



IGN  
COGIT Laboratory

Paris VI University  
LIP6 Laboratory



Generalisation Workshop, ICA 03

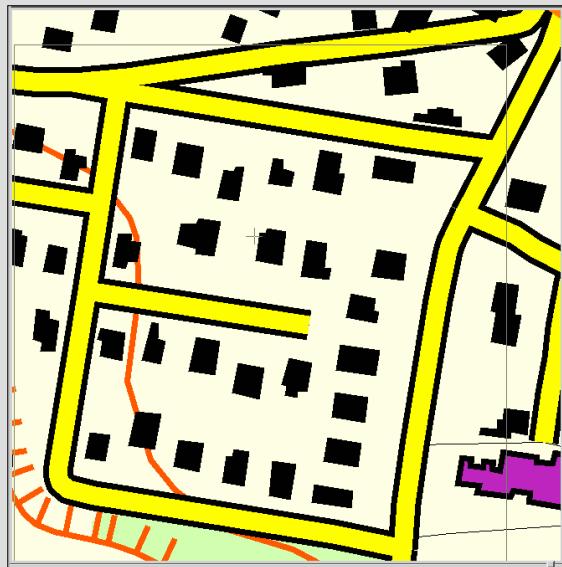
Assessment of the quality of  
Generalisation

Sylvain BARD, Ph.D. Student

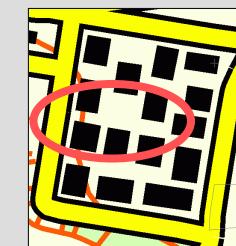
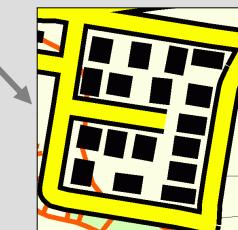
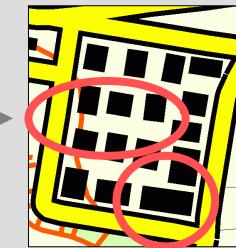
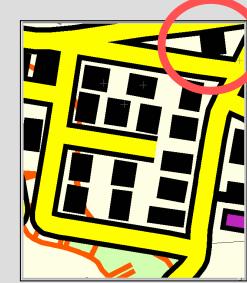
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April 28, 2003

