MAP NAMES GENERALIZATION AT THE INSTITUT CARTOGRÀFIC DE CATALUNYA

Blanca Baella, Maria Pla

CONTENTS

- Introduction
- ICC model for map names
    - input data
    - data model
- ICC map names databases
- Map names generalization
    - automatic generalization
    - interactive tools
    - an example
- Conclusions

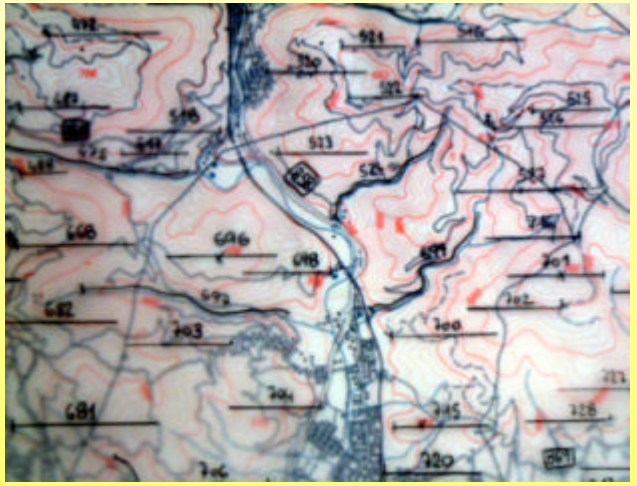
INTRODUCTION

- 1983: ICC foundation
- 1984: Orthophotomap of Catalonia at 1:5 000 starts
    - covers Catalonia, 32.000 km2, 4.272 sheets
    - digital orthophotoimage
    - manual techniques for map names and marginalia
- 1989: Orthophotomap of Catalonia at 1:5 000 fully digital
- Since 1989:
    - map names database
    - ICC data model and ICC software applications
- Since 1991: need of map names generalization tools

THE ICC MODEL FOR MAP NAMES: INPUT DATA

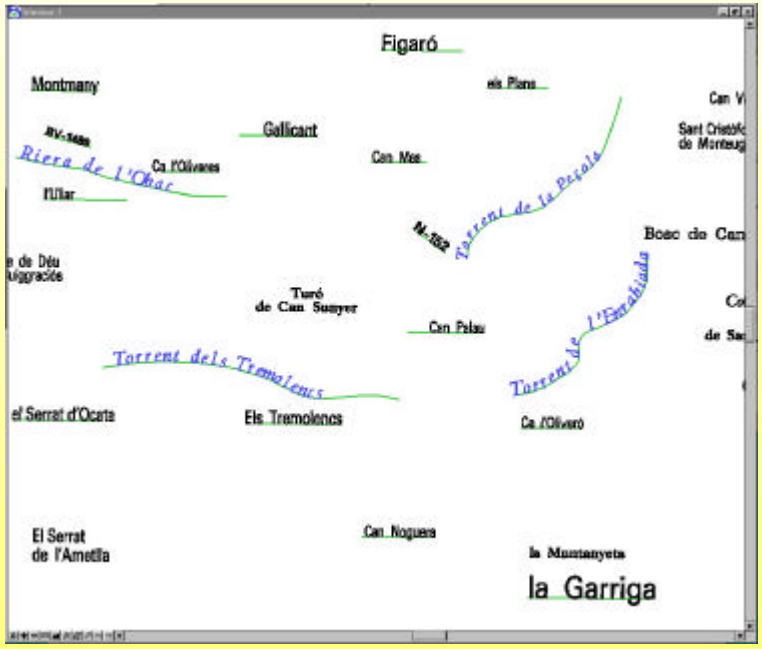
- Compiled in a fieldwork campaign
- Excel file containing the map names and their attributes
- Georeferenced manually on top of an existing paper map

Numerical identifier	Geographical code	Typographic code	Lenght (mm)	Map name
696	50203	56	0	Turó de Can Sunyer
697	60303	48	0	Torrent dels Tremolencs
698	10301	16	0	Can Palau
699	60303	48	0	Torrent de l'Enrabiada
700	10301	16	0	Ca l'Oliveró
701	50203	56	0	Turó de Santa Margarida
702	10301	16	0	Can Parades
703	10105	17	0	els Tremolencs

