ICC
Institut Cartogràfic de Catalunya

Generalitat de Catalunya

Newsletter 38

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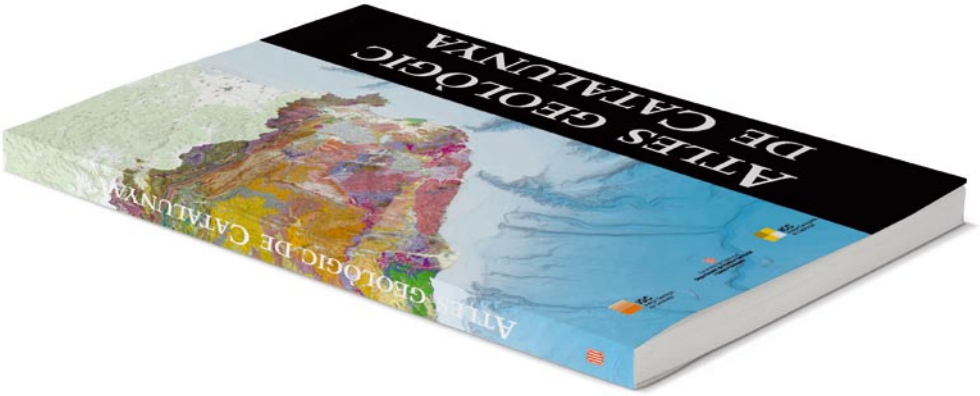
Geological Atlas of Catalonia 1:50 000

In March 2010, the *Atles geològic de Catalunya 1:50 000* was published, the result of a joint undertaking by Institut Geològic de Catalunya (IGC) and Institut Cartogràfic de Catalunya (ICC).

In 1997, the need was identified for continuous and uniform digital geological coverage of Catalonia that was more detailed than the coverage available at that time. Therefore, the Departament de Medi Ambient i Habitatge (Environment and Housing, DMAH) and the ICC embarked on the project to digitize and homogenize the sheets corresponding to Catalonia of the *Mapa Geológico de España 1:50 000*, produced by the Instituto Geológico y Minero de España (Spanish Geological and Mining Institute, IGME).

The task of giving homogeneity and territorial continuity was undertaken at the ICC, through the Geological Survey, part of the ICC at that time and now Institut Geològic de Catalunya.



IN 2006 THE DIGITAL GEOLOGICAL DATABASE OF CATALONIA 1:50 000 WAS COMPLETED, THE FIRST IN EUROPE AT THIS SCALE

The geological database has provided the 41 sheets in the *Mapa geològic de Catalunya 1:50 000* series, published between 2005 and 2007, and the *Atles geològic de Catalunya 1:50 000*, which has just been published.

The atlas is organized into two parts:

- The first part contains an exhaustive description of the geology of Catalonia, accompanied by numerous diagrams and thematic maps. It offers a synthetic and didactic presentation of the content of the geological maps, tracing the historical evolution of geological cartography right up to the current map series. The chapter with geothematic maps provides an overview of the relief units, geological structure, types of rocks, forms of relief, hydrological system and seismic activity. The Atlas devotes particular attention to Catalonia's 550 million years of geological history, to which the geological record bears testimony. This record is offered by chronological presentation of 18 representative outcrops and, finally, man's footprint on the territory. This first part concludes with eleven geological sections in significant areas of Catalonia.
- The second part contains the geological map 1:50 000 (202 pages), in addition to its legend and the methodology used to create the geological database of Catalonia. This part forms the main body of the atlas. The legend consists of 1 047 geological units identified by an alphanumeric inscription and an index number. To facilitate reading the description of the geological units, a vocabulary consisting of approximately 600 words and expressions has been compiled.

  A new feature that has been included is a brief etymology of all the terms that identify the geochronological units, in alphabetical and chronological order.

The Atlas ends with the bibliography and a complete toponymic index containing the approximately 12 000 place names that appear on the maps at 1:50 000.