# 1. Objectives of automatic assessment



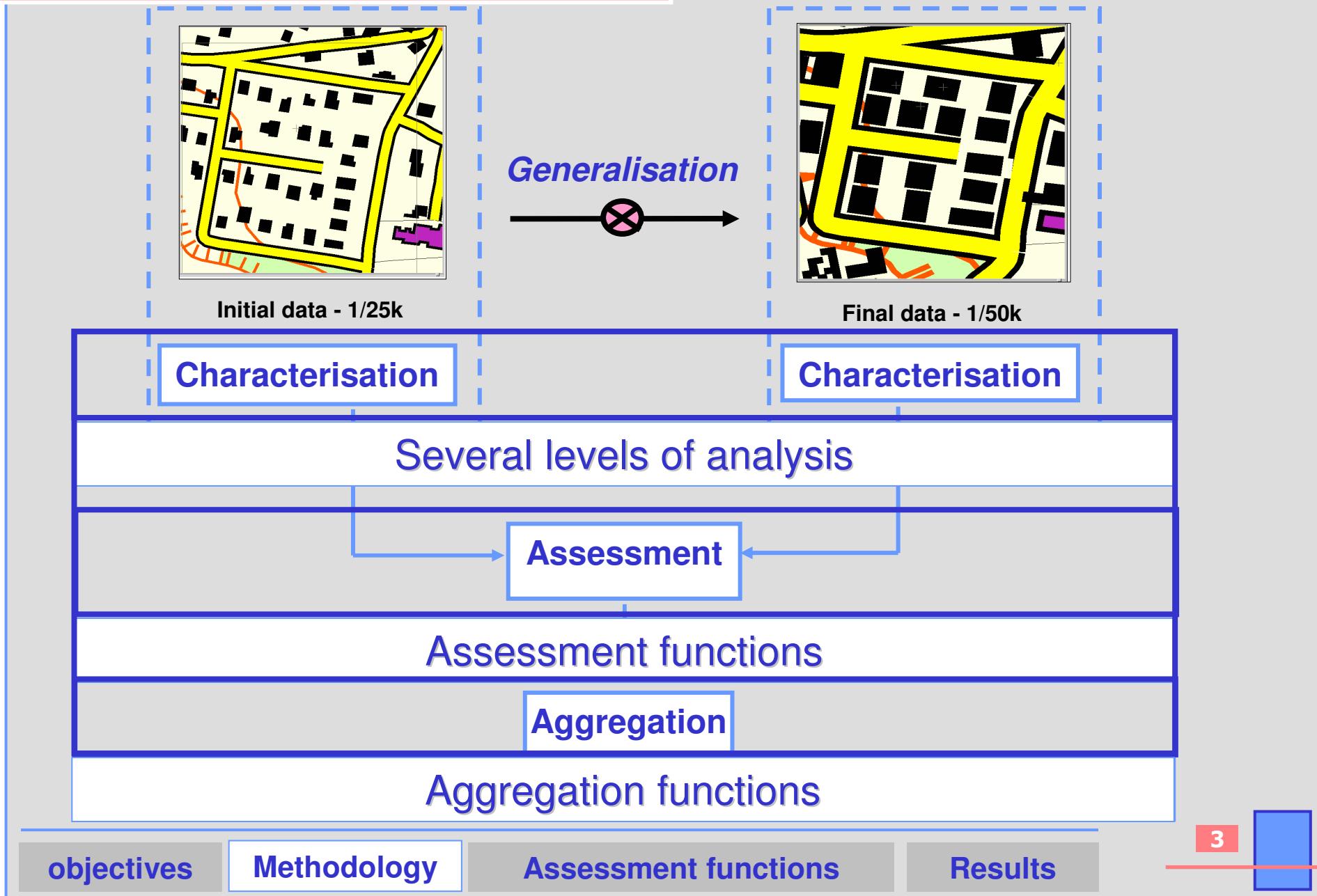
Generalisation



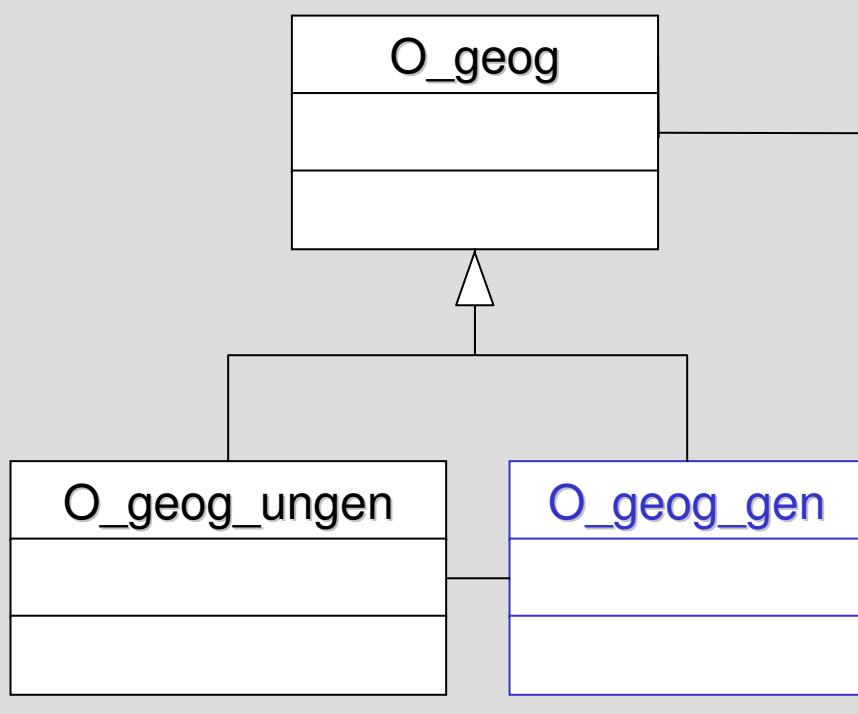
1- Error detection

2- Qualitative characterisation

## 2. Methodology of assessment



## Enrichment of data schema

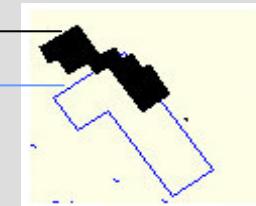


**Characterisation**

- Property 1
- Property 2
- Characterise()

**Characterisation**

- Size, position, shape...