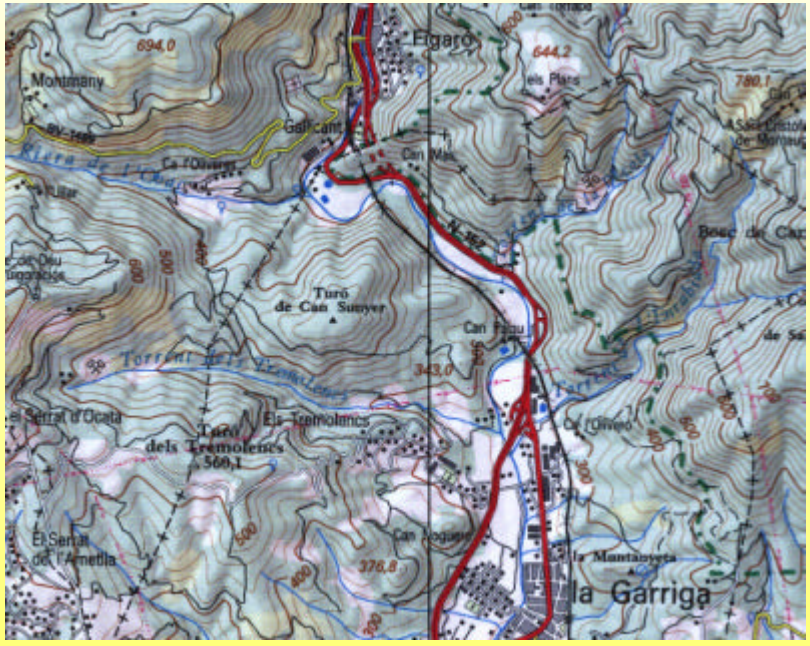


THE ICC MODEL FOR MAP NAMES: INPUT DATA

- Digital map names are obtained from the excel file and the georeferentation on paper map



