

Detección de piscinas en base a información catastral: posibilidades y limitaciones

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CONSUM

La febre per tenir una piscina a casa creix a Barcelona

Les empreses constructors registren un augment de la demanda d'entre el 15% i el 25% en un any

SELENA SORO BARCELONA | ACTUALITZADA EL 22/08/2016 00:00



L'Andrés s'està construint una piscina de 8,5 metres a la seva residència de Cabrils (Maresme). / CÈLIA ATSET

Métodos manuales



Métodos basados en teledetección

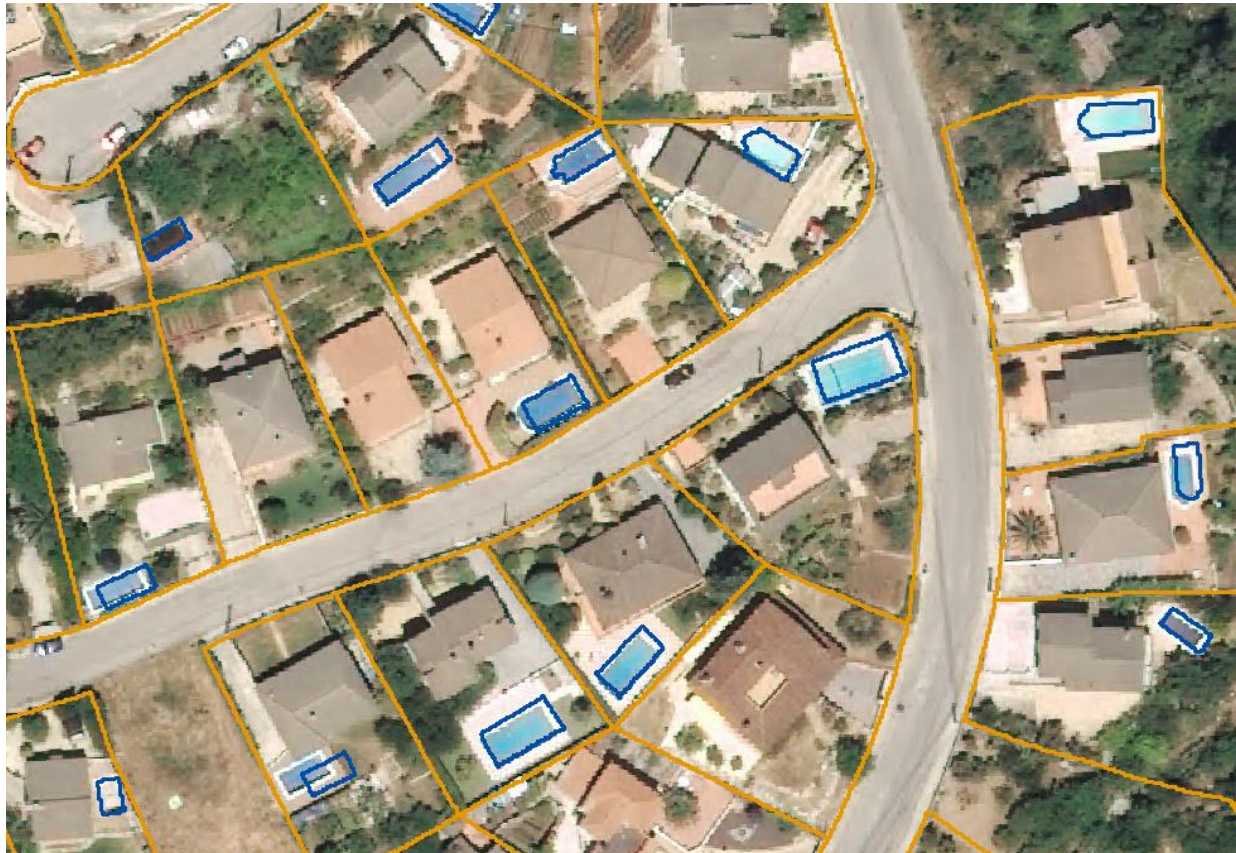
- Árboles, sombras...
- Costes (imágenes, software, especialistas...)
- Disponibilidad de información
- Reproducibilidad



