

REVEALING THE GEOLOGY OF URBAN AREAS:

The 1:5000 urban
geological map of
Catalonia approach

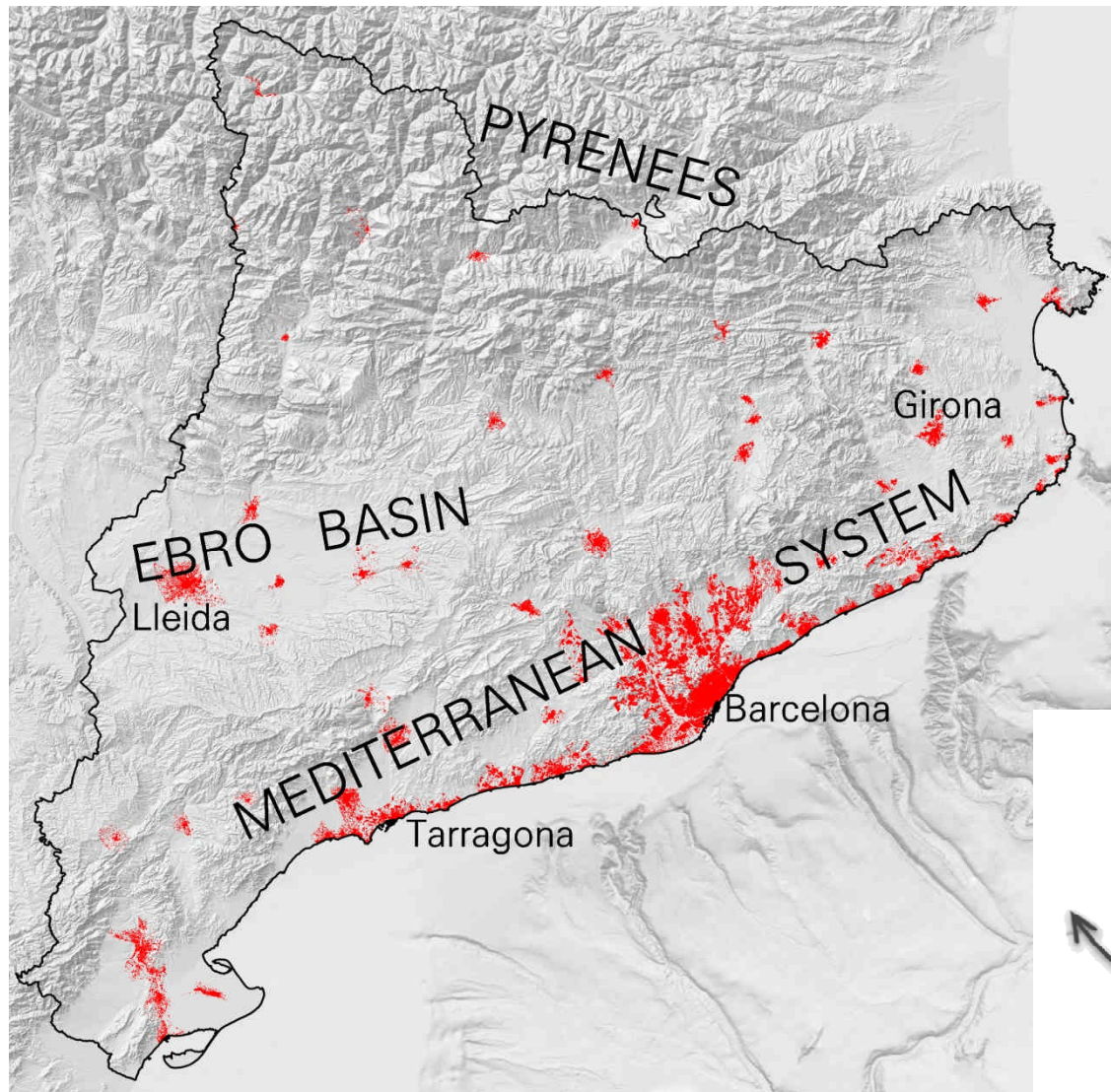
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INTRODUCTION



- TARGETED STUDIES
- SYSTEMATIC CHARACTERIZATION



AREAS PLANNED TO BE MAPPED

- 1:5000 scale
- County capitals and town >10000 inhabitants
- Total of 131 towns and 2200 km²
- 260 maps
- 60% belong to Barcelona metropolitan area



METHODOLOGY

COMPILING PREVIOUS DATA

ACQUIRING NEW DATA

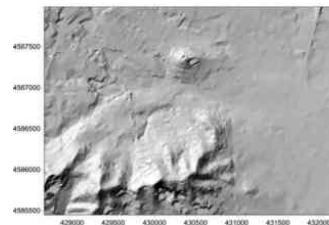
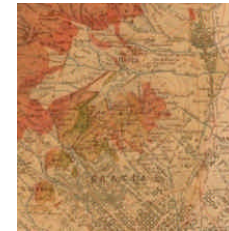