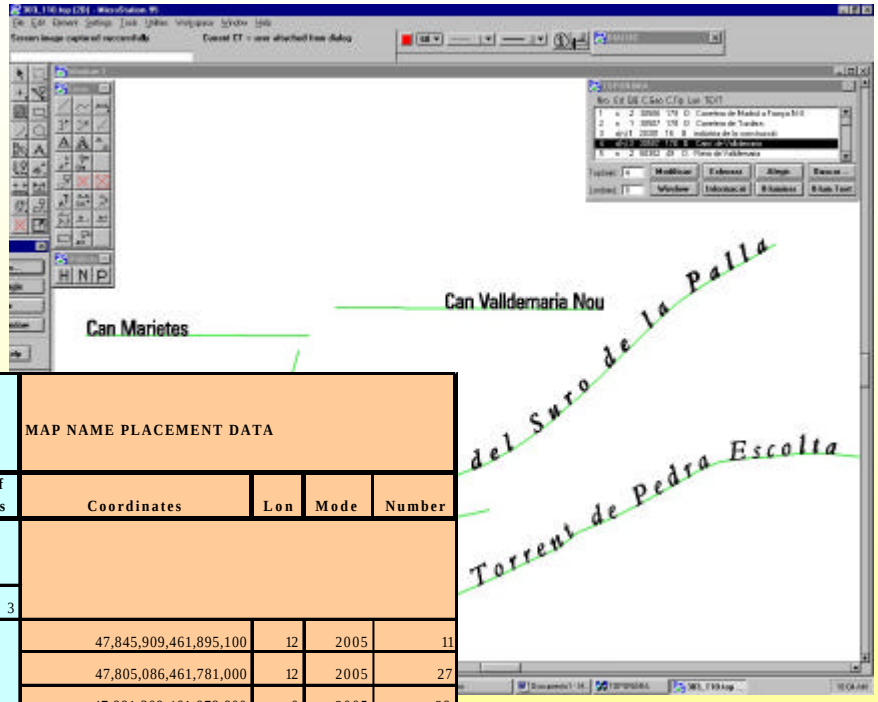
Graphical display of the database



Final map

THE ICC MODEL FOR MAP NAMES: DATA MODEL

- Model structure: graphical and alphanumerical linked by an identifier



MAP NAME DATA								MAP NAME PLACEMENT DATA			
Number	Edition mask	Geog. code	Typog. Code	Adm. Code	Map Name	Lon	Number of placements	Coordinates	Lon	Mode	Number
4	101000001	30507	178	0	Camí de Valldemaria	0	3				
								47,845,909,461,895,100	12	2005	11
								47,805,086,461,781,000	12	2005	27
								47,881,309,461,978,800	0	2005	29
19	10000000	60303	49	0	Torrent de Pedra Escolta	0	2				
								47,899,420,461,965,100	40	2005	30
								47,993,264,461,978,500	43	2005	33
21	10000000	10301	16	0	Can Valldemaria Nou	0	1				
								47,899,811,461,990,300	0	3002	6
22	10000000	50304	39	0	Sot del Suro de la Palla	0	1				
								47,907,283,461,983,600	45	2005	31
23	10000000	10301	16	0	Can Marietes	0	1				
								47,821,739,461,971,300	0	1002	1
40	10000000	30605	16	0	línia elèctrica d'alta tensió	0	2				
								47,857,292,461,959,100	0	1004	5
								47,811,913,461,807,300	0	1004	26

THE ICC MODEL FOR MAP NAMES: DATA MODEL

- Data model limitations:
    - model continuity: map names are stored sheet by sheet
    - link between topographical object and its map name: there is not link between them
    - multiscale storage and representation: map names have single scale and only one representation
    - versioning: map names don’t store version