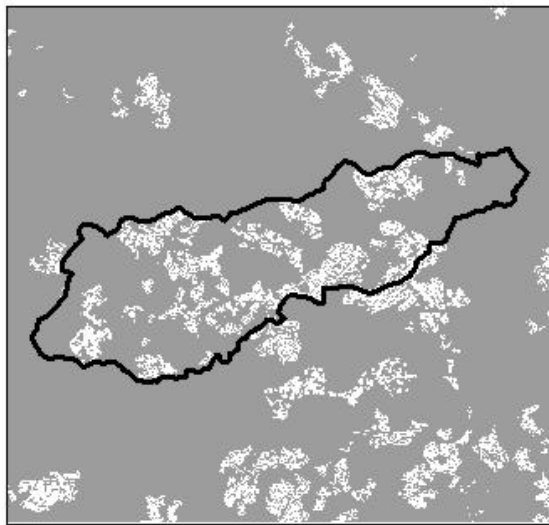
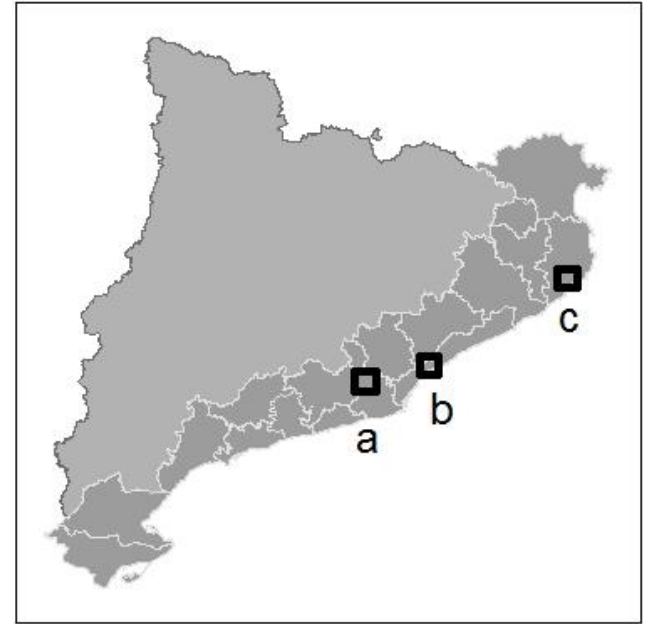
Sede Electrónica del Catastro

Descarga de datos y cartografía por municipio

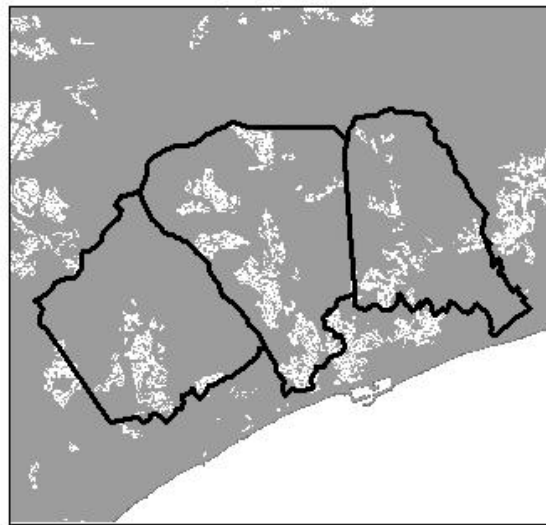
- Descarga de información alfanumérica (formato CAT) [+INFO](#)  cl@ve
- Descarga de cartografía vectorial (formato Shapefile) [+INFO](#)  cl@ve
- Descargas de ficheros de Redes Topo-Geodésicas Catastrales [+INFO](#)  cl@ve