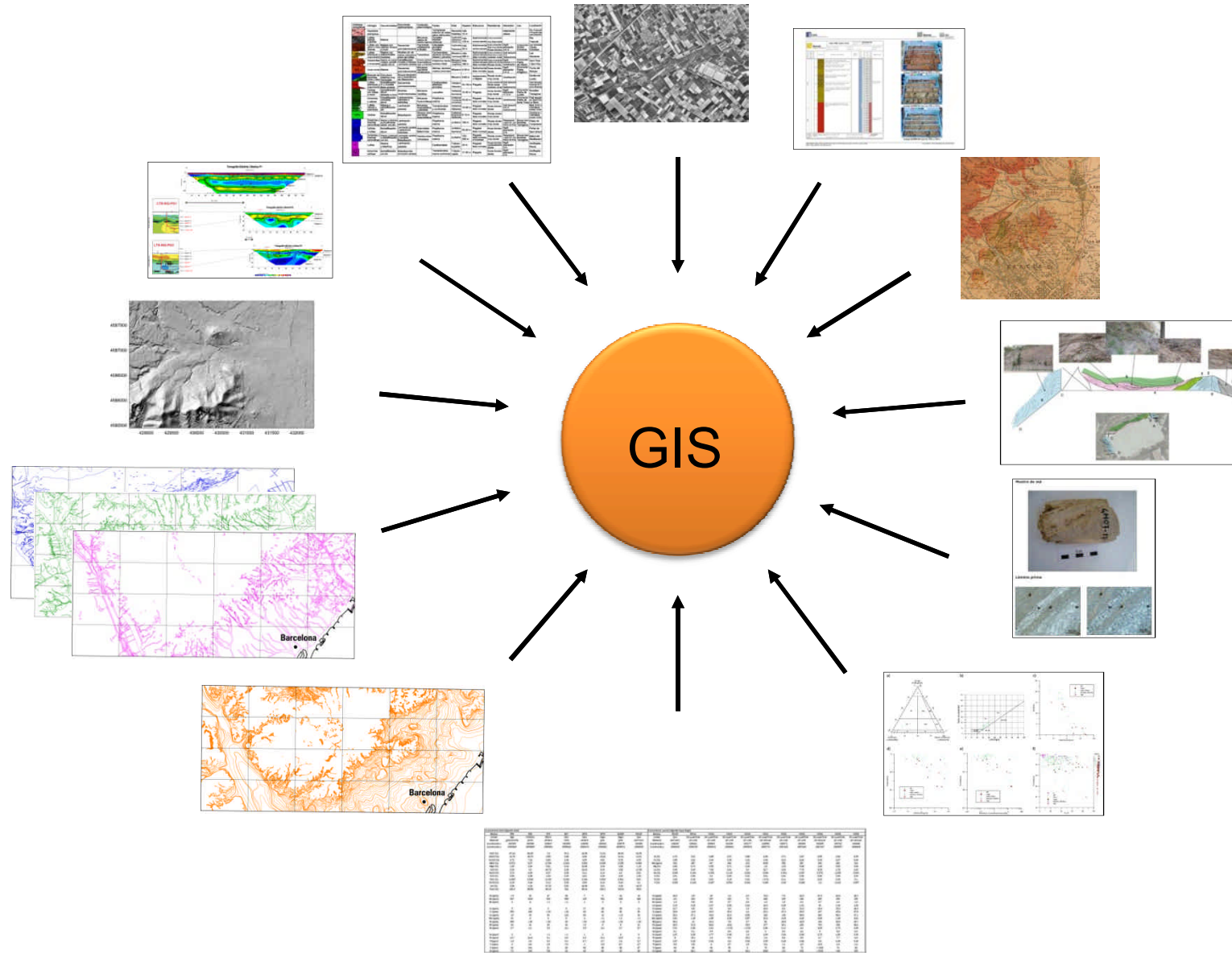
ANALYSIS OF THE DATA

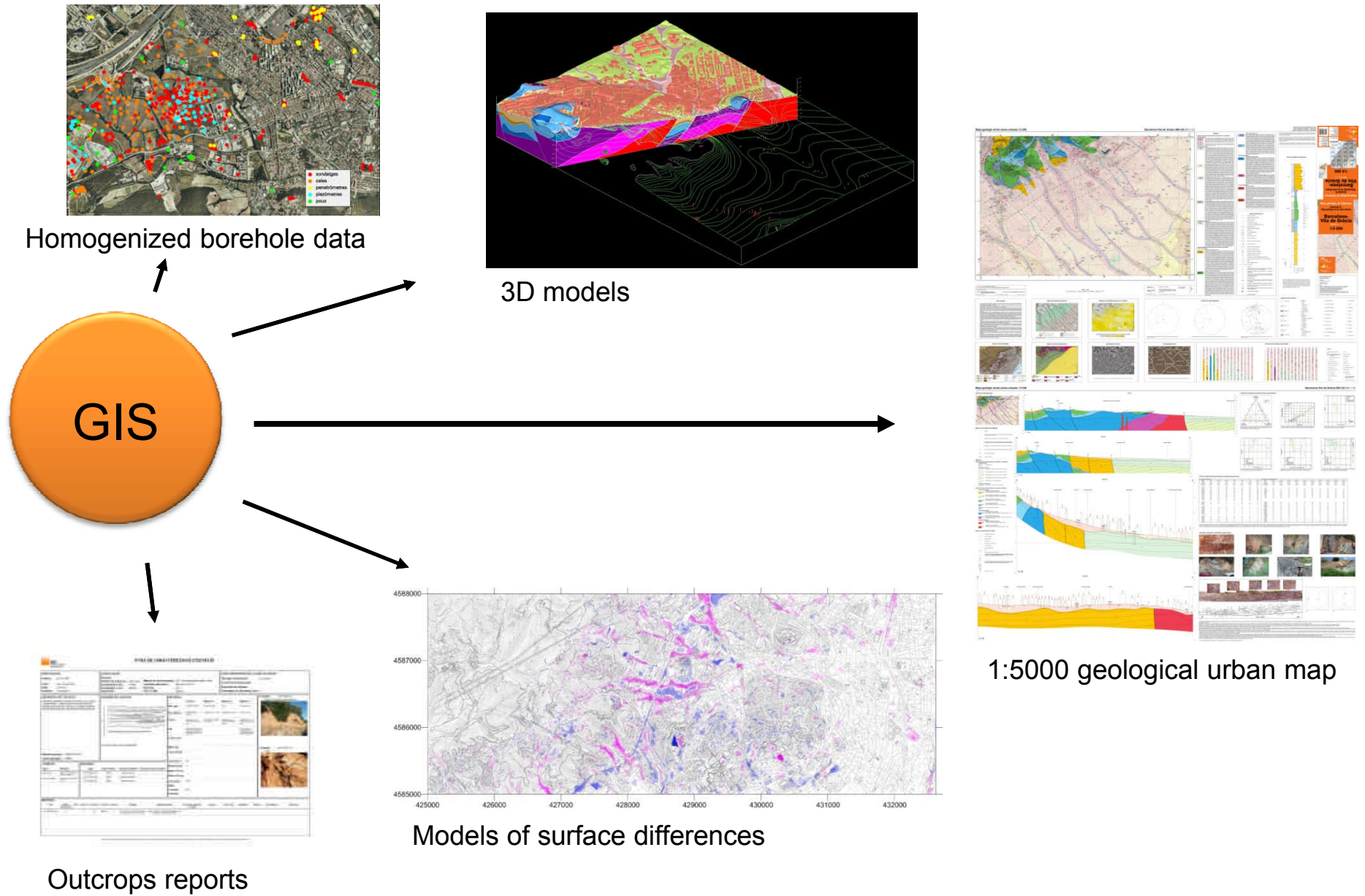


INTEGRATION IN A DATABASE

- Previous geological maps and geological studies from IGC
- Other geologic maps and geoscientific studies
- Applied geological studies (e.g. geotechnical)
- Ancient cartographic documents
- Actual cartographic documents

