Land-use and cover changes in the Massif Central region of France
ALUMHI : Automatic Land Use Maps from Historical Images

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Introduction

Natural afforestation following agricultural abandonment

Consequences

- Vegetation communities (Lepart et Escarré 1983)

- Ecosystem functioning ? (Piché et al. 2015, Buscaldo et al. 2019)

- Ecosystem services ? (Ustaoglu et al. 2018)

  o **Carbon stock**

  o **Soil fertility**

  o Erosion limitation
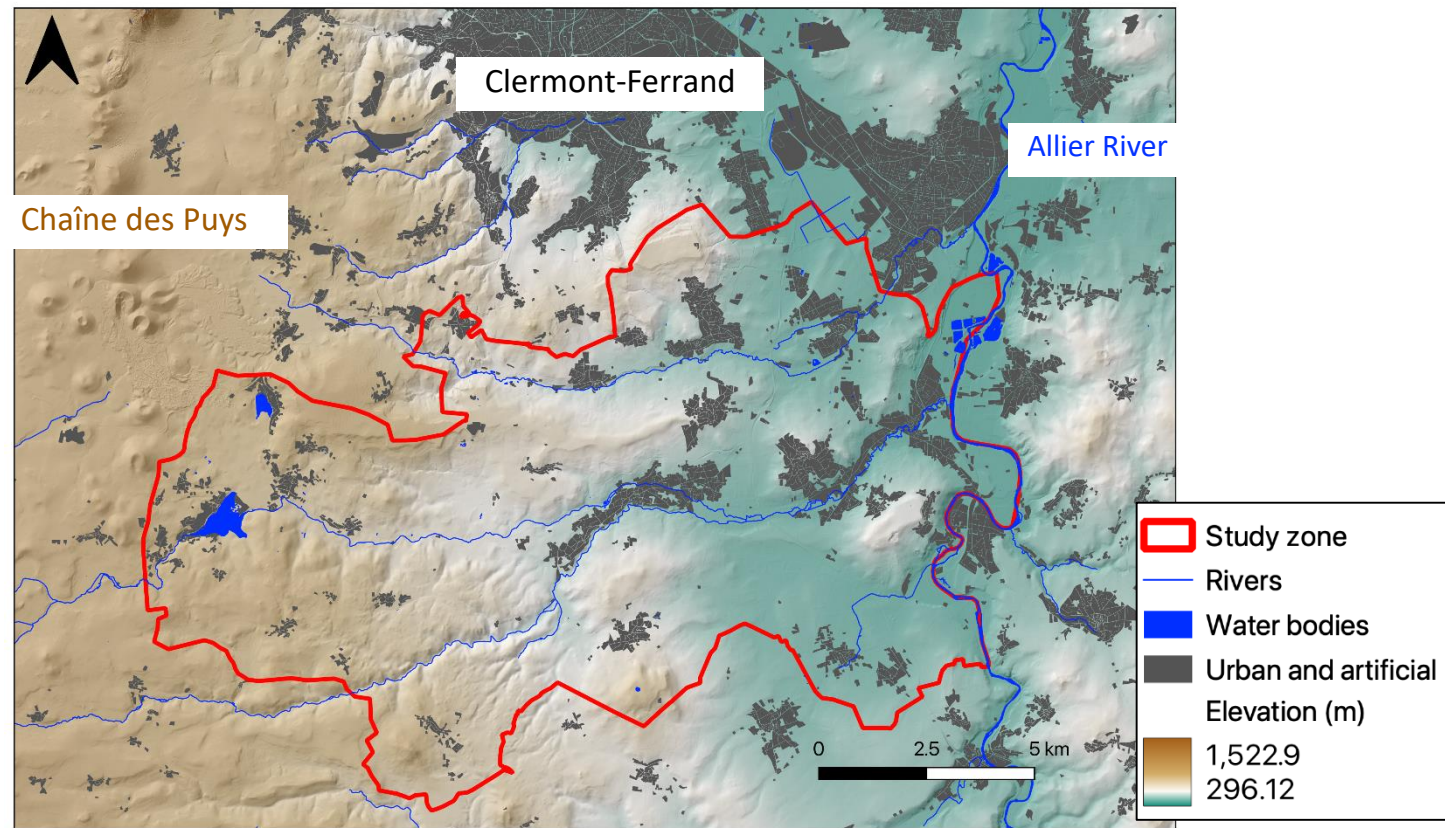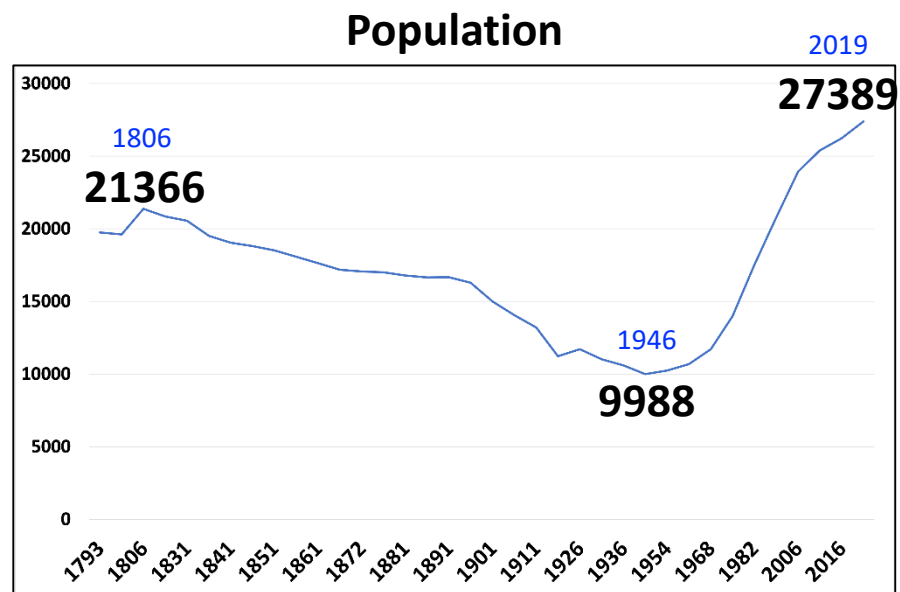
Study region