**Assessment**

- E Property 1
- E Property 2
- E Global
- Evaluate()
- Aggregate()

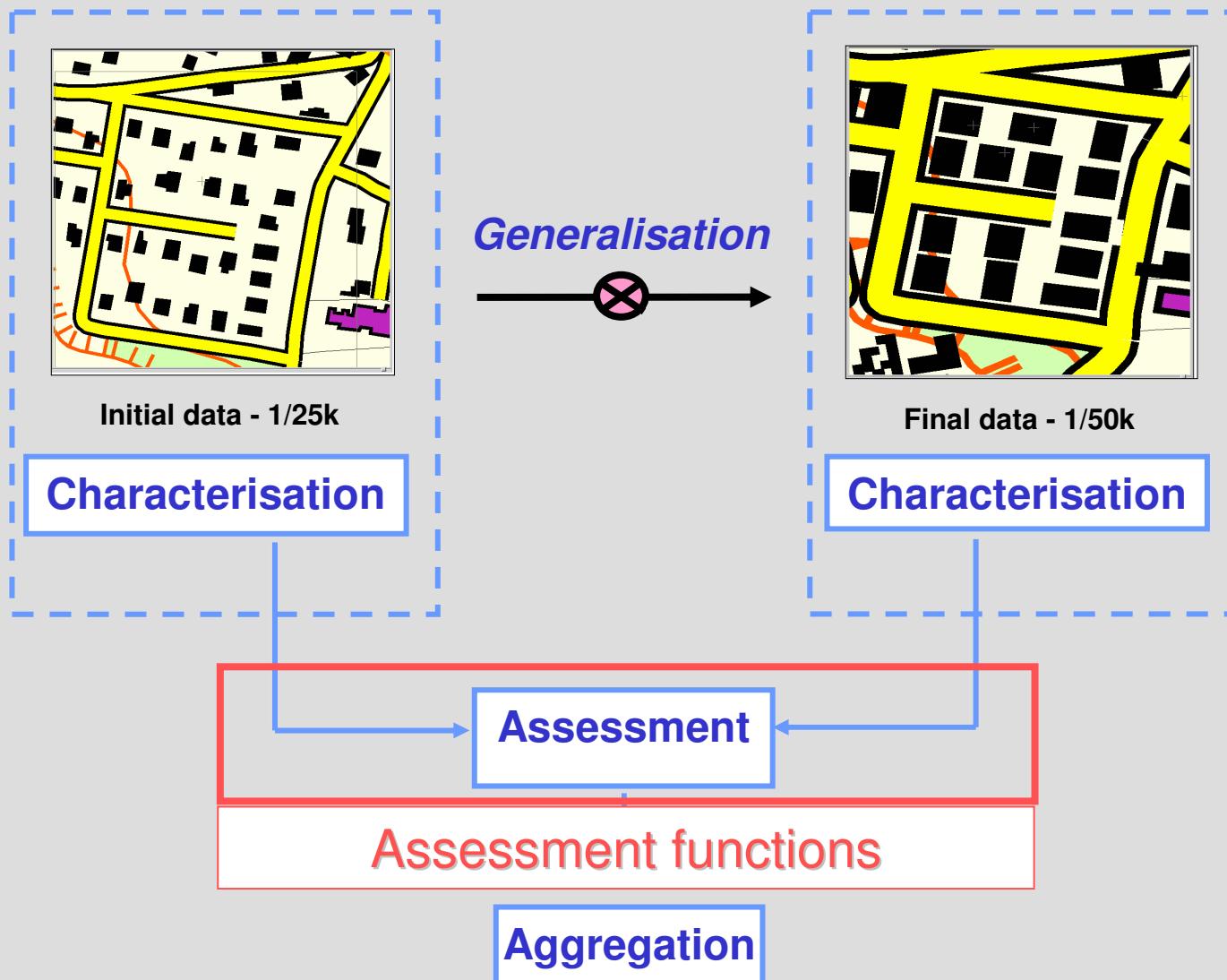
**Characterisation**

- Size, position, shape...