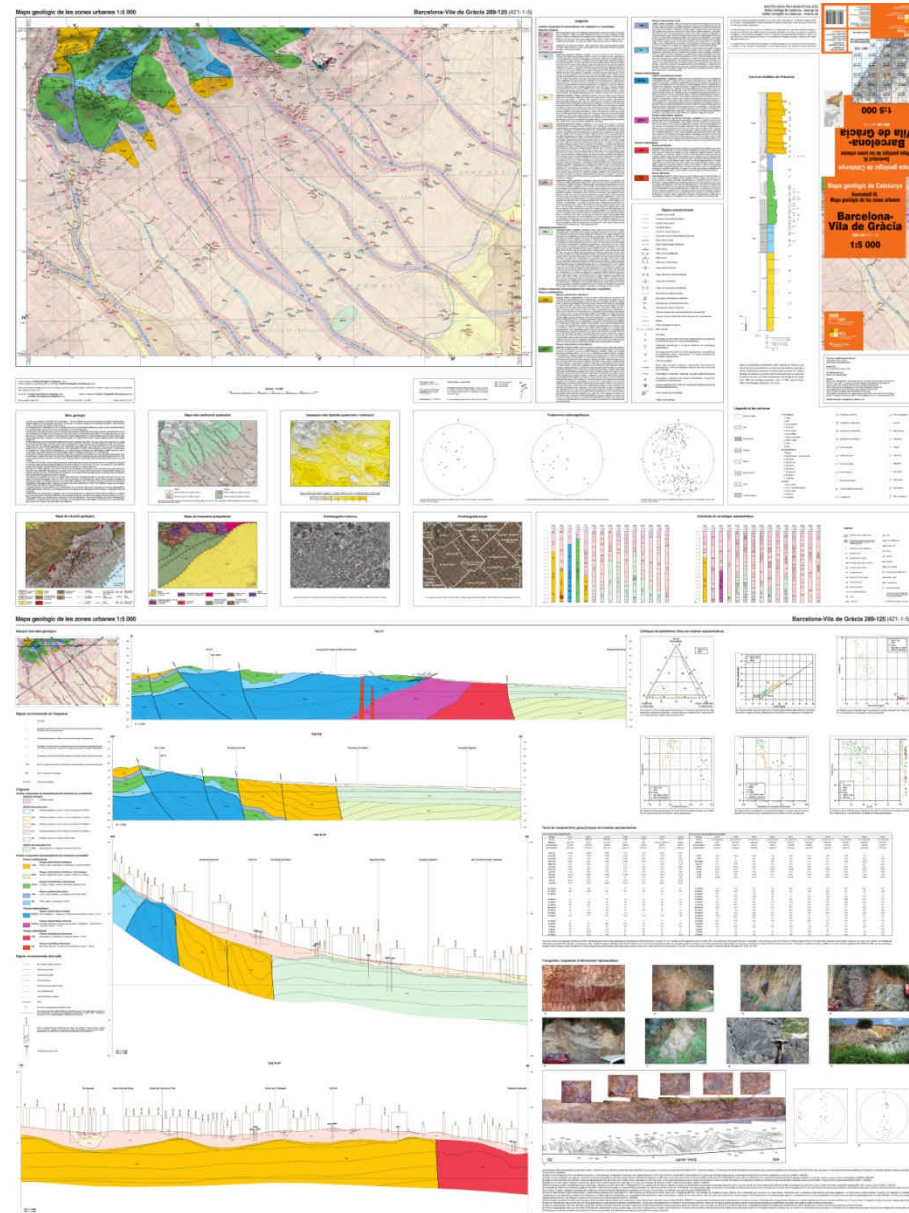


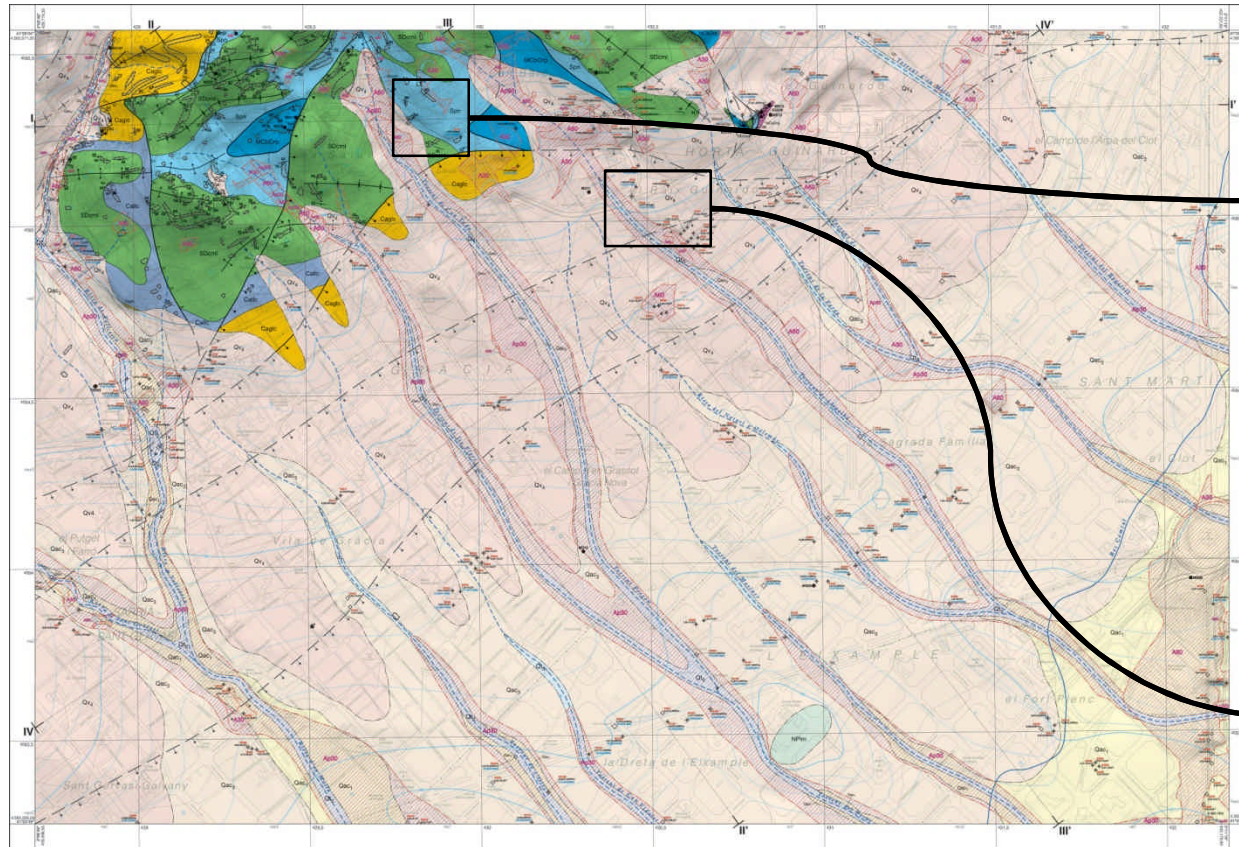




THE 1:5000 SCALE URBAN GEOLOGICAL MAP OF CATALONIA PRODUCT

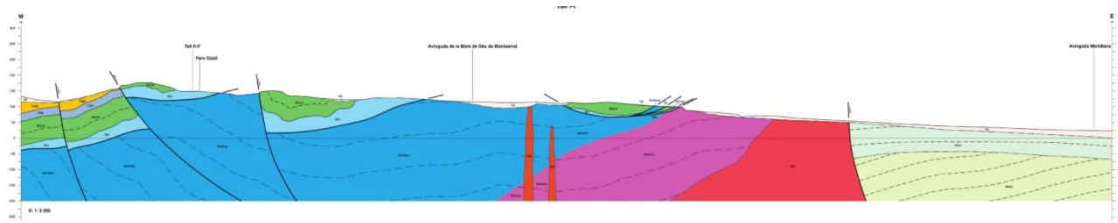
- Main map of 8 km²
- Several complementary elements related to the map area
- The content may change depending on geological features and available data



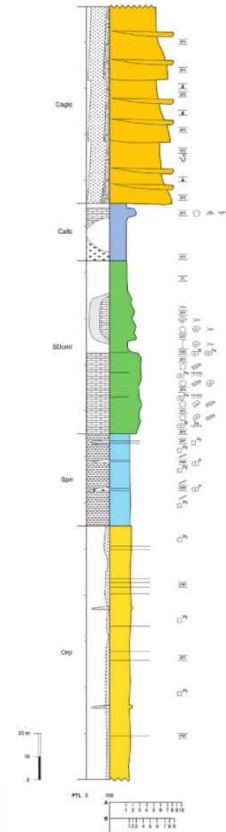


- Quaternary and bedrock deposits
- Main anthropogenic deposits
- Outcrops
- Boreholes
- Contour lines of the top prequaternary surface