Massif central region

History of rural depopulation, changing agricultural practices and landscapes (Diry et al. 2000)

Massif central
Study zone
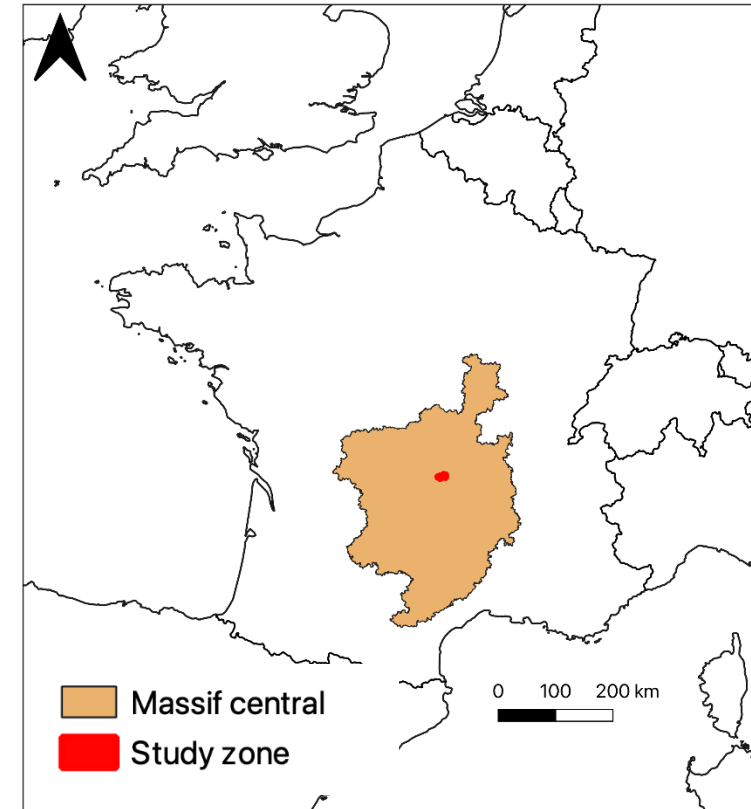
Study zone

Between mountains and plain

Demographic changes

Population

→ **Q1. What are the land-use and cover changes in the study zone ? What is the extent of natural afforestation ?**
