ICC
Institut Cartogràfic de Catalunya

Generalitat de Catalunya

Newsletter 35

The National Atlas of Catalonia (v.1) on the Internet

In May 2009 the ICC published v.1 of the *Atles nacional de Catalunya* on the site:

www.atlesnacional.cat

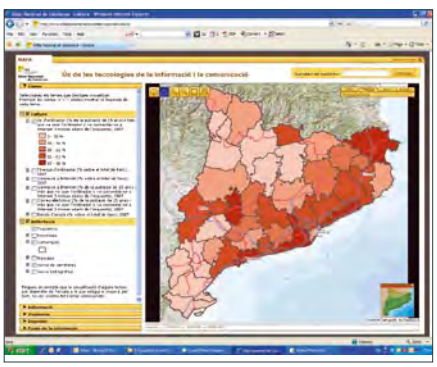
The aim of the atlas is to offer a descriptive and global view of Catalonia by considering its physical and human geography and its environment.

In the application, the elements have been organized in two columns: On the left-hand side, there is an index with the thematic structure of the atlas. Serving as a backbone, this enables users to direct their inquiry towards the relevant section.

On the right-hand side, there is a wider window which shows the content of the chapters; at the top of the page, there is a photograph and the beginning of the text for the section selected (which can also be viewed in full), and at the bottom of the page there is a list of the resources relating to the particular section.

The resources are classified into: maps, graphics and photographs. There are two types of map: information maps and maps that support interactive inquiries.

The information maps are static resources. These maps, the graphics and the texts have been prepared by the Universitat de Girona. This information cannot be manipulated, but it can be saved and/or printed.



THE INTERACTIVE MAPS ARE THE NEWEST PART OF THE APPLICATION

The interactive maps can be consulted on a topographic database, an orthoimage, a blank map or a hypsometric map. When they are consulted, a menu with a number of options appears in the left-hand column:

- The **layers** are formed by the legend, the variables of the map and the reference layers. The display of some layers depends on the scale of the map, and so they may not be visible, although they are activated.
- Quantitative **information**, by *comarques* (administrative divisions of Catalonia), relating to the data shown.
- In the case of interactive map inquiries, a search can be made for toponyms (top right window) and the results are shown below the tab marked **toponyms** on the left-hand side. If the toponym selected in the search is the capital of the *comarca*, it can be viewed in all the databases available (photograph, map, blank map and relief), but if it is a minor toponym, it is only displayed on the "map" base.
- The **print** option generates a PDF file which can subsequently be printed. The print scale can be selected.
- The **sources of information** show the sources used to produce the map. Different departmental websites of the Generalitat de Catalunya have been consulted. In all cases, the source and the date when it was consulted are shown.

The application also offers access to the ICC website, which in turn offers direct access to its GeoServices.

The Atlas is easy to consult and useful for primary and secondary school pupils and teachers, the general public, and professionals and students who may need to consult data or map statistical phenomena. ■

Contents of the atlas

	GIS Maps	Maps produced	Graphics	Photos
Basic maps	**4**	**10**	**–**	**–**
Physical geography	**16**	**13**	**1**	**23**
Relief and geology	3	2	1	7
Climate	6	6	–	5
Hydrography	4	3	–	7
Vegetation	3	2	–	4
Human geography	**51**	**70**	**37**	**59**
Population	2	4	4	4
Population and activity	2	1	5	2
Economy	3	7	2	4
Agriculture, livestock and fisheries	10	5	18	8
Extraction activities and electricity	1	3	–	6
Industry	1	10	–	5
Construction and housing	2	5	5	3
Services	4	10	–	5
Trade and tourism	8	11	2	8
Education	3	5	1	4
Culture	10	8	–	5
Transport	5	1	–	5
Environment	**16**	**13**	**1**	**21**
Environment	10	7	–	5
Landscape domains	3	2	–	7
Natural risk	3	4	1	9
Total	**87**	**106**	**39**	**103**

Topographic map of Catalonia 1:25 000 (v.2)

The new version of the *Mapa topogràfic de Catalunya 1:25 000* series consists of 77 sheets, which are divided into three collections: regional (*comarca*) capitals, protected natural areas and geographic units.

AS AT MAY 2009, 3 SHEETS HAVE BEEN PUBLISHED: VALL DE NÚRIA, ULLDETER; ALTA GARROTXA, LA MUGA; AND PARATGE NATURAL D'INTERÈS NACIONAL DE L'ALBERA

The map is produced with information from the *Base topogràfica de Catalunya 1:25 000* (BT-25M, topographic database) and updated with reference to the orthophoto 1:5 000 (ORTO-5M) and projects for infrastructure construction and other major initiatives in the territory. In addition to the updating process, the main tasks involved in producing the map is classification and hierarchical organization of information, and incorporation of thematic information for tourists and hikers, particularly minor roads, paths, places of interest and accommodation, which are highlighted by means of specific symbols and toponymy labeling. Thus this topographic map is enhanced with thematic information in order to serve a broader public, as well as territorial management entities.