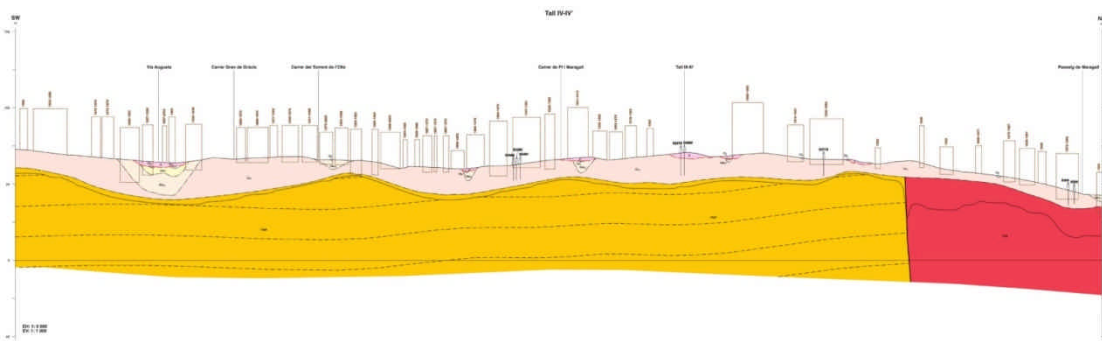
General cross section



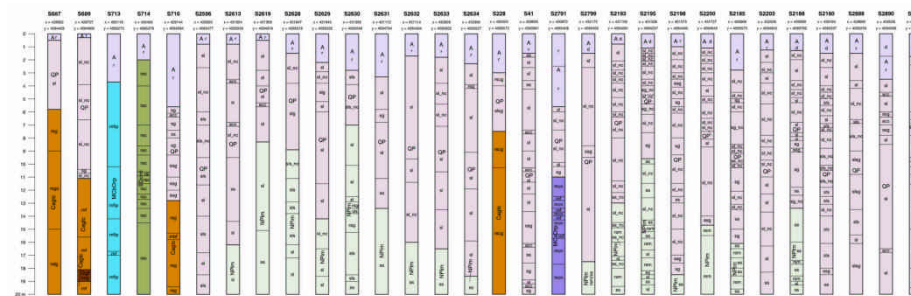
Simplified lithostratigraphic section



Detailed cross section



Harmonized borehole logs

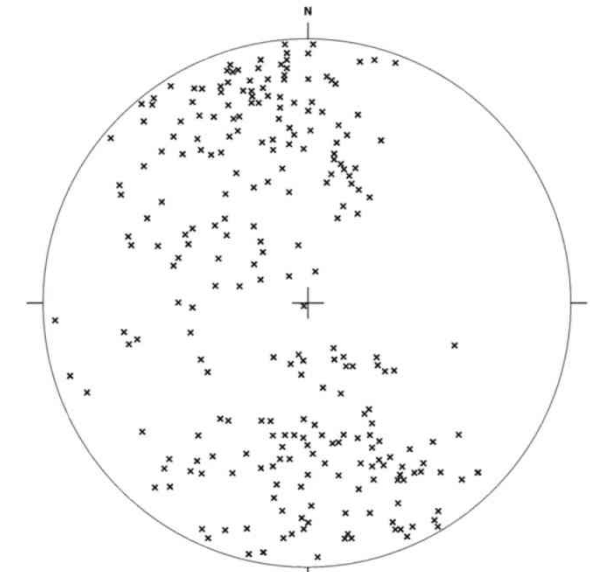
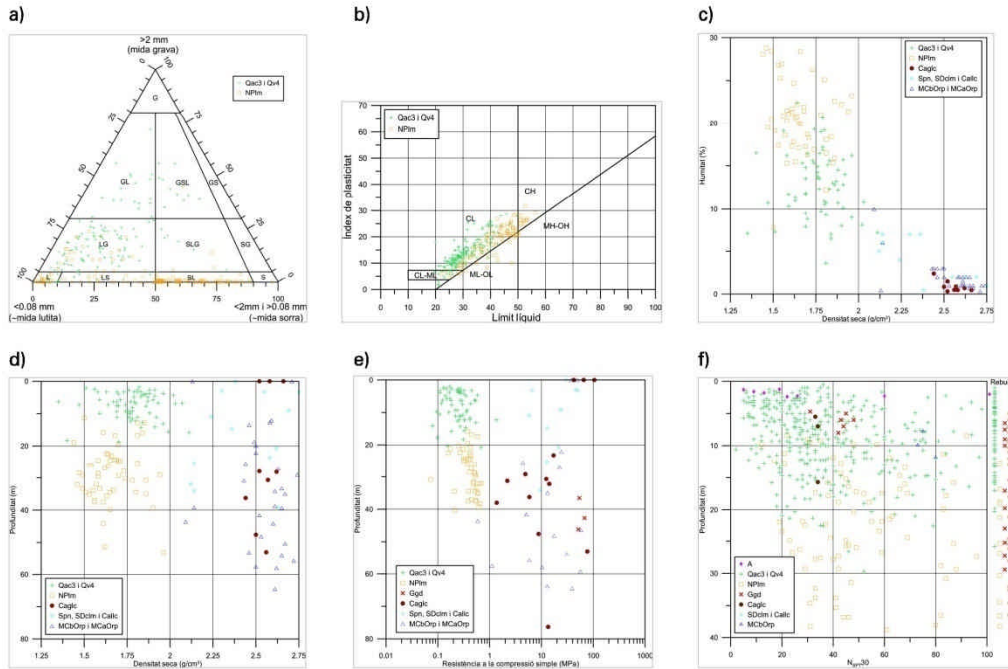