**Assessment**

- Size, position, shape ...
- Global

### 3. Assessment function



### 3.1- What a reference could be

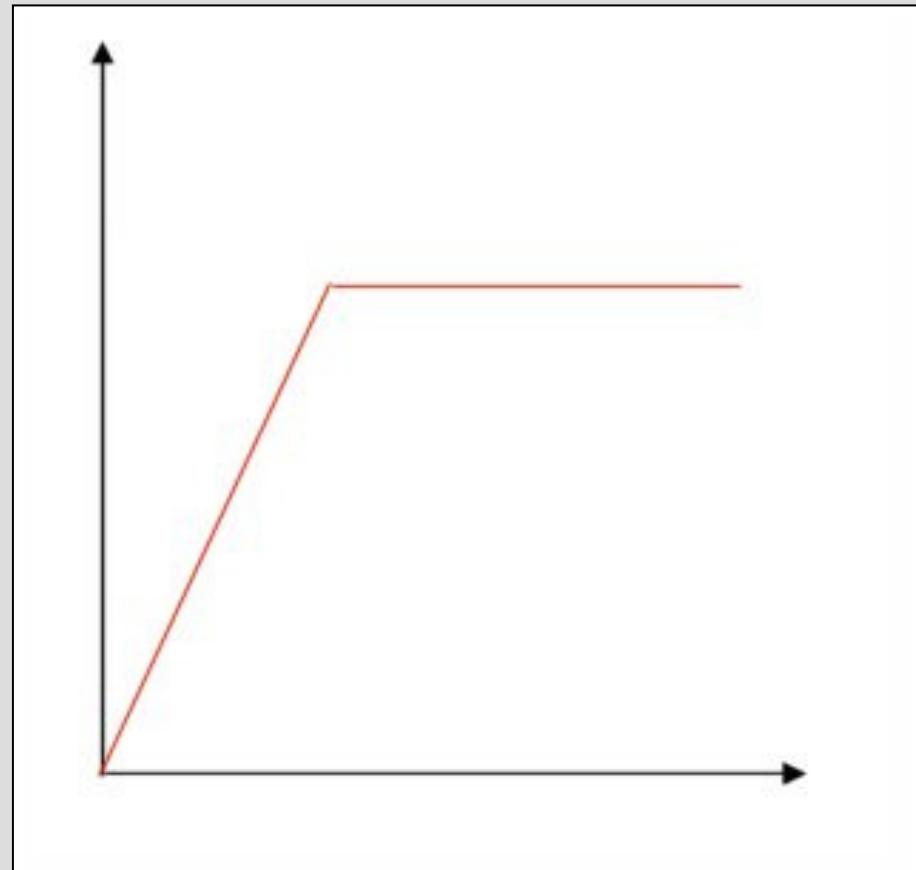
Example. size property

Parameter  $\lambda \Leftrightarrow \min. \text{size}$

◀ Reference function

Function shape  
Parameters  $\lambda$

Different shapes



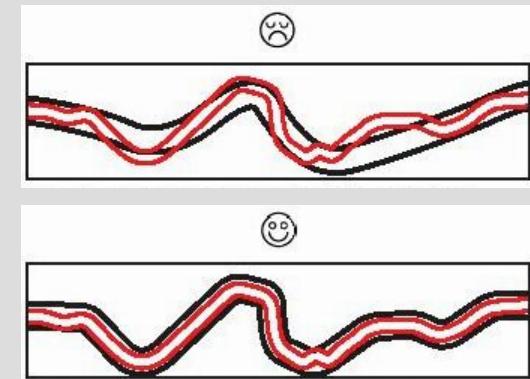
### 3.2- Define a reference, but...