The communications network is updated with information provided by the competent institutions; the minor road network is classified on the basis of the information shown on the *Mapa topogràfic de Catalunya 1:5 000*, interpretation of the ORTO-5M, and information provided by regional councils and protected natural areas management bodies. Land use and cover is obtained by generalization of the *Mapa dels hàbitats a Catalunya 1:50 000* (habitat map). The municipal boundaries are established according to the various phases of work completed of the municipal map. The toponymy is a selection from the toponymic database at 1:50 000 scale and includes information from the topographic map at 1:50 000, made official by the *Nomenclàtor oficial de toponímia major de Catalunya* (Official gazetteer of the main toponyms of Catalonia). The tourist information of the ICC, carefully designed and selected to offer a perspective of Catalonia as a whole, is complemented by the information provided by the local bodies mentioned earlier, which regularly contribute the information required to reflect and publicize the specific characteristics of each area. ■

Planispheres at 1:15 000 000 and 1:22 000 000 scales

Between 2007 and 2009, the ICC has created some digital cartographic databases of the world with a view to offering a service to geography professionals, students and the public in general. Drawing on these databases, two planispheres at 1:15 000 000 and 1:22 000 000 scales have been produced, with digital models of relief, land use, bathymetry, and exclusive treatment for the Arctic and the Antarctic.

The principal projection of the planispheres is that of Robinson (Arthur H. Robinson, 1961). This is a pseudocylindrical projection which prioritizing the equilibrium between the forms, areas, scale and distances despite that may distort them; it is a projection that is particularly suitable for making the map of the world, since the distortion factor is very small between latitudes 45° north and 45° south, and in the polar areas the Universal Polar Stereographic (UPS) projection has been used at 1:25 000 000 scale.

The complementary information referring to the main projection shows a distortion diagram with Tissot ellipses and a graphic scale with a distortion factor according to the latitude.

The cartography is presented through a legend formed by 11 elements of population and administrative boundaries, 6 hydrographic elements, 4 orographic elements, 3 elements of submarine orography and 2 elements that refer to world heritage. In total, 26 elements that offer various cartographic readings. Land use is represented by the grouping of 15 types.

The place names that appear on these planispheres are taken from the toponymic database of the ICC. This database has been produced from cartographic and bibliographic sources. The selection that is presented corresponds to the type of map, with particular attention to elements related with human settlement (capitals and towns and villages), land and sea oronyms, and also marine toponymy, given the relevance of this concept in the design of the planisphere. ■

ARE Project: Detailed tacheometric surveys

In 2008, the ICC and the Institut Català del Sòl (INCASOL, Catalan Land Institute) signed a collaboration agreement to undertake the appropriate initiatives in the Strategic Residential Areas (ARE), a project promoted by the Direcció General d'Actuacions Estratègiques (Strategic Action Office) of the DPTOP.

Within the framework of this agreement, between 2008 and 2009 the ICC has completed tacheometric surveys at 1:500 scale of the areas where it is planned to build housing.

THE PROJECT HAS INCLUDED TACHEOMETRIC SURVEYS AT 1:500 OF 75 CONSTRUCTION INITIATIVES (A TOTAL OF 1 745.83 HA)

The surveys were conducted with field work by tacheometry combined with the GPS-RTK systems. In large inaccessible areas, photogrammetric stereoplotting was employed.

Quality control was conducted both in the field, making control measurements in 50% of the surveys, and in the laboratory, checking all the drawings and writing a report of the work completed in each survey. ■

Survey of "l'Hospitalet-la Florida", urban terrain covering 4.80 ha.

20th anniversary of GeoTeX/ACX

Between 1988 and 1989, the ICC began the development of the software ACX (combined network adjustment), the nucleus of the GeoTeX system (geodesy, remote sensing and networks), which computes and adjusts any type of geodetic-photogrammetric network by the least-squares method.

The aim behind this development was to obtain a universal system (used both in geodesy, photogrammetry, remote sensing and in other areas) that would be portable to different platforms (maintaining an elementary user interface) and flexible (with respect to both the implantation of new geometric modules and to different modes of work). Besides, GeoTeX had to be designed for use in a production and in a development environments.

The first adjustment made with the ACX software consisted in the aerial triangulation of the photogrammetric block with GPS kinematic support known as the "Flevoland Test". This was done at the Institute für Photogrammetrie (IfP) in Stuttgart, within the framework of the special research group High Precision Navigation SFB-228-B5 of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation). The ACX software and its results were presented during the Photogrammetrische Woche (Photogrammetric Week) in 1989.

MARCH 2009 MARKED THE 20TH ANNIVERSARY OF THE FIRST ADJUSTMENT MADE WITH THE ACX SOFTWARE

The GeoTeX system, in addition to the ACX, consists of a set of auxiliary tools for data processing that has been developed over these last 20 years: format conversion and coordinate transformation, etc. Thus a system is now available which adapts easily to the new problems of network adjustment and which supports the natural integration of geometric models associated with the new Earth observation sensors.