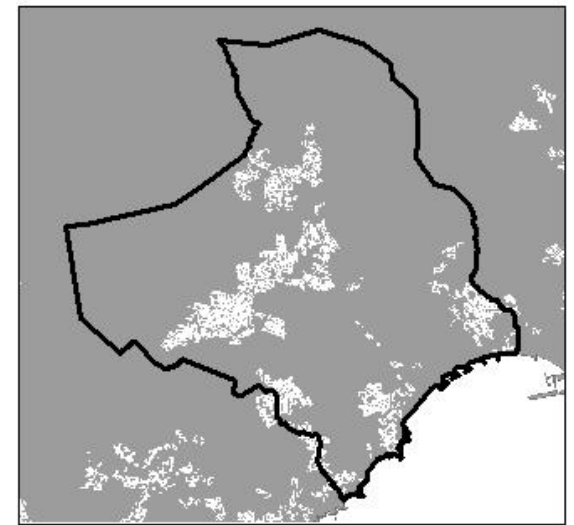
Área de estudio



a



b



c

Métodos

Virtual Office of the Cadastre



Raw
cadastral
data

Input

CREAF Research Centre



Low density
residential areas
extracted from the
Land Cover Map
of Catalonia

Mask

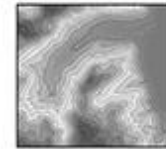
Cartographic and Geologic Institute of Catalonia



2015
Colour & IR
orthoph.
1:2500



2011
LiDAR



5-metre
Digital
Elevation
Model

Extraction

GEOBIA

Geoprocessing



Cadastral
swimming
pools



Cadastral
parcels



Detected
swimming
pools



Average
slope and
aspect
per parcel



Cadastral parcels
with added attributes

Added attributes

Cadastral parcel area	Average parcel slope
Cadastral swimming pool area	Average parcel aspect
Swimming pool (no/built/temporary)	Cadastral vs. detected pool centroid distance
Pool condition (empty/full/covered/undetermined)	Cadastral vs. detected pool centroid angle
Pool location (not in cadastre/correct/partial overlap/no overlap)	

*Geospatial
analysis (GIS)*

Statistical analysis (SPSS)

Descriptive statistics

ANOVA

Correlations

Clustering patterns

Resultados

Presencia de piscinas (base real)

	Corbera de Ll.	TAT	Calonge
Number of plots	4157	3877	4084
Without a swimming pool (%)	2331 (56.1%)	2363 (60.9%)	2134 (52.3%)
With a swimming pool (%)	1826 (43.9%)	1514 (39.1%)	1950 (47.7%)
Permanent pools (%)	1652 (39.7%)	1470 (37.9%)	1923 (47.1%)
Temporary pools (%)	174 (4.2%)	44 (1.1%)	27 (0.7%)

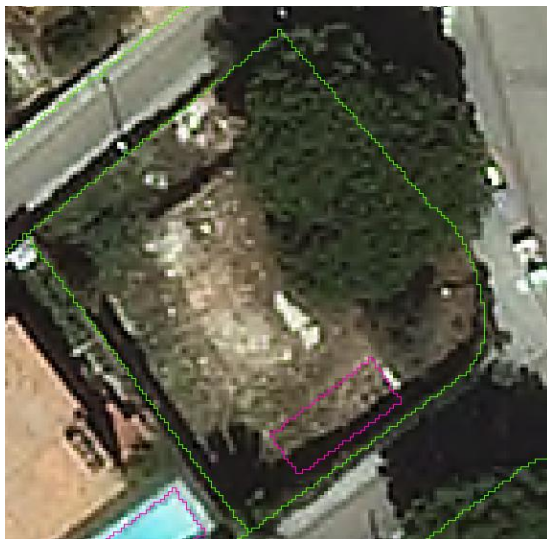
Evaluación de la corrección del catastro

	Corbera de Ll.	TAT	Calonge
Plots with permanent swimming pools ¹	1543	1266	1856
Commission error (% ²)	47 (2.8%)	41 (2.8%)	13 (0.7%)
Omission error (% ³)	156 (9.4%)	245 (16.7%)	80 (4.2%)

¹According to cadastral data.