#### Imprecision in the knowledge on generalisation

##### ↳ Generalisation constraint

↔ “Roads must not moved too much ”

Maximum of displacement = 1mm



From [SGK 02]

##### ↳ Legibility constraint

↔ “Buildings minimum size is about 0.16 mm<sup>2</sup>”

$0.15 \text{ mm}^2 / 0.17 \text{ mm}^2 \approx \text{'same size'}$



### 3.3- Tolerance

Size property

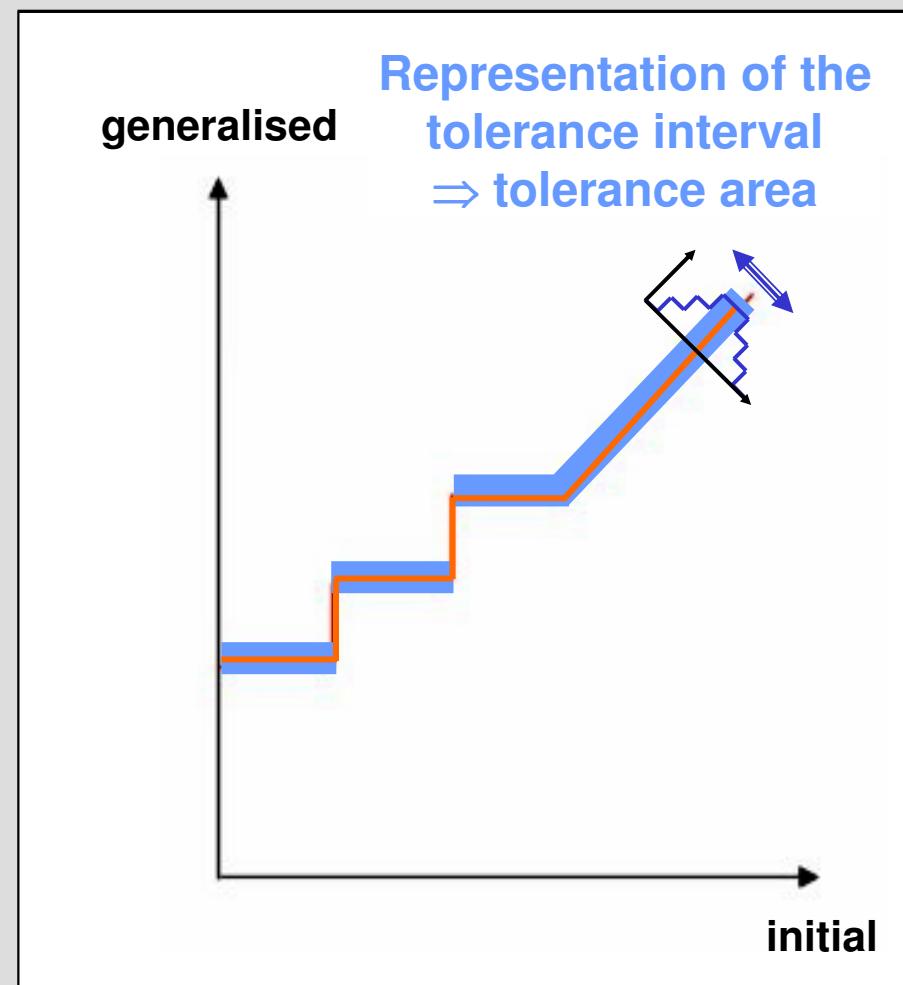
Parameter  $\lambda \Leftrightarrow$  scale

↖ Reference function

Function shape  
Parameters  $\lambda$

↖ Imprecision ?

Tolerance  $\varepsilon$



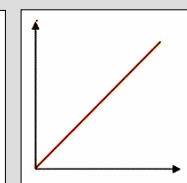
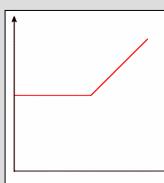
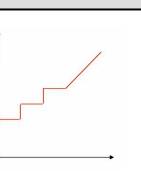
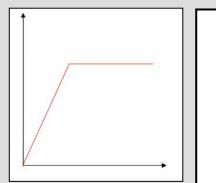
### 3.4- So, what is an assessment function ?



