



## Mapping urban geology of the city of Girona, Catalonia

Miquel Vilà (1), Pau Torrades (2), Roser Pi (1), and Ona Monleon (2)

(1) Institut Cartogràfic i Geològic de Catalunya, Barcelona, Spain (miquel.vila@icgc.cat), (2) Sotasòl-AT, Serveis de Geologia, s.l.p., Barcelona, Spain (ptorrades@sotasol.cat)

A detailed and systematic geological characterization of the urban area of Girona has been conducted under the project '1:5000 scale Urban geological map of Catalonia' of the Catalan Geological Survey (Institut Cartogràfic i Geològic de Catalunya). The results of this characterization are organized into: i) a geological information system that includes all the information acquired; ii) a stratigraphic model focused on identification, characterization and correlation of the geological materials and structures present in the area and; iii) a detailed geological map that represents a synthesis of all the collected information.

The mapping project integrates in a GIS environment pre-existing cartographic documentation (geological and topographical), core data from compiled boreholes, descriptions of geological outcrops within the urban network and neighbouring areas, physico-chemical characterisation of representative samples of geological materials, detailed geological mapping of Quaternary sediments, subsurface bedrock and artificial deposits and, 3D modelling of the main geological surfaces.

The stratigraphic model is structured in a system of geological units that from a chronostratigraphic point of view are structured in Palaeozoic, Paleogene, Neogene, Quaternary and Anthropocene. The description of the geological units is guided by a systematic procedure. It includes the main lithological and structural features of the units that constitute the geological substratum and represents the conceptual base of the 1:5000 urban geological map of the Girona metropolitan area, which is organized into 6 map sheets.

These map sheets are composed by a principal map, geological cross sections and, several complementary maps, charts and tables. Regardless of the geological map units, the principal map also represents the main artificial deposits, features related to geohistorical processes, contours of outcrop areas, information obtained in stations, borehole data, and contour lines of the top of the pre-Quaternary basement surface. The most representative complementary maps are the quaternary map, the subsurface bedrock map and the isopach map of thickness of superficial deposits (Quaternary and anthropogenic). The map sheets also include charts and tables of relevant physico-chemical parameters of the geological materials, harmonized downhole lithological columns from selected boreholes, stratigraphic columns, and, photographs and figures illustrating the geology of the mapped area and how urbanization has changed the natural environment.

The development of systematic urban geological mapping projects, such as the example of Girona's case, which provides valuable resources to address targeted studies related to urban planning, geoengineering works, soil pollution and other important environmental issues that society should deal with in the future.