THE ATLAS CONTRIBUTES TO GENERAL KNOWLEDGE ABOUT GEOLOGY WITH 202 PAGES OF GEOLOGICAL MAP AT 1:50 000 AND 138 PAGES ON THE HISTORY OF THE GEOLOGICAL FORMATION OF CATALONIA

With the publication of this Atlas, the public is given the opportunity to learn about the geology and geological history of our country in one single volume, and in this way a contribution is made to general knowledge of this discipline. In this respect, the Atlas serves as a tool of reference, not only for geology and earth sciences professionals, but also for the general public. ■

Orthophoto 25 cm of Catalonia

The generation of the orthophoto with a ground pixel size of 25 cm (1:2 500) was begun in 2002 for the metropolitan areas of Catalonia.

Whereas with analog cameras the measurement factor was the flight scale, when digital cameras are used in aerial photography it is the ground pixel size, and often an equivalent flight scale is provided that makes it possible to establish a comparison with previous analog flights.

It was in 2005 that the ICC commissioned the digital mapping camera (DMC) for photographic capture, which records 4 optical channels at the same time (red, green, blue and infrared).

At a later stage, with the photographs captured in 2007 of the 4 provincial capitals, the public product specifications were obtained with v3.2 of the color orthophoto.

In 2008, the flight was repeated over the same cities and two new objectives were achieved: downloading from the ICC website of sheets in MrSID format was enabled through VISSIR2, and the GeoServices were activated, both for the color orthophoto and for version 1.0 of the infrared color orthophoto 25 cm.

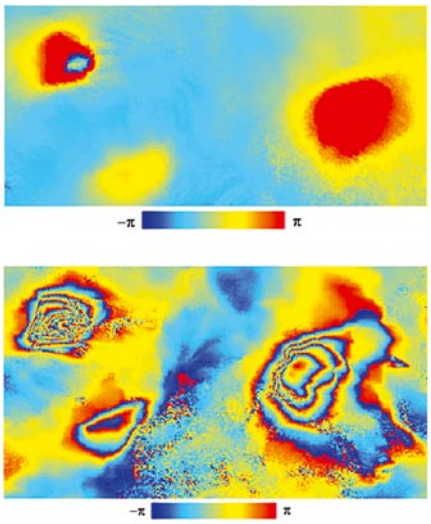
In 2009, a flight was made over the entire territory of Catalonia, and at present the orthophotos corresponding to v3.3 of the color orthophoto product 25 cm and v1.1 of the product in infrared are being generated. ■

Orthophoto 25 cm in infrared color and in color. Plaça de Catalunya (Barcelona city).

Principal characteristics of the versions of the color orthophoto 25 cm of Catalonia

Version	Area	Sheets	Sheet section	Flight year	Flight scale	Ground pixel size (m)	Camera
1.0	Barcelona	124	1:2 000	2002	1:12 000		analog
1.1	Barcelona	245	1:2 000	2003	1:12 000		analog
2.0	Barcelona	269	1:2 000	2004	1:10 000		analog
	Lleida	12					
	Tarragona	18					
	Girona	12					
3.0	Barcelona	327	1:2 000	2005	1:12 500	0,15	digital
	Sabadell	51					
3.1	Barcelona	328	1:2 000	2006	1:16 666	0,20	digital
	Tarragona	81					
3.2	Barcelona	358	1:2 000	2007	1:16 666	0,20	digital
	Lleida	82					
	Tarragona	83					
	Girona	53					
3.2	Barcelona	358	1:2 000	2008	1:18 750	0,225	digital
	Lleida	82					
	Tarragona	83					
	Girona	53					
3.3	Catalonia	4 275	1:5 000	2009	1:18 750	0,225	digital

Completion of the PISAR project



Interferometric fringes due to the same movement in L-band (λ=23 cm), C-band (λ=5.6 cm) and X-band (λ=3.1 cm). A color cycle is equivalent to deformation of $\lambda/2$, in which λ is the wavelength of each sensor.