    - multiple typography for a single map name: each map name has only one typography associated
- Graphic software limitations:
    - kerning

THE ICC MAP NAMES DATABASES

- Map Names Database at 1:5 000
    - covers Catalonia
    - aprox. 350.000 map names
    - first version completed in 1992
    - used in the series
        - Orthophotomap of Catalonia at 1:5 000
        - Topographic Database of Catalonia at 1:5 000
- Map Names Database at 1:50 000
    - covers Catalonia
    - aprox. 60.000 map names
    - first version completed in 1995
    - Used in the series
        - Mapa Comarcal de Catalunya 1:50 000

MAP NAMES GENERALIZATION

- At early 90's, several generalization applications appeared in the market, but none of them take into account the map name generalization requirements

- At present, some functionalities, as selection or scaling, can be found in the commercial software

- These tools are GIS oriented and have serious limitations to obtain high quality cartographic products

- The ICC decided to develop map name generalization tools that take advantage of the ICC data model

MAP NAMES GENERALIZATION: AUTOMATIC TOOLS

- Operations
  - selection
  - merge
  - scaling and typographic changes

original generalized

MAP NAMES GENERALIZATION: AUTOMATIC TOOLS

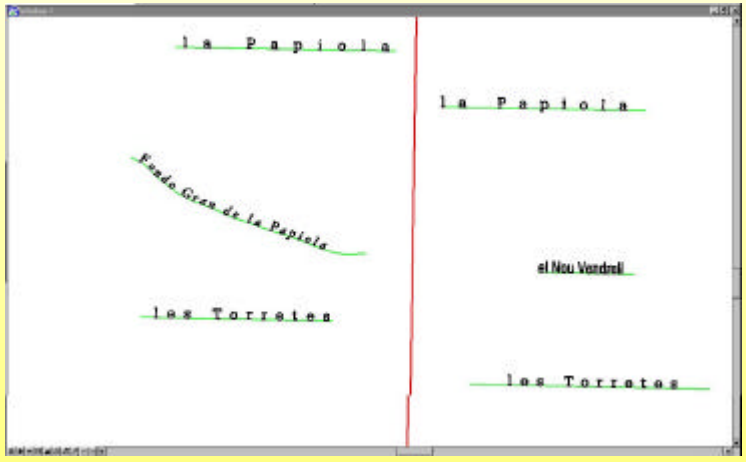
- Limitations
  - recalculation of the generalized intercharacter spacing in map names placed along elements