Since 1991, the ACX is working within the ICC production workflow and it has been used in the aerial triangulation of 264 548 images. It is also being used in lidar and CASI projects, to adjust classical geodetic networks, to determine the parameters of datum transformations, to evaluate and simulate new types of sensors such as MOMS, EarlyBird and SPOT5, and to integrate INS/GPS mechanization equations, in order to compute airborne gravimetry and calibrate the stochastic models of IMU sensors.

In the last 20 years, the ACX has processed data relating to various geographical areas: Catalonia, the natural working environment of the ICC; other Autonomous Communities in Spain (Andalusia, Aragon, Asturias, the Balearic Islands, Cantabria, Castilla-La Mancha, Castilla y León, Extremadura, Galicia, Navarra, the Basque Country, La Rioja); and various countries abroad (Germany, Andorra, Argentina, Austria, Bolivia, the USA, France, Gambia, the Netherlands, Italy, Morocco, Mozambique, Namibia, Portugal, the Dominican Republic, Chile and Venezuela). ■

Brief notes

THE ICC AND GOOGLE EARTH ENTERPRISE

In 2008 the ICC installed a Google Earth Enterprise server. This has enabled the Institute to make its cartography available for use with the functionalities of Google Maps. At present, ORTO-5M and 25M, BT-5M, MTC-10M and 250M, and Landsat image 1:250 000 can be viewed and used.
http://www.icc.cat/web/content/ca/prof/cartografia/api_gm.html

MODELS OF CITIES

In 2009, the distribution of buildings in Catalonia in 3D has been added to the website of the ICC. These city models are extracted from the BT-5M and they are distributed in KMZ format (Google Earth format).
http://www.icc.cat/vissir2

AWARD FOR THE TV PROGRAM QUÈQUICOM: THE DECIMAL METRIC SYSTEM

In April 2009, the Institut d'Estudis Catalans (Catalan Studies) awarded with the 2009 Sant Jordi Award of Mathematics and Society to the Quèquicom program entitled "Naixement del sistema mètric decimal", broadcast by Televisió de Catalunya.

The ICC collaborated in making this program, which offers a didactic explanation of geodetic triangulation, the techniques and instruments used to measure the Meridian of Dunkerque-Paris-Barcelona, and the current measurement methods.

This program is currently accessible at TV3's "Vídeos a la carta" website.
http://www.tv3.cat/videos/395969/

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ortoXpres

The ICC offers the new ortoXpres service, through which rapid orthophotos of Catalonia may be consulted via the Internet prior to their publication:

www.ortoxpres.cat

With the ortoXpres service, once the information has been captured on the photogrammetric flights, it is processed in less than two months and added to the ICC servers. These servers generate the orthophotos as the user navigates with the help of the viewer. Through this process the data are constantly updated, so the user has access to recent information.

All the information from the flights is exploited, offering resolutions of 22.5 cm and 7.5 cm in metropolitan areas and town and city centers; the infrared band is also added, which is represented in false color.

Through this service, images of an area taken at different periods of time can be compared by means of a tool that superimposes the orthophoto versions. The orthophotos can also be viewed in 3D by means of anaglyphs for a greater understanding of the territory.

It should be remembered that the (geometric and radiometric) accuracy of the rapid orthophoto cannot be compared with the accuracy of the classic orthophoto. In the generation of the rapid orthophoto, no account is taken of infrastructures or constructions, and elements that are edited out in the classic orthophoto may be visible. ■

Banyoles Campaign (EuroSDR)

The ICC contributes to the EuroSDR working group on "Radiometric Aspects of Digital Photogrammetric Images" through the Banyoles campaign.

THE AIM OF THE CAMPAIGN IS TO IMPROVE KNOWLEDGE ABOUT THE RADIOMETRY OF DIGITAL PHOTOGRAMMETRIC CAMERAS

Action has been taken to establish the objectives and the field of operation of this campaign; the contacts and coordination with the participants; the processing of the data captured during the flight; and the definition and production of the test data set to be distributed to the participants in the group.

The ICC has set up a temporary test field in Banyoles with radiometric targets for the analysis of the digital cameras resolution. Simultaneous airborne images have been obtained with the CASI and DMC. In addition to this, the Institute for Regional Development of the Universidad de Castilla-La Mancha (IDR-UCLM) and the Centre for Ecological Research and Forestry Applications (CREAF) have made ground radiometric measurements in the calibration field and in the area flown over, and the Universitat de Barcelona (UB) and the Universitat Politècnica de Catalunya (UPC) have measured the state of the atmosphere with a lidar system and a solar photometer. The Meteorological Service of Catalonia (SMC) has provided forecasts and meteorological data about the working area. ■

TOPONYMIC SEARCH VIA INTERNET

In May 2009, 133 548 toponyms were uploaded to the website of the ICC. Users can now search for and locate these in a cartographic database. The toponyms have been extracted from the toponymic database of Catalonia 1:50 000 and the toponyms that are points from the database at 1:5 000.