² Relative to plots with permanent swimming pools according to cadastral data.

³ Relative to plots with verified permanent swimming pools.



Resultados

Evaluación de la precisión espacial del catastro

	Corbera de Ll.	TAT	Calonge
Plots with permanent swimming pools ¹	1496	1225	1843
Correct location	756 (50.5%)	906 (74.0%)	1167 (63.3%)
Partial overlap	697 (46.6%)	297 (24.2%)	615 (33.4%)
No overlap	43 (2.9%)	22 (1.8%)	61 (3.3%)

¹ According to cadastral data and manually verified.



An aerial photograph of a building complex. A yellow dashed line outlines the entire complex, while a blue solid line outlines a specific rectangular area on the right side of the complex. The area inside the blue line is dark, possibly a pool or a paved area. The surrounding area is light-colored, possibly a road or a large open space.

Evaluación de la precisión espacial del catastro

			Corbera de Llobregat			TAT			Calonge		
Dependent Variable			Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.
Pool area ²	1	2	1.32	0.70	.144	2.91*	1.14	.033			
		3	5.54*	1.86	.012	-1.32	3.69	1.000			
	2	1	-1.32	0.70	.144	-2.91*	1.14	.033			
		3	4.22	1.85	.069	-4.22	3.78	.791			
	3	1	-5.54*	1.86	.012	1.32	3.69	1.000			
		2	-4.22	1.85	.069	4.22	3.78	.791			
Distance to nearest point ¹	1	2	-0.71*	0.12	.000	-0.71*	0.18	.000	-0.80*	0.11	.000
		3	-6.12*	0.97	.000	-5.55*	0.98	.000	-8.43*	0.94	.000
	2	1	0.71*	0.12	.000	0.71*	0.18	.000	0.80*	0.11	.000
		3	-5.41*	0.97	.000	-4.84*	0.99	.000	-7.63*	0.95	.000
	3	1	6.12*	0.97	.000	5.55*	0.98	.000	8.43*	0.94	.000
		2	5.41*	0.97	.000	4.84*	0.99	.000	7.63*	0.95	.000
Angle to nearest point ¹	1	2	23.07*	5.01	.000				9.49*	3.63	.024
		3	-28.48	13.46	.097				9.96	11.44	.660
	2	1	-23.07*	5.01	.000				-9.49*	3.63	.024
		3	-51.55*	13.52	.001				0.47	11.62	.999
	3	1	28.48	13.46	.097				-9.96	11.44	.660
		2	51.55*	13.52	.001				-0.47	11.62	.999

			Corbera de Llobregat			TAT			Calonge		
Dependent Variable			Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.
Average slope ¹	1	2	-1.38*	0.34	.000				-0.81*	0.34	.049
		3	-1.80	1.01	.221				-3.82*	1.16	.004
	2	1	1.38*	0.34	.000				0.81*	0.34	.049
		3	-0.42	1.01	1.000				-3.01*	1.17	.033
	3	1	1.80	1.01	.221				3.82*	1.16	.004
		2	0.42	1.01	1.000				3.01*	1.17	.033
Average aspect ²	1	2	-20.72*	4.57	.000						
		3	-36.94*	13.64	.020						
	2	1	20.72*	4.57	.000						
		3	-16.22	13.67	.706						
	3	1	36.94*	13.64	.020						
		2	16.22	13.67	.706						
Plot area ²	1	2	186.39*	29.60	.000	134.07*	30.66	.000	26.70	22.85	.728
		3	37.73	91.89	.911	-70.43	132.85	.857	-255.58*	60.22	.000
	2	1	-186.39*	29.60	.000	-134.07*	30.66	.000	-26.70	22.85	.728
		3	-148.66	91.15	.243	-204.50	133.94	.298	-282.28*	61.55	.000
	3	1	-37.73	91.89	.911	70.43	132.85	.857	255.58*	60.22	.000
		2	148.66	91.15	.243	204.50	133.94	.298	282.28*	61.55	.000