original

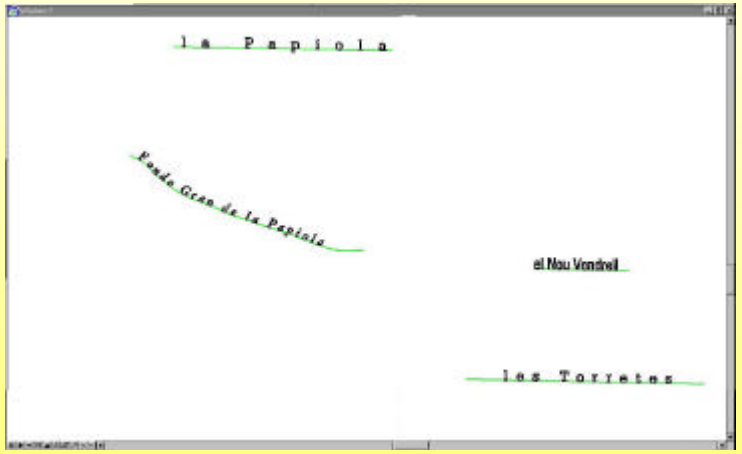
generalized

MAP NAMES GENERALIZATION: AUTOMATIC TOOLS

- Limitations
  - density
  - model continuity



automatic generalization



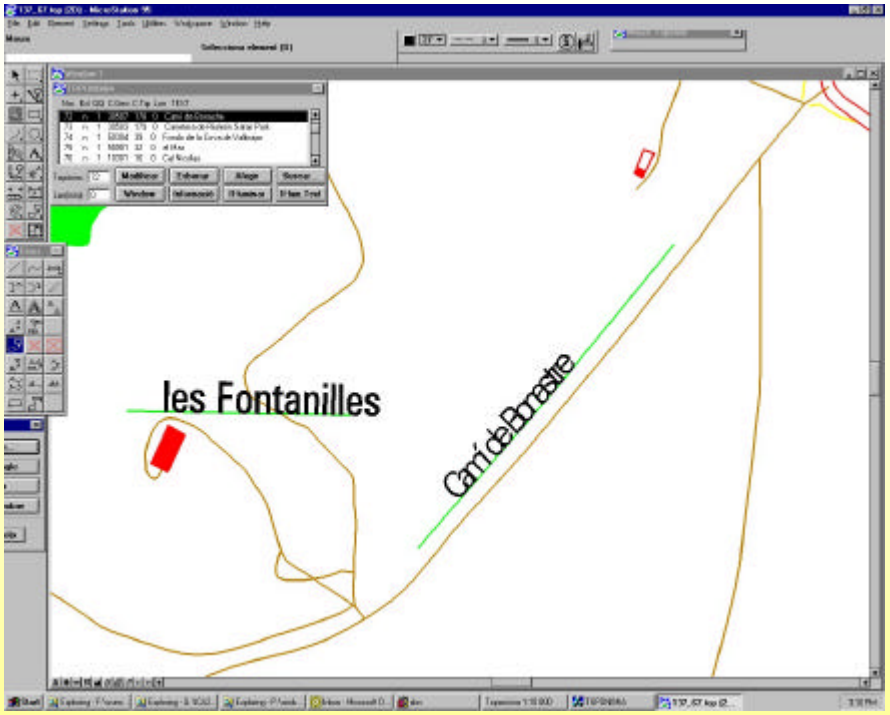
manual generalization

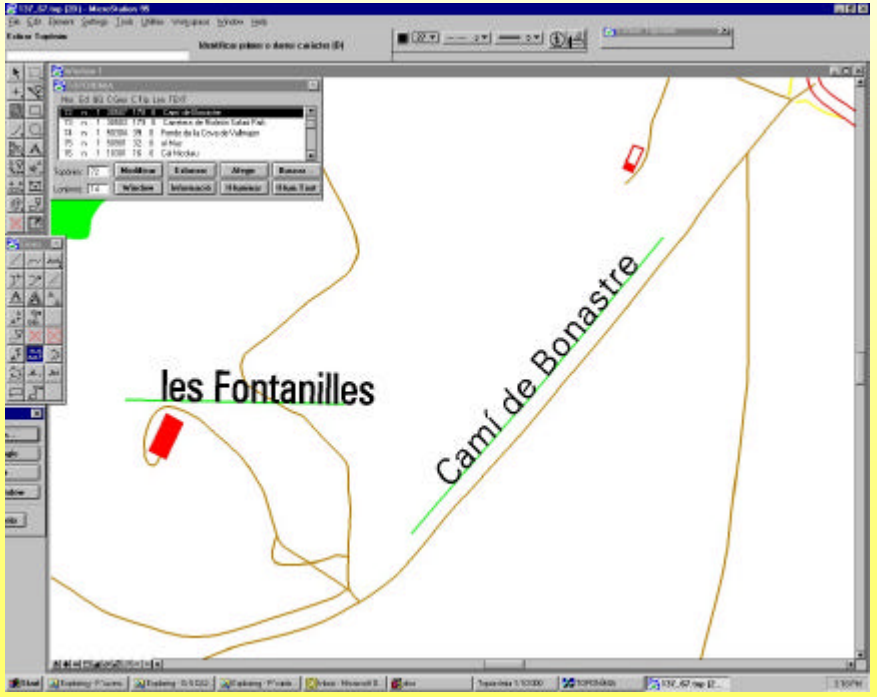
MAP NAMES GENERALIZATION: INTERACTIVE TOOLS

- Used for:
    - improving automatic generalization
    - realizing aesthetical refinements

- Tools:
    - deleting tools for improving automatic selection
    - stretching tools for intercharacter or line spacing