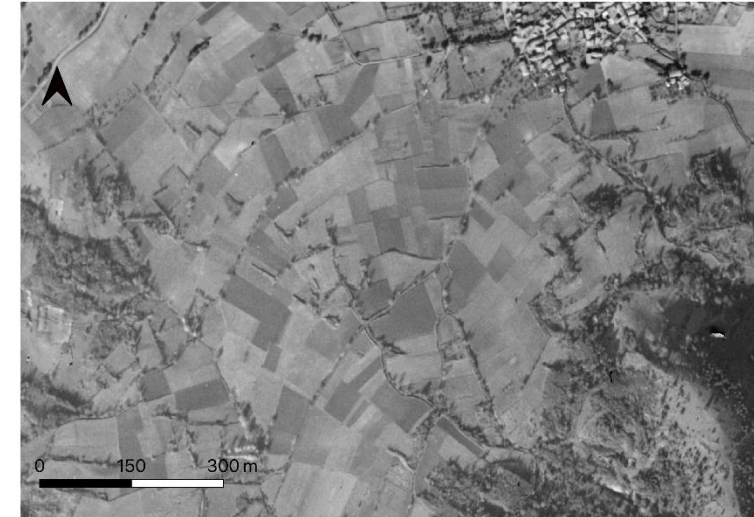
Land-use/cover changes: methods

Historical mapping 1946 - 2019

- Historical areal photographs

- Land use data

Main categories

- Forest   ■
- Planted forests   ■
- Shrubs   ■
- Agricultural lands   ■
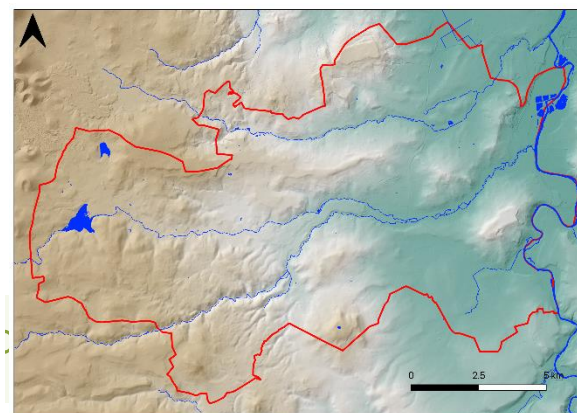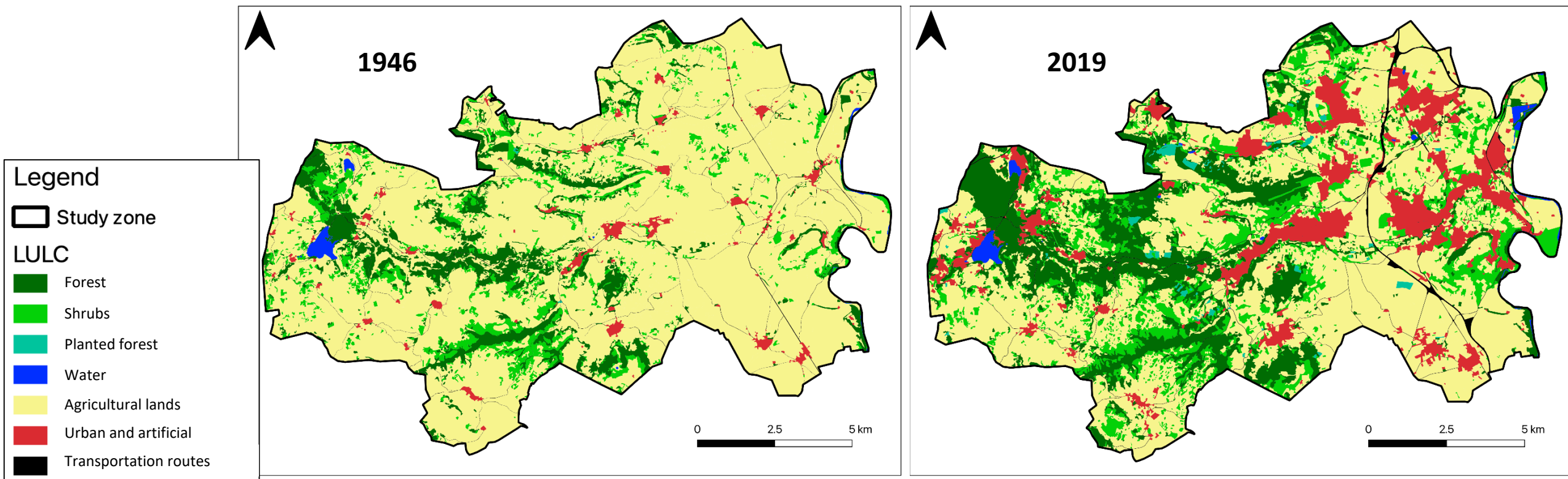- Urban and artificial   ■