Function shape, Parameters

+

Tolerance



$\lambda$

$\pm \epsilon$

Reference function

Imprecision

“Assessment of buildings size”

$\lambda=0.16\text{mm}^2$  and  $\epsilon=\pm 0.1\text{mm}^2$

## 4. Results (1)

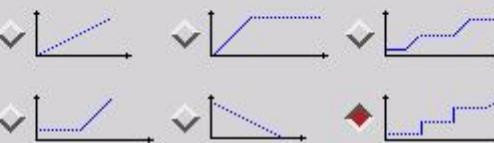
MEvaGeK - S. RARD 2002

Parameter Computation     Automatic parameter computation  
                             Personal parameter computation

Help informations   

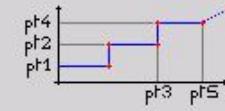
PARAMETERS	Automatic	Tolerance	Personal
Min Size	400.0	40.0	
Max Position Change			
Max Orientation Change			
Min Distance	10.0	1.0	
Min Granularity	10.0	1.0	
Differentiation			
Min width line	700.0	70.0	

Feature Class selection       

Criteria selection        

Tolerance   

Seuil   

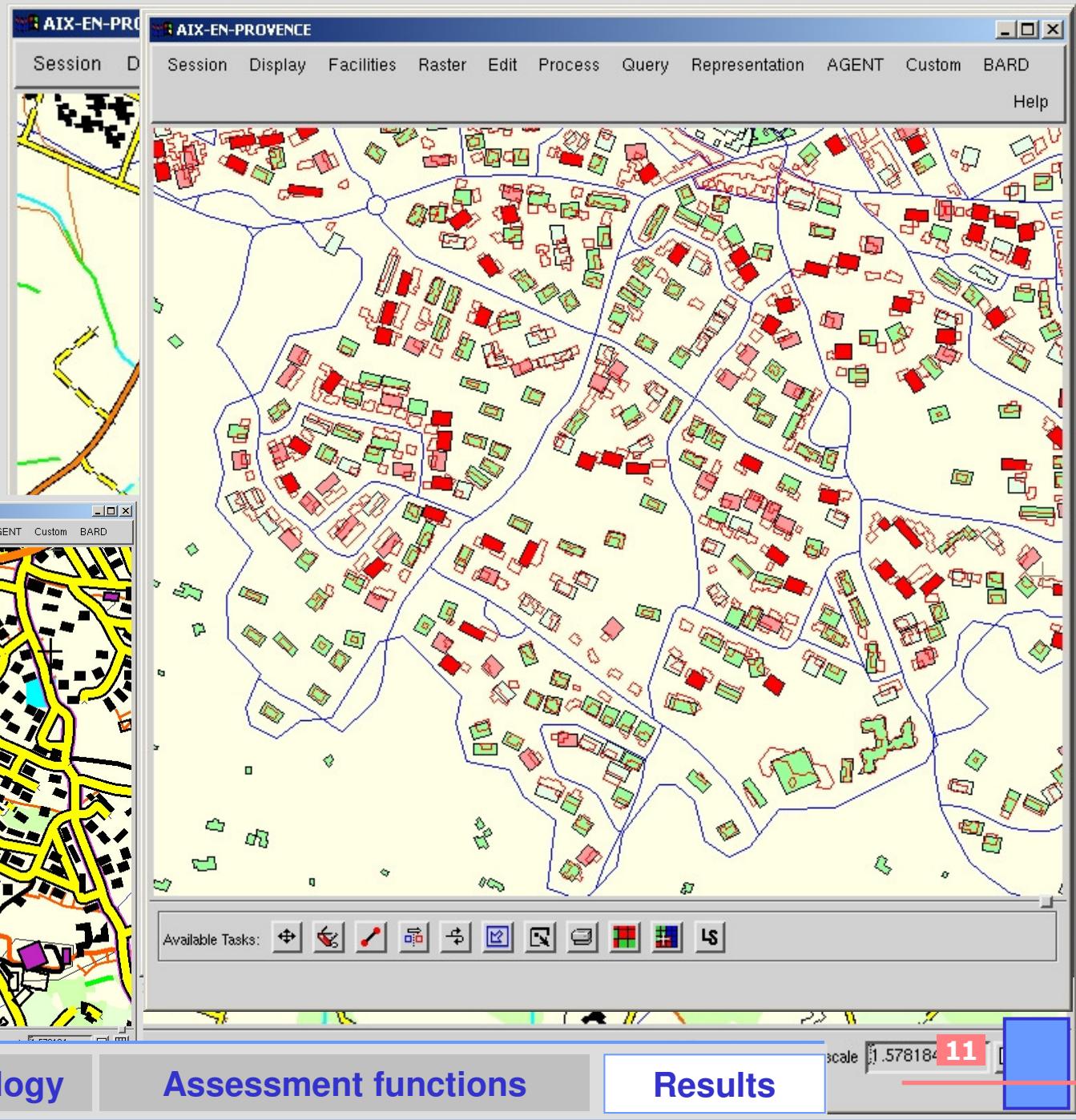
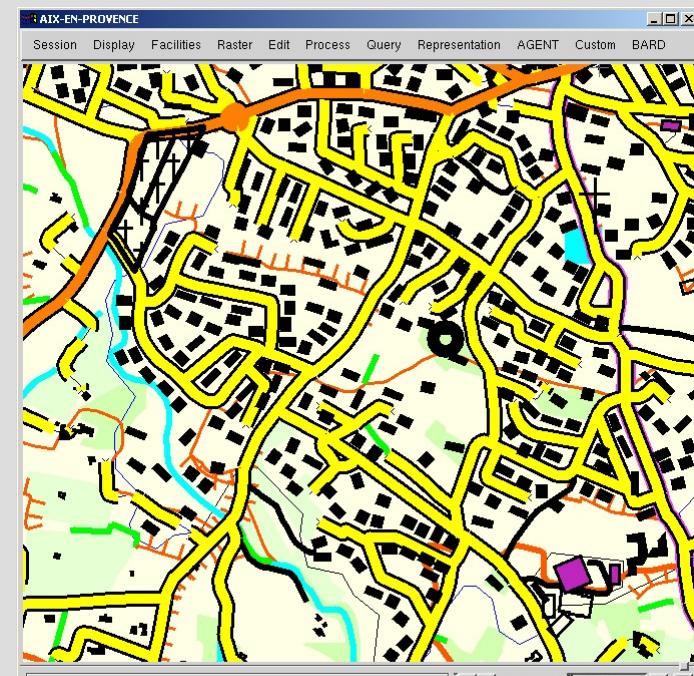
X point 1      
Y point 1      
X point 2      
Y point 2      
X point 3      
Y point 3      
X point 4      
Y point 4      
X point 5      
Y point 5      
X point 6      
Y point 6      