MAP NAMES GENERALIZATION: INTERACTIVE TOOLS



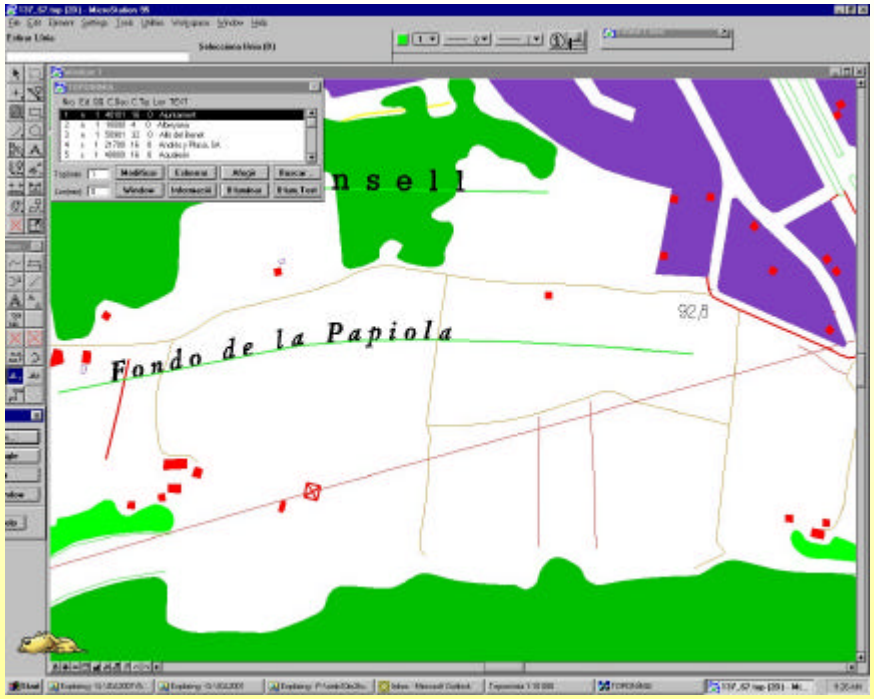


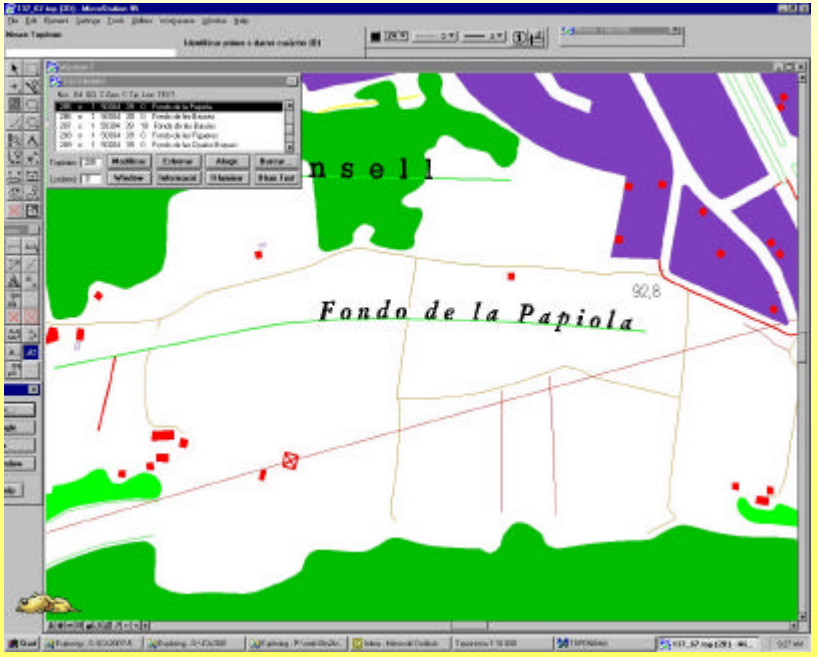
MAP NAMES GENERALIZATION: INTERACTIVE TOOLS

- Used for:
    - improving automatic generalization
    - realizing aesthetical refinements

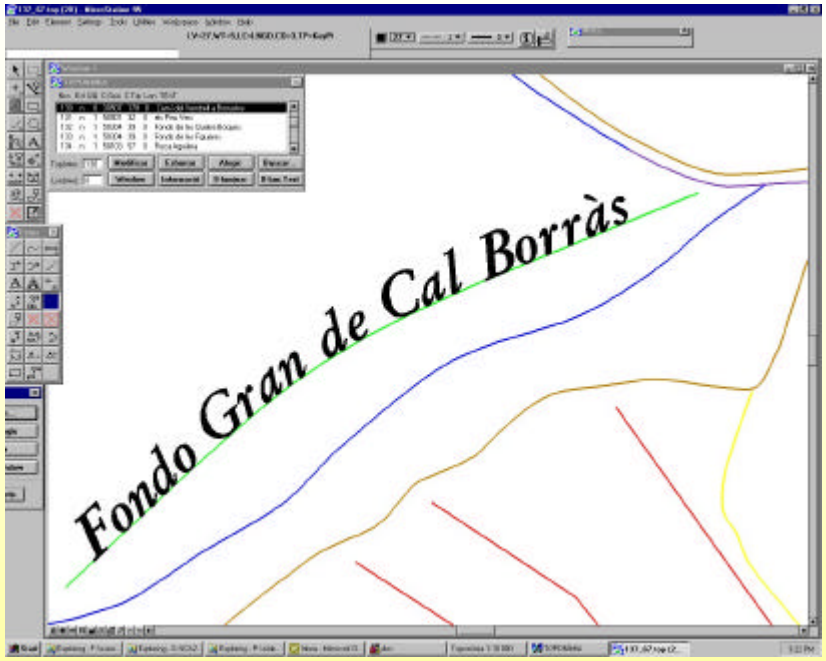
- Tools:
    - deleting tools for improving automatic selection
    - stretching tools for intercharacter or line spacing
    - moving and rotating tools for solving overlapping conflicts
    - movements of the text along the associated curve or modification on the curve