1946

2019

Land-use and cover changes: results

Legend

□ Study zone

LULC

- ■ Forest
- ■ Shrubs
- ■ Planted forest
- ■ Water
- □ Agricultural lands
- ■ Urban and artificial
- ■ Transportation routes

1946

2019

□ Study zone
— Rivers
■ Water bodies
Elevation (m)
1,522.9
296.12

M Weissgerber, Extent of a... ...ems

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1946　　　　　　　　　2019

Forest

Shrubs

Urban and artificial

Abandonment 23%

Artificialization 12%

Agricultural lands

Forest x 2.2

Shrubs x 1.6

Urban and artificial x 5.3

Agricultural lands

A1: LUCC = agricultural abandonment, natural afforestation and urbanization

→ Representative of European territories
(Ustaoglu et al. 2018, Shaw et al. 2020)

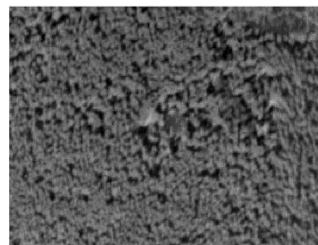**Internship question 1a:**
At which pace did it happened ?

M W   equences on ecosystems

Cartography methods

Digitalization scale : 1/5000

1946
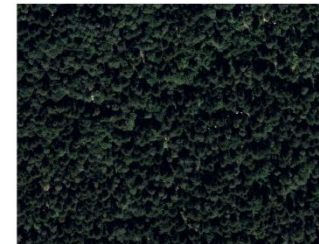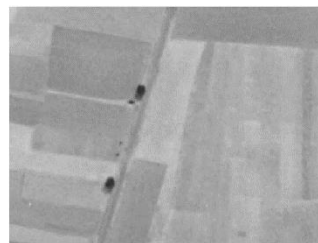
Urban and artificial

