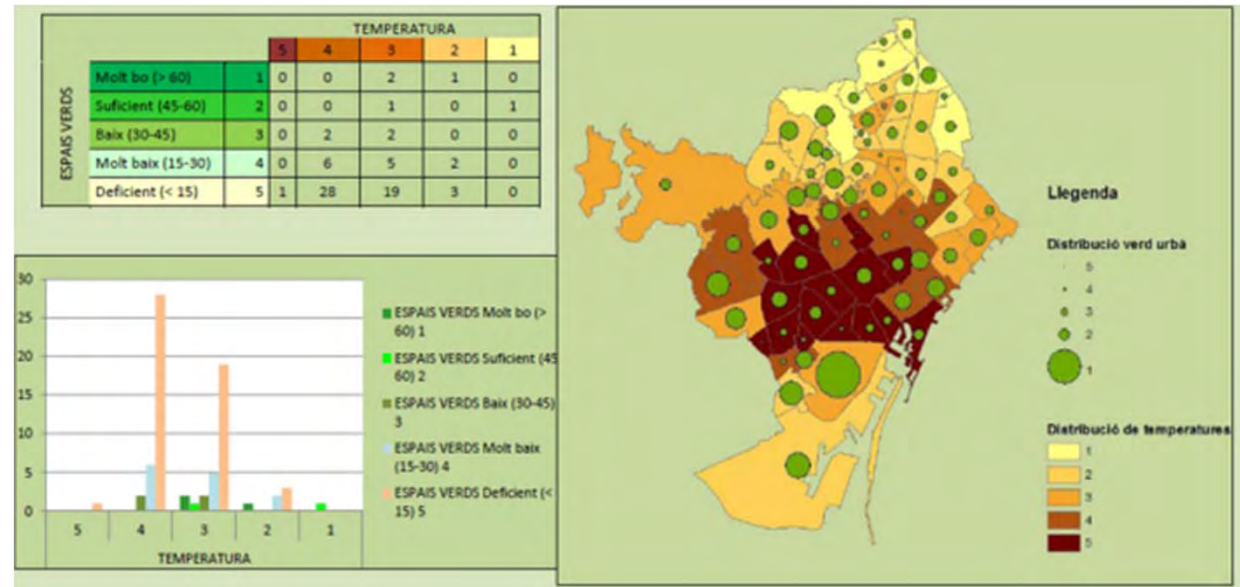
*On a research level, we exploring new earth observation architectures to become operational to help, monitor and evaluate air pollution*



# OBSERVACIÓ DE LA TERRA, GEOINFORMACIÓ I SALUT



<http://geoinfo.uab.es/master/>



## LA JORNADA: FINESTRA D'OPORTUNITAT

09:00 – 09:20	Lliurament d'acreditacions als assistents
09:20 – 09:30	Benvinguda i presentació de la jornada
09:30 – 10:00	Observació de la Terra – Geoinformació i salut Jordi Corbera, ICGC
10:00 – 10:30	Contaminació lumínica Ariadna Garcia, Institut de Salut Global de Barcelona (ISGLOBAL)
10:30 – 11:00	Pausa – descans
11:00 – 11:30	Qualitat de les aigües Jordi Camp, Institut de Ciències del Mar (ICM) – Consejo Superior de Investigaciones Científicas (CSIC)
11:30 – 12:00	Comportament tèrmic – Illa de calor Josep Roca i Blanca Arellano , Centre de Política del Sòl i Valoracions (CPSV) – Universitat Politècnica de Catalunya (UPC)
12:00 – 12:30	Debat i cloenda