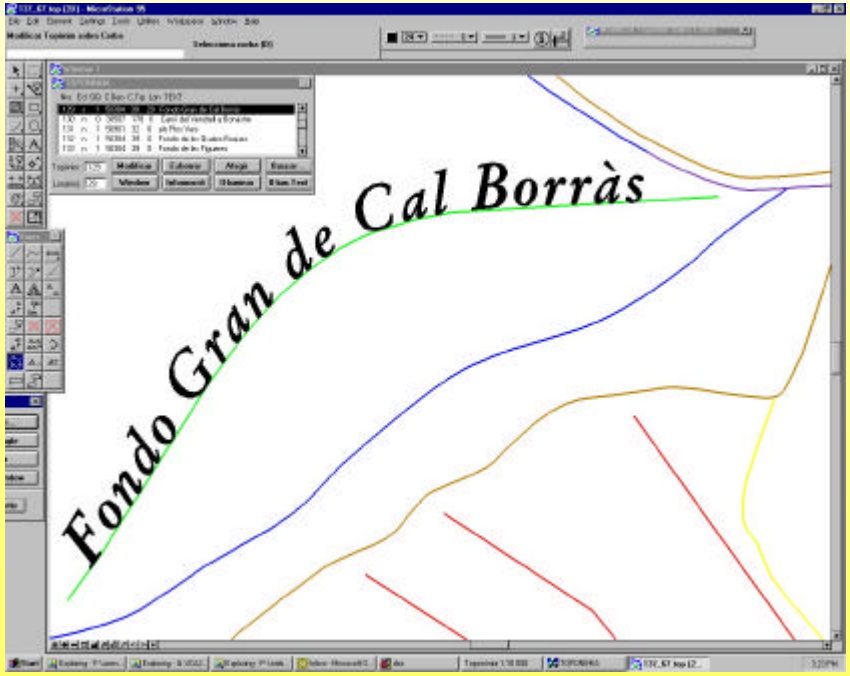
MAP NAMES GENERALIZATION: INTERACTIVE TOOLS





MAP NAMES GENERALIZATION: INTERACTIVE TOOLS



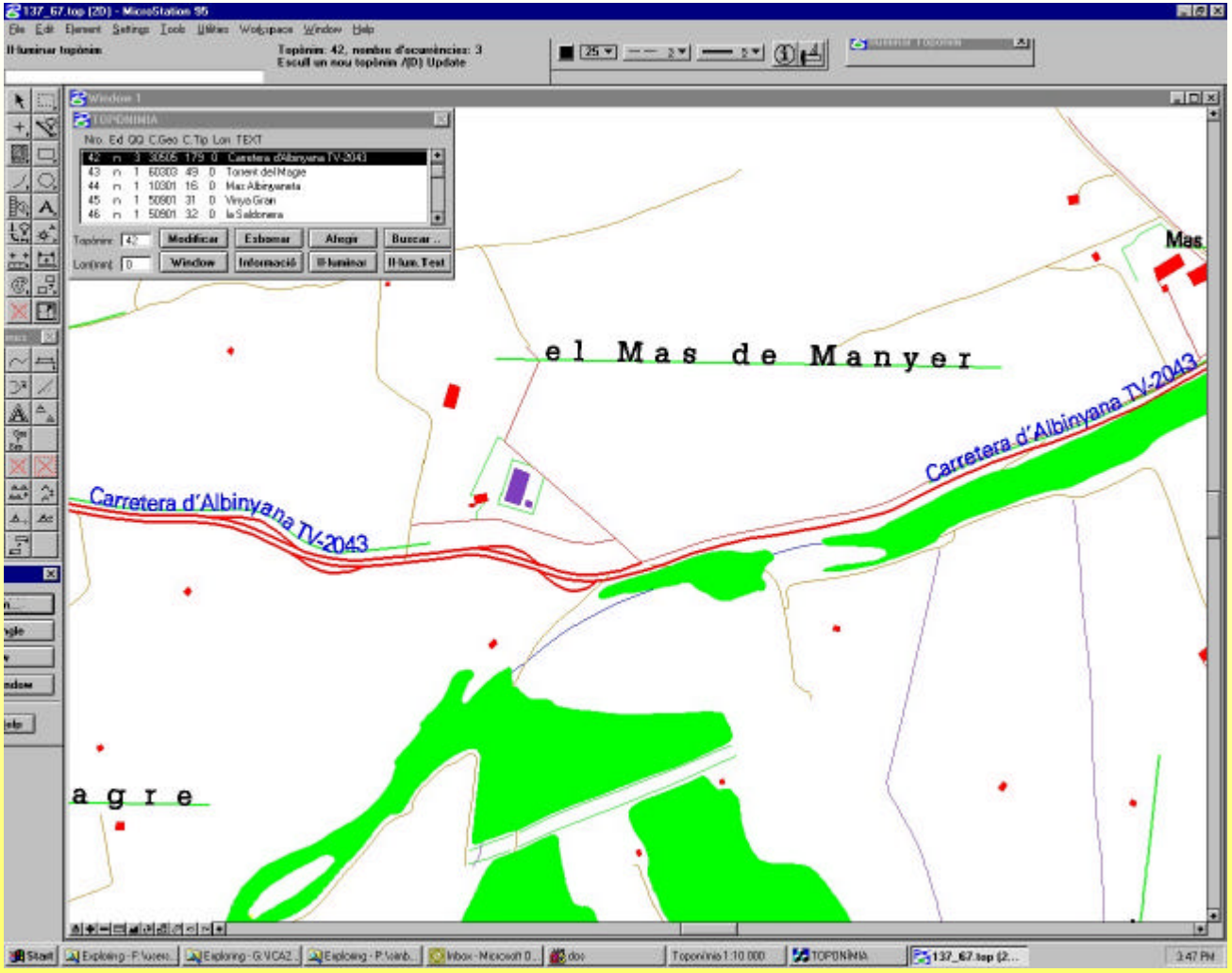


MAP NAMES GENERALIZATION: INTERACTIVE TOOLS

- Used for:
  - improving automatic generalization
  - realizing aesthetical refinements

- Tools:
  - deleting tools for improving automatic selection
  - stretching tools for intercharacter or line spacing
  - moving and rotating tools for solving overlapping conflicts
  - movements of the text along the associated curve or modification on the curve
  - changes in the geographical or typographical codes
  - show, analyze, modify and verify database contents

MAP NAMES GENERALIZATION: INTERACTIVE TOOLS



MAP NAMES GENERALIZATION:
THE EXAMPLE OF THE TOPOGRAPHIC MAP AT 1:10 000

- Started at the end of 1999
- Obtained generalizing the Topographic Database at 1:5 000
- 1070 sheets, 300 published
- Productivity:

GENERALIZATION PROCESS		**TIME**	
Automatic processes			
	Automatic map names generalization	1‘	
	Other automatic generalization	6‘	
Total automatic			**7‘**
Manual assisted editing			
	Manual map names editing	5 h	
	Manual spot height selection	7 h	
	Manual conflict resolution	4 h	
	Manual aesthetic refinement	4 h	
Total manual			**20h**
Data management			**1h 30'**
Total per map sheet 1:10.000			**21h 37’**

MAP NAMES GENERALIZATION:
THE EXAMPLE OF THE TOPOGRAPHIC MAP AT 1:10 000

original

generalized

CONCLUSIONS

• The efforts devoted to the research and the development for map names generalization have been until now very low compared with the efforts invested in topographical data generalization

• The generalization tools have to consider as the GIS needs as the map publishing requirements. The georeferentation of the original map names database should be taken also in account.

• The data model should take into account other aspects than the typographical or placement parameters. Links to the topographical objects, continuity, versioning and multiscale storage and representation, are essential to achieve an optimum management and exploitation of the database, and also to improve the results of automatic generalization processes