In December 2009, the PISAR project was completed (high resolution polarimetric radar images for analysis of terrain deformation by means of DInSAR). This project has been undertaken in collaboration with Institut Geològic de Catalunya (IGC).

The PISAR project has been co-financed by the Spanish Ministry of Science and Innovation and it aims to improve the calculation of terrain deformation using DInSAR techniques in two respects:

- Use of SAR images with polarimetric information of a different frequency. For this purpose, data from the new satellite-borne radar sensors such as the TERRASAR (X-band) and the ALOS (L-band) have been used, which complement the data from the ENVISAT mission (C-band).
- Development and application of multichannel radar techniques (combination of polarimetry, frequency and spatial resolution).

Following adaptation of the interferometric process chain to the data, special attention has been devoted to studying the dependence of the band with respect to the type of terrain cover and to developing mechanisms for the combination of polarimetric images.

The main conclusion of the project is that, in comparison with single channel techniques, the combination of SAR data with different properties leads to an improvement in quality, especially in non-urban areas, resulting in an increase in the density of useful points in the area studied. This is particularly important for the purpose of defining the causes of deformation. An increase in the spatial resolution of the results has also been obtained thanks to the high resolution of the new sensors.

The results obtained in this study have been validated with leveling measurements in test zones by installation, on the terrain, of passive equipment (reflective trihedrons) designed to increase the response of the terrain in the signal emitted by the satellites.

This project will make it possible to improve the techniques for monitoring terrain deformation in Catalonia, tasks for which both the ICC and the IGC are responsible. ■

INSPIRE selects 6 members of C4

The aim of the INSPIRE Directive, which entered into force in 2007, is to provide citizens in the European Community with access to relevant standardized geographic information of high quality and to support the environmental policies of the EU.

The Directive defines 34 spatial data themes for the environmental applications, classified in 3 annexes. The definition model is based on the application of international standards (ISO, OGC).

To guarantee the exchange of geographic data and the compatibility of spatial data infrastructures, and to facilitate their use, the Directive establishes (by means of committees) certain technical specifications for all the member states.

The INSPIRE team has selected 6 experts from the Cartographic Coordination Committee of Catalonia (C4), two of whom are members of the ICC, to take part in the development of the technical specifications of the themes in annexes II and III. INSPIRE has made this selection from 320 European experts proposed and approximately 600 reference materials.

Among the selection criteria were the expertise of the candidates as demonstrated by their résumés, the time that they invest in the thematic working groups, and the geographic representation of each working group.

It is worth recalling that 3 experts from the ICC participated in the definition of annex I. ■

Experts from C4 selected by INSPIRE to form part of the development of annexes II and III

Expert	Organization	Thematic working group
Xavier Berástegui	Institut Geològic de Catalunya	Geology and Mineral Resources
Raquel Canet	Direcció General de Protecció Civil	Natural Risk Zones
Jordi Escriu	Institut Cartogràfic de Catalunya	Elevation
Josep Maria Mestres	Departament de Medi Ambient i Habitatge	Area Managemment / Restriction, Regulation Zones and Reporting Units
Carme Olivella	Departament de Medi Ambient i Habitatge	Production and Industrial Facilities
Vicenç Palà	Institut Cartogràfic de Catalunya	Ortho imagery

Brief note

THE "ALBERT SERRATOSA I PALET" PERSONAL COLLECTION AT THE CARTOTECA DE CATALUNYA

In February 2010, Mr. Albert Serratosa i Palet transferred his collection of documents to the ICC's Cartoteca de Catalunya (CTC - Catalonia Map Library). This transfer was formalized by an agreement signed by both parties.

This collection is composed of articles from books and journals, reports, manuscript notes, press cuttings, congress documents and photographs taken in the course of his professional career.