Geochemical composition of representative rocks sediment and topsoil samples

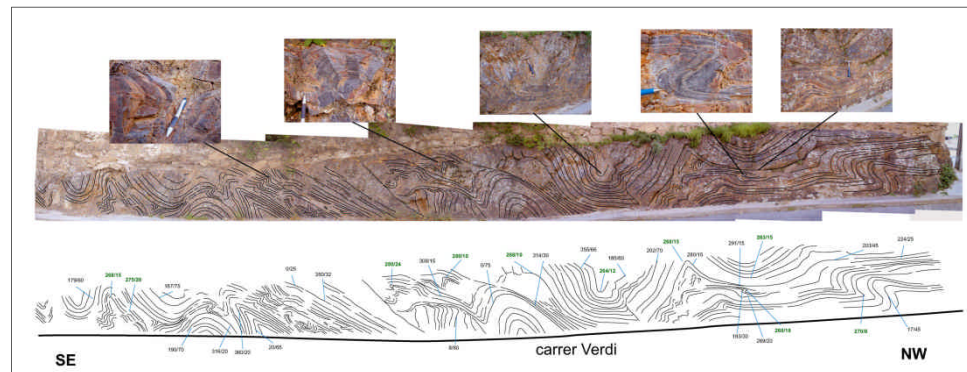
Concentració total (d'elements totals)							Concentració parcial (d'elements Aque Regia)													
Mostra	ES515	ES542	ES540	ES593	ES547	ES552	ES564	Mostra	MS13	MS08	MS09	MS10	MS11	MS12	MS18	MS19	MS20	MS17		
Unitat	Riv	MCaOp	MCaOp	CgCg	CgCg	CgCg	SDim	Unitat	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial	S45 Superficial		
Material sediment	profes	corriosa	grs	grs	microconglomerat	calçaria		Material sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment		
Coordenada x	429630	430782	430830	428884	429936	428911	430351	Coordenada x	430600	430773	430973	430362	430328	430857	429443	429363	429242	429476		
Coordenada y	4595500	4595273	4595307	4584534	4595521	4595273	4584531	Coordenada y	4595305	4593943	4583930	4584036	4585084	4585331	4582811	4593555	4584539	4585309		
SiO ₂ (%)	82.56	69.08	57.92	70.21	73.44	79.18	12.57	Al (%)	1.33	2.63	1.92	1.73	1.84	3.22	1.68	2.63	0.8	1.6		
Al ₂ O ₃ (%)	7.25	13.58	20.96	12.52	12.2	7.34	3.01	Fe (%)	1.85	3	2.59	2.36	2.55	6.74	2.37	13.2	3.14	2.27		
Fe ₂ O ₃ (%)	2.83	4.75	6.91	4.85	4.63	3.49	4.64	Mn (ppm)	412	549	497	460	761	270	563	2600	4180	363		
MnO (%)	0.062	0.005	0.051	0.058	0.049	0.077	0.536	Mg (%)	0.31	0.76	0.76	0.6	0.58	0.72	1.3	4.27	0.49	0.49		
MgO (%)	1.13	0.36	2.4	1.35	1.4	0.39	11.25	Ca (%)	0.42	0.96	0.93	3.36	6.35	2.9	0.27	12.3	3.02	0.02		
CaO (%)	26.65	0.4	0.25	3.02	0.46	1.62	0.46	Na (%)	0.076	0.057	0.12	0.074	0.058	0.081	0.072	0.041	0.025	0.028		
Na ₂ O (%)	0.69	0.09	0.33	1.91	1.64	1.41	0.07	K (%)	0.27	0.53	0.58	0.44	0.44	0.79	0.4	0.55	0.25	0.38		
K ₂ O (%)	1.38	4.25	4.55	2.22	2.15	1.06	0.64	Ti (%)	0.02	0.07	0.09	0.097	0.06	0.05	<0.01	<0.01	0.01	0.01		
TiO ₂ (%)	0.416	0.516	0.328	0.738	0.714	0.402	0.376	P (%)	0.038	0.05	0.177	0.111	0.153	1.07	0.077	0.195	0.085	0.074		
P ₂ O ₅ (%)	0.09	0.26	0.36	0.1	0.12	0.07	0.09	As (ppm)	0.2	12.3	5.8	2.3	16.3	19.7	13.7	117	52.7	31.9		
LOI (%)	26.18	3.38	4.2	3.18	2.89	2.87	36.45	Ba (ppm)	88.9	202	273	208	88.9	196	408	557	507	300		
Total (%)	99.43	97.25	98.66	98.35	98.7	98.54	99.24	Be (ppm)	0.8	1.2	0.8	0.6	1	2.7	0.8	3.7	1.2	1.1		
As (ppm)	16	186	7	6	27	14	21	Cd (ppm)	0.05	0.28	0.38	0.3	1.5	0.36	0.38	0.47	1.58	0.47		
Ba (ppm)	464	6086	998	525	503	385	266	Ce (ppm)	3.7	12.4	9.6	6.7	10.2	32	12.6	88.8	27.2	9.2		
Be (ppm)	2	4	3	2	2	<1	<1	Cr (ppm)	51.1	53.1	53.7	17.9	53.5	60.5	50.3	34.8	16.1	50		
Co (ppm)	3	5	15	12	11	8	<1	Cu (ppm)	7.33	60.2	53.7	39.1	95.8	189	66.4	209	131	136		
Cr (ppm)	40	160	100	70	90	60	20	Md (ppm)	<2	17	3.06	3.07	0.93	4.37	10.2	17.7	5.83	25.2		
Cu (ppm)	40	150	30	20	30	20	20	Ni (ppm)	4.6	38	22.1	12	31.7	56.6	31.4	646	106	64.2		
Md (ppm)	<2	17	<2	<2	4	3	2	Pb (ppm)	14.7	45.6	49.2	49.2	141	103	168	104	23.9	105		
Ni (ppm)	30	50	40	30	50	30	90	Sb (ppm)	<0.02	0.92	0.86	0.47	1.69	3.3	1.15	3.66	1.73	3.33		
Pb (ppm)	7	1230	16	<5	7	6	14	Se (ppm)	0.5	0.5	0.7	0.8	0.8	4.8	1.2	6.3	2.1	5.2		
Sb (ppm)	<0.5	10.1	<0.5	<0.5	<0.5	<0.5	0.8	Sn (ppm)	1.51	2.26	2.54	2.33	3.79	0.55	2.1	1.25	0.47	1.59		
Sn (ppm)	4	4	6	4	4	3	2	Th (ppm)	16.1	6.3	6.1	9	4.2	7.7	9.4	4.1	1.1	2.1		
Th (ppm)	8.2	10.5	16.2	10.5	10.5	5.8	2.7	Tl (ppm)	0.11	0.29	0.29	0.21	0.36	1.29	0.37	1.91	1.04	0.97		
Tl (ppm)	<0.1	2.1	0.6	0.4	0.4	0.2	0.2	U (ppm)	2.8	21.1	3.4	2.9	1.2	12.1	1.7	4.6	1	4.8		
U (ppm)	2.8	21.1	3.4	3.1	2.9	1.7	3	V (ppm)	23	59	56	54	63	238	72	115	50	154		
V (ppm)	97	1769	150	91	86	57	35	Zn (ppm)	67	124	180	127	383	110	1010	1490	103	279		
Zn (ppm)	90	1510	390	90	60	70	2530													