Resultados

Área de piscinas y parcelas según tipología

	Corbera de Ll.	TAT	Calonge
Number of cadastral plots	4157	3877	4084
Average plot size in m ² (Std. Dev.)			
All plots	879 (541)	639 (501)	825 (491)
Plots without swimming pool	789 (501)	483 (411)	678 (475)
Plots with temporary swimming pool	915 (507)	824 (672)	654 (219)
Plots with permanent swimming pool	1001 (574)	883 (526)	989 (458)
Total area of permanent swimming pools in m ²	47784	42044	65920
Average area of permanent swimming pools in m ² (Std. Dev.)	31.9 (13.7)	34.3 (19.4)	35.8 (14.4)

Correlación entre área de parcela y área de piscina

		Swimming pool area		
		Corbera de Ll.	TAT	Calonge
Plot area	Pearson correlation	0.389**	0.588**	0.402**
	Sig. (bilateral)	.000	.000	.000
	N	756	906	1167
** Correlation is significant at the 0.01 level (bilateral).				

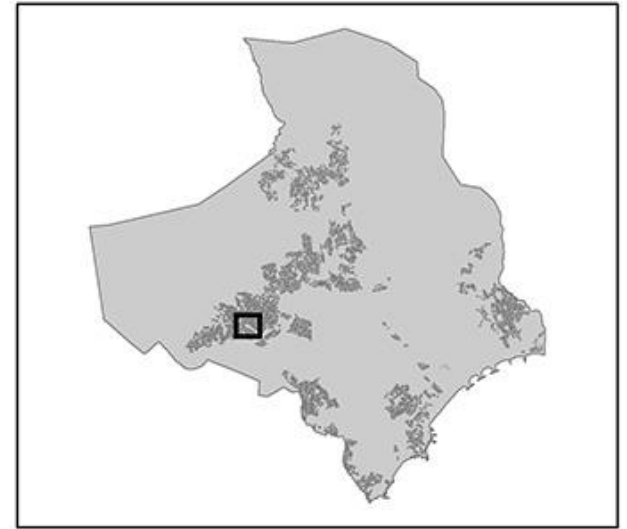
Resultados

Condición de las piscinas permanentes

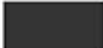
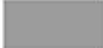
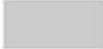
	Corbera de Ll.	TAT	Calonge
Plots with a permanent swimming pool	1652	1470	1923
Empty (% ¹)	159 (10.6%)	117 (8.5%)	64 (3.5%)
Full (% ¹)	1288 (86.2%)	1230 (88.9%)	1541 (83.6%)
Covered (% ¹)	47 (3.1%)	36 (2.6%)	238 (12.9%)
Undetermined	158	87	80



Resultados



Legend

-  Swimming pool, with cover
-  Swimming pool, no cover
-  No swimming pool

Conclusiones

El catastro:

- Base catastral apta para selección de una muestra de parcelas con piscina
- Utilidad limitada para usos que requieran alta precisión y exhaustividad
- Recomendable como punto inicial para la generación una base de datos completa y fiable

Los métodos:

- No identifican un único factor como responsable de los errores de localización de piscinas
- GEOBIA puede contribuir a la identificación de errores de localización
Pero contiene omisiones/comisiones propias, cubiertas, árboles, etc.
- Recomendable combinar distintos métodos (catastro+GEOBIA>manual)

Piscinas, agua y planificación:

- Existe relación entre el tamaño de la parcela y la presencia de piscina permanente
- Influencia apreciable de factores socioeconómicos y culturales:
 - Diferencias entre municipios (menores ingresos -> más piscinas temporales, permanentes de menor tamaño, más piscinas vacías)
 - Aglomeración espacial de cubiertas: efecto de vecindad, ejemplaridad, estatus...

Investigación futura:

- Optimización del tratamiento de la información catastral e integración con GEOBIA
- Generalización de resultados requiere una estratificación sensible a factores socioeconómicos
- Efectos de la revisión catastral 2013-2017 sobre su calidad