Mr. Serratosa is a key figure in the field of territorial planning in Catalonia. He has contributed to almost all the plans which have "designed" the territory of Catalonia: he participated in the Master plan for the Metropolitan Area of Barcelona; he directed the General Metropolitan Plan; he was responsible for the promotion and management of the Cadí Tunnel, and he directed the Barcelona Metropolitan Territorial Plan. He has also received the Creu de Sant Jordi (St. George's Cross) and he currently collaborates with the Institut d'Estudis Territorials (Territorial Studies).

The Cartoteca de Catalunya of the ICC has made a commitment to take over the collection, preserve it in its entirety, catalogue it and facilitate access to it for consultation purposes.

The collection will be maintained as a unit and it will be known as the "Albert Serratosa i Palet Collection".

This is an important addition to the CTC's growing archive of documents related with the territory of Catalonia in the 20th century.

This newsletter is a free publication available in Catalan, Spanish and English.

Year 15 / June 2010 / Number 38
ISSN: 1137-2370 / DL: B-40970-1996

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http://www.icc.cat

Downloads of large cartographic series, 2009

In 2009, the ICC website (plus VISSIR2 and the Guide to Catalonia) received a total of 2 270 000 visits and 1 045 000 individual visitors (an increase of 20% and 6% in comparison with 2008).

The ICC website provides links to the following websites:

- Cartographic Coordination Committee of Catalonia (4 000 visits; 42% more than in 2008).
- Cartographic Registry of Catalonia (no increase on 2008: 6 500 visits).
- Cartographic Standards Committee (new since July 2009: 685 visits).
- Spatial Data Infrastructure of Catalonia (81 568 visits; similar level to 2008).
- Catalan Earth Observation Program (no increase on 2008: 3 500 visits).
- *Revista Catalana de Geografia* (8 500 visits; 21% more than in 2008).
- National Atlas of Catalonia (new since May 2009: 15 000 visits).
- Onomastics Society (new since November 2008; in 2009 it received 16 000 visits).
- Digital Map Library (110 000 visits; 20% more than in 2008).
- Digital Library (new since December 2009: 435 visits).

In November 2009, the option was introduced of downloading the sheets of the *Mapa urbà de Catalunya 1:1 000* (MUC-1M, urban map), produced by the ICC, in vector format, and the sheets of the *Mapa comarcal de Catalunya 1:50 000* (regional map), in raster format.

The number of downloads of large cartographic series increased 23% in comparison with 2008. In 2009, a tool was added to capture a cartographic image in jpg format directly on the screen; users captured a total of 151 654 images.

The ICC distributes its products in raster (MrSID) and vector (DXF, DGN, MMZ, E00, KMZ and SHP) formats. KMZ and SHP were introduced in November 2009: KMZ for buildings in the BT-5M and SHP for the MUC-1M.

The distribution format most downloaded by users has been raster MrSID (61%), since this is the format most commonly found on the ICC website. Of the files in vector format, the following downloads have been made: DXF (64%), DGN (21%), MMZ (8%), E00 (6%), and KMZ and SHP (2 %).

	2008			2009			
	Raster	Vector	Total	Raster	Vector	Direct. screen	Total
MUC-1M	–	–	–	–	668	–	668
BT-5M	96 803	242 347	339 150	100 398	229 982	–	330 380
MTC-10M	89 911	–	89 911	65 860	–	–	65 860
BT-25M	31 550	7 202	38 752	44 372	10 472	–	54 844
BT-50M	–	5 828	5 828	–	35 306	–	35 306
MTC-50M	–	–	–	2 987	–	–	2 987
ORTO-5M	179 704	–	179 704	168 776	–	–	168 776
ORTO-25M	43 752	–	43 752	46 032	–	–	46 032
Total	**441 720**	**255 377**	**697 097**	**428 425**	**276 428**	**151 654**	**856 507**