

# Assessing land cover changes in the French Pyrenees since the 1940s

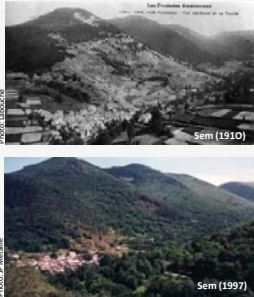
## A semi-automatic GEOBIA approach using aerial photographs



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### Introduction

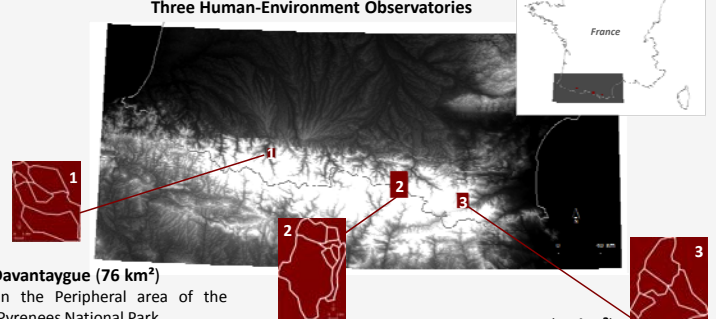


As in many mountain areas in Europe, **agro-pastoral landscapes** of the Pyrenees are subject to **fast spontaneous reforestation**. Encroachment is mainly related to the abandonment of farmland in combination with rural depopulation and agriculture modernization.

Observed changes of land abandonment or land-use extensification can be similar at the regional scale but the **dynamics at the local scale do not occur homogeneously**, as it is determined by specific conditions (environmental, climatic, socio-economic, anthropogenic).

The **objective** of this work (part of the MODE-RESPYR project) is to **assess the spatial patterns of land cover changes** during the last 70 years in three study sites of the Pyrenees, and to **compare the local dynamics** in order to **observe and to explain similarities and disparities**.

### Study sites

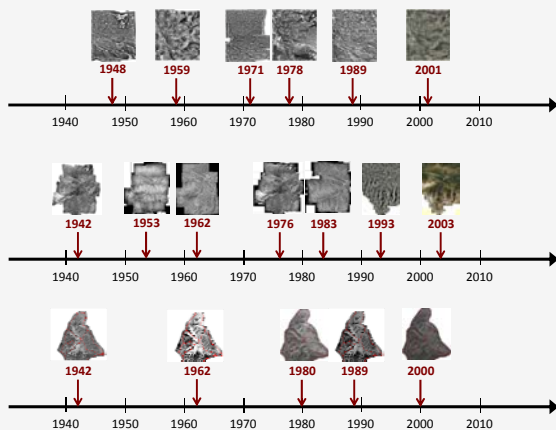


- 1. Davantaygue (76 km<sup>2</sup>)**
  - In the Peripheral area of the Pyrenees National Park
  - **6 municipalities**
- 2. Haut-Vicdessos (244 km<sup>2</sup>)**
  - In the Regional Natural Park of Ariège
  - **7 municipalities**
- 3. Garrotxes (85 km<sup>2</sup>)**
  - In the Regional Natural Park of the Catalan Pyrenees
  - **5 municipalities**

### Material and Method

#### Data

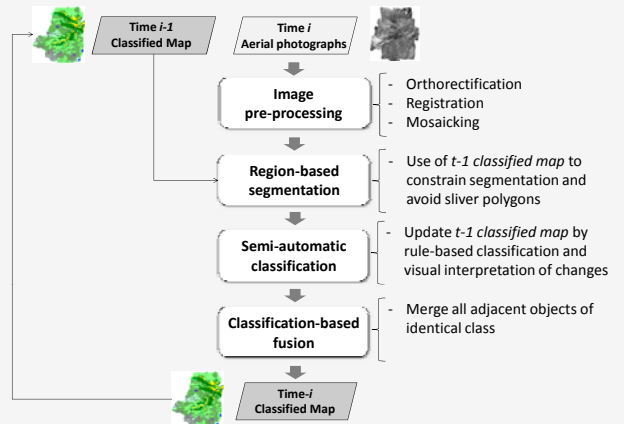
Historical panchromatic aerial photographs with recent true color digital images



- 1. Davantaygue**
  - Number of photographs: 67
  - 6 dates: from 1948 to 2001
  - Scale: 1:15000-1:30000
  - Spatial resolution: 0.5m
  - TIFF (8 or 24 bits)
- 2. Haut-Vicdessos**
  - Number of photographs: 286
  - 7 dates: from 1942 to 2003
  - Scale: 1:25000-1:30000
  - Spatial resolution: 0.5m
  - TIFF (8 or 24 bits)
- 3. Garrotxes**
  - Number of photographs: 104
  - 5 dates: from 1942 to 2000
  - Scale: 1:25000-1:30000
  - Spatial resolution: 0.5m
  - TIFF (8 or 24 bits)

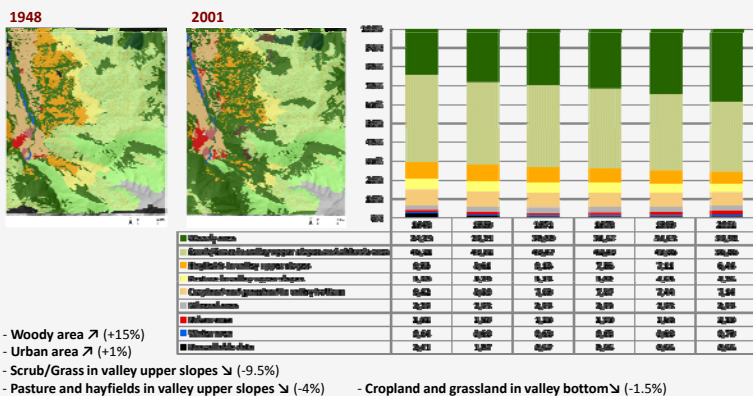
#### Methodological approach

Dependently-generated land cover maps from a GEOgraphic Object-Based Image Analysis

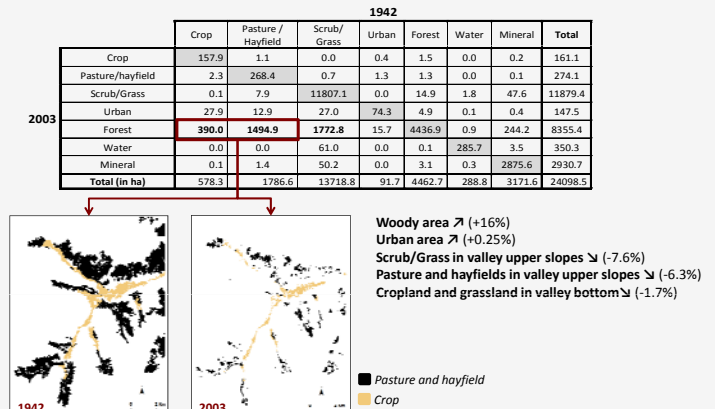


### Results

#### 1. Davantaygue



#### 2. Haut-Vicdessos



### Conclusions

- A **similar spatial pattern** of land cover changes for the 3 study sites (encroachment at low and medium altitudes) but with **different rates and extents**, and occurring at different periods.
- A spatial pattern highly related to pattern of **farmland abandonment** and depopulation.
- A **generic method** usable for various mountain areas
- Perspectives: developing an automatic classification procedure using very high resolution remotely sensed images for monitoring annual land use and cover changes.

#### 3. Garrotxes