objectives    Methodology    Assessment functions    **Results**    **10**

## 4. Results (2)

- ***Good quality***
- ***Rather good***
- ***Rather bad***
- ***Bad quality***



objectives

Methodology

Assessment functions

Results

scale 1:578184 11

## Conclusion

### ◀ Assessment of generalisation

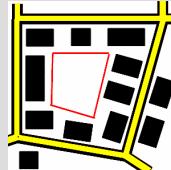
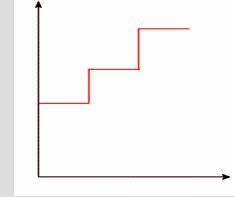
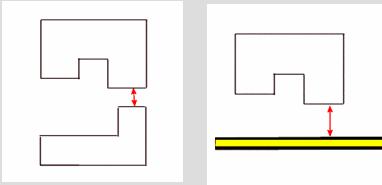
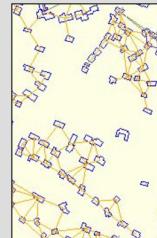
3 steps: characterisation, evaluation, aggregation

Assessment function = (reference, parameter) + tolerance

Tools developed: interfaces

### ◀ on-going work

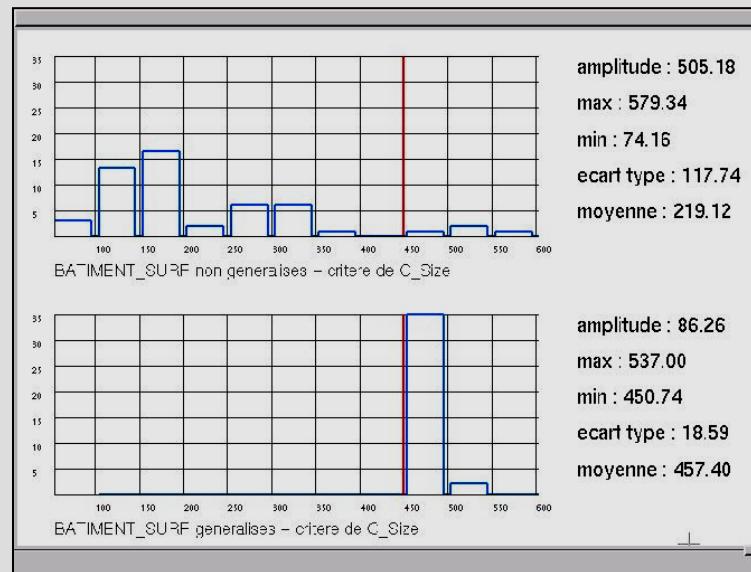
Assessment of meso and macro level

Meso	Characterisation	Evaluation
Density	<p>Buildings</p>  <p>Free space</p>	
Street density	<p>% road covering</p>  <p>Number, surface</p>	
Proximity	<p>Buildings</p>  <p>Buildings / roads</p>	$\lambda = 0.15\text{mm}$ $\varepsilon = \pm 0.05\text{mm}$
Structure	<p>Alignment</p>  <p>Cluster of buildings</p> 	
Semantic	<p>Number and surface</p> 	<span style="background-color: red; color: white; padding: 2px 5px;">13</span> 

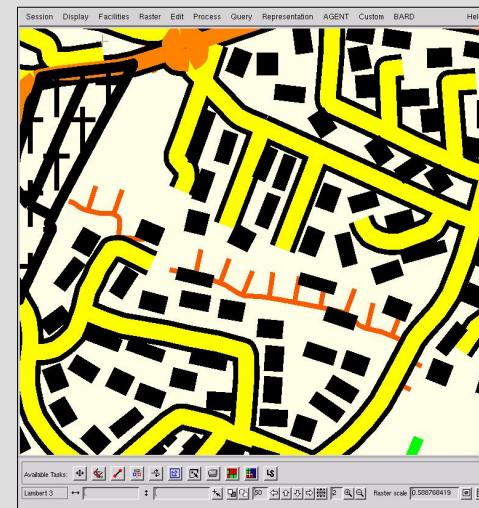
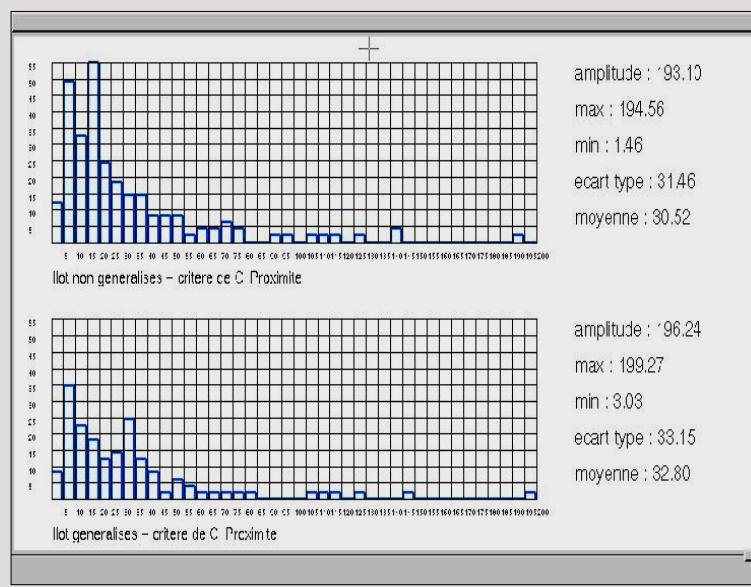
## Macro

## Characterisation

### Size



### Proximity



# Conclusion

## ↗ on-going work

Assessment of meso and macro level

Fuzzy set theory ↗ aggregation