Physical parameters (mainly geotechnical) of the geological units

Stereographic projections of the main discontinuities and structures

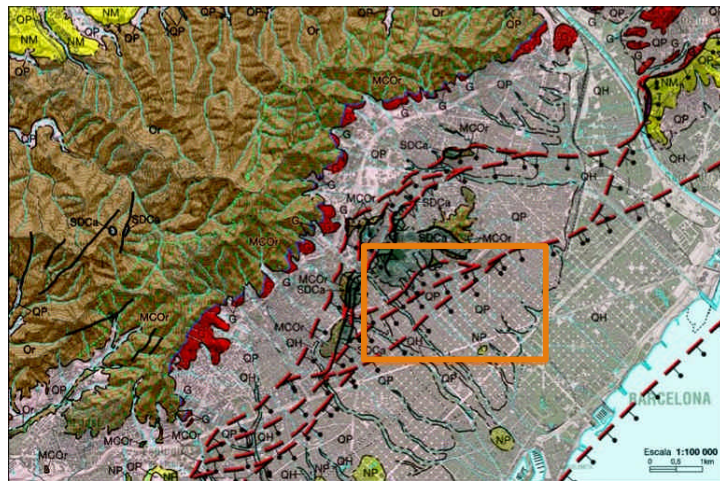


Photography gallery

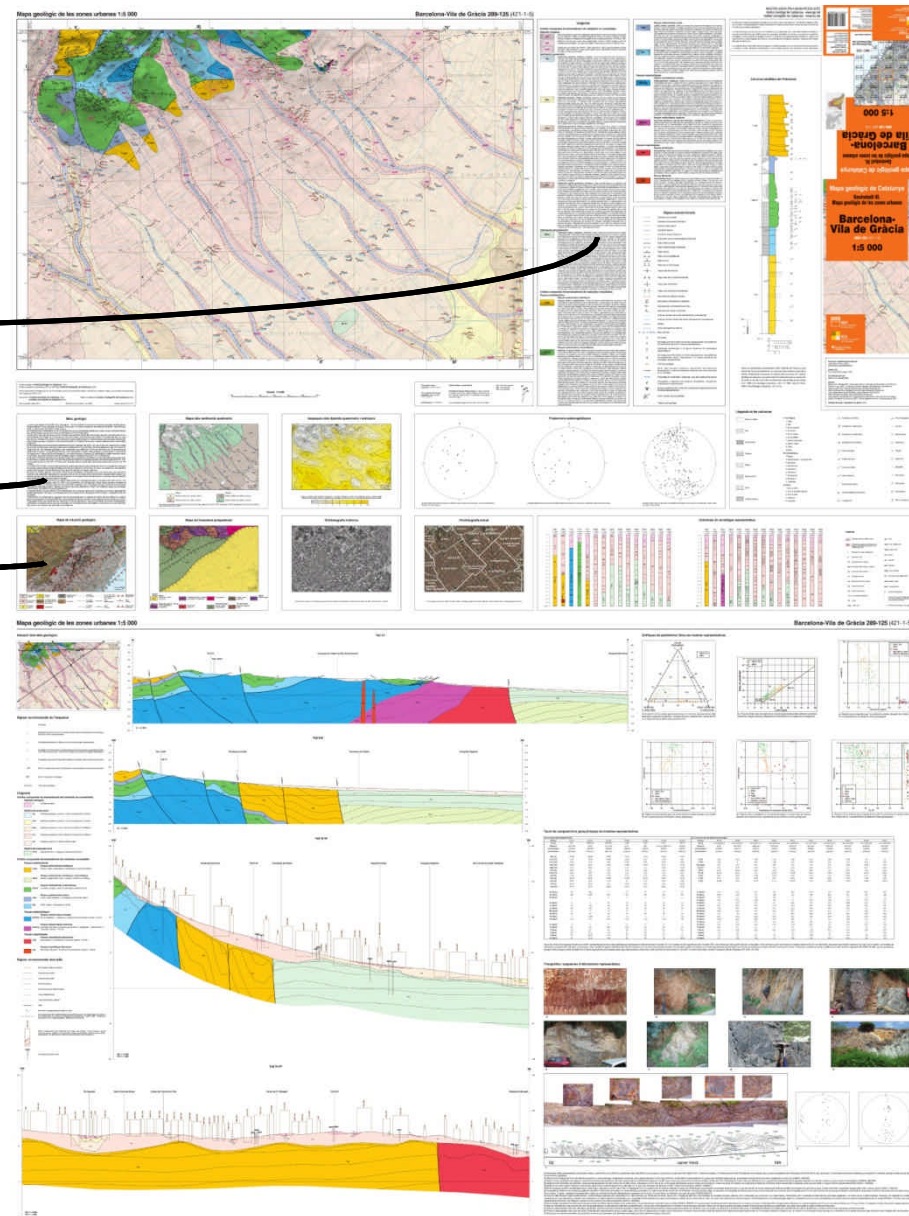


RESULTING MAP SHEET AND BINDING COMPONENTS

- Legend (petrologic, geotechnical and genetic) ←
- Geological setting ←
- 1:100.000 geological map ←



1:100000 schematic geological map



CONCLUSIONS

The 1:5000 urban geological map of Catalonia

- systematic urban mapping survey
- self-consistent database
- wide range of uses
- update required

World wide applicability



THANK YOU !