Forest

Water

Agricultural lands

Shrubs

Transportation routes

Planted forest

0   50   100 m

2019

Urban and artificial

Forest

Water

Agricultural lands

Shrubs

Transportation routes

Planted forest

0   50   100 m

8
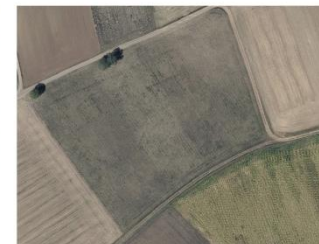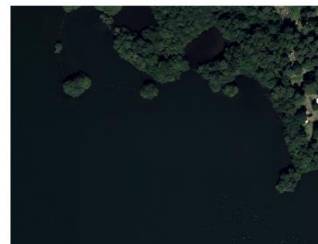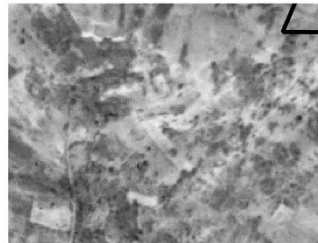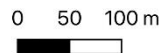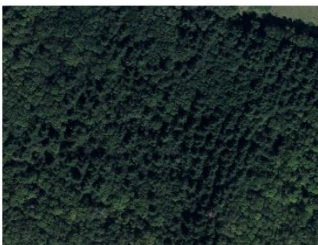
Internship question 1b: What for the **images** in between ?

Agricultural intensification

1946

1946

2019

2019
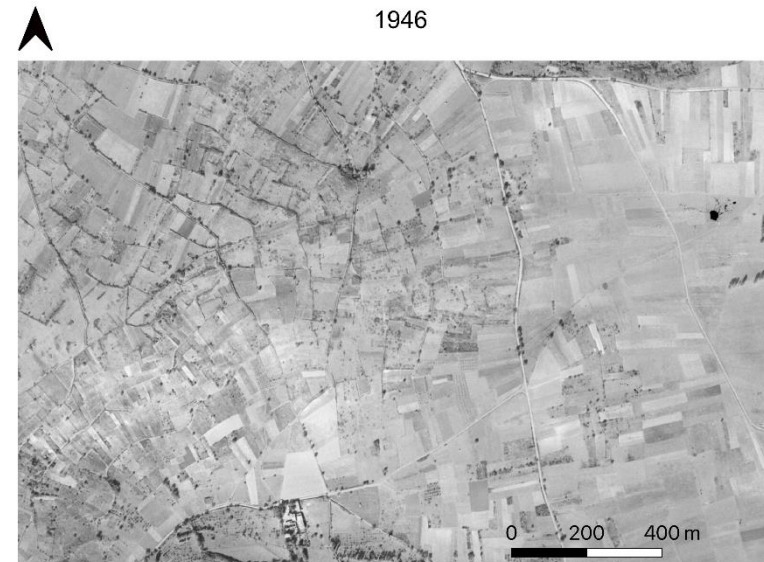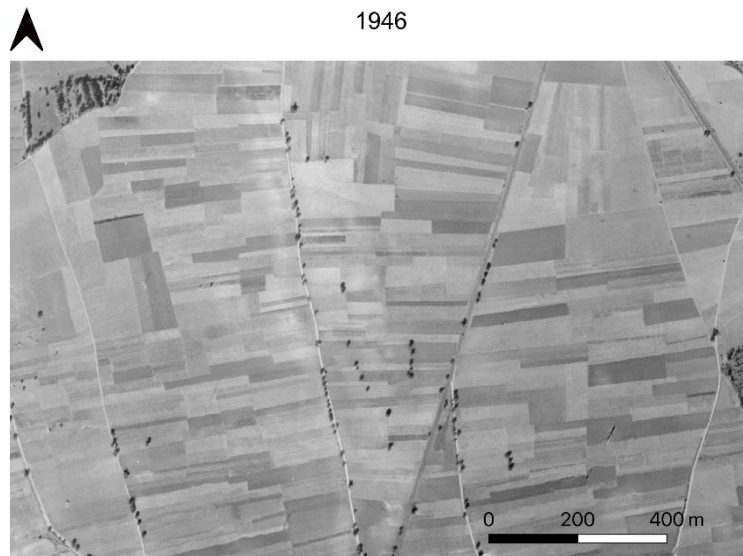
Internship question 2: Can we automatically segment parcel to measure the agricultural intensification ?