MODELLING PAST AND FUTURE LAND USE AND COVER CHANGES A MULTI-SCALE APPROACH APPLIED IN THE PYRENEES – THE MODE RESPYR PROJECT CONTEXT AND OBJECTIVES

Thomas Houet, Didier Galop, Florence Mazier, D Sheeren, J.-F. Dejoux

MODELLING PAST AND FUTURE LAND USE AND COVER CHANGES

A MULTI-SCALE APPROACH APPLIED IN THE PYRENEES – THE MODE RESPYR PROJECT

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CONTEXT AND OBJECTIVES

Context

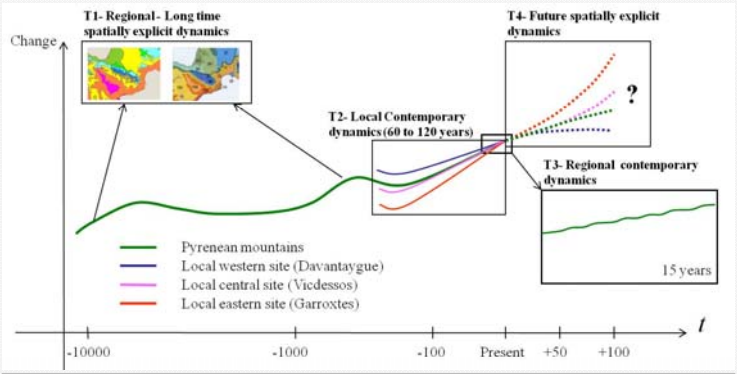
- Land cover changes have significant impacts on local and regional climate and on others environmental issues.
- Understanding past LUCC is essential to reduce uncertainties related to current changes, identify driving forces of LUCC and better anticipate future changes
- Under climate change assumptions, Pyrenees mountains will face dramatic effects of climate change and show high environmental stakes (water / snow resources, biomass, biodiversity...)

Scientific & Methodological issues

- Providing knowledge on past and future land use and cover changes with heterogeneous datasets
- Simulating local / regional land use and cover changes using spatially explicit models
- Simulating past / futures land use and cover changes based on scenarios

- What is the role of spatial approaches in prospective research?
- What spatial and temporal resolutions are required for short / long term projections?

PROJECT METHODOLOGY



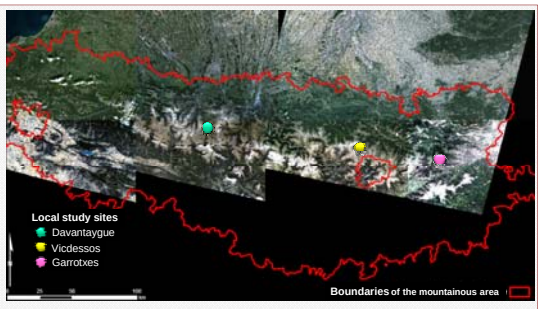
Task 1: Regional LUCC over last 12 000 years using palaeo-environmental data and models
Task 2: Local LUCC over last 60-120 years using historical maps / aerial photographs
Task 3: Regional LUCC over last 15-20 years using high resolution satellite imageries

Integration of knowledge → Participatory approach → Building scenarios → Use / Development of models

Task 4: Modelling past / future LUCC based on scenarios and dynamic/spatially explicit models

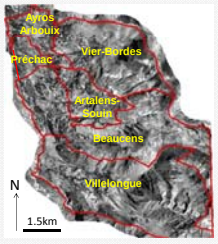
STUDY SITES

The Pyrenees



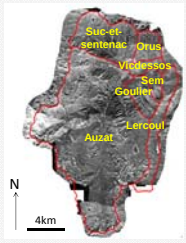
Davantaygue

Long Term Ecological Research site
76 km² - 6 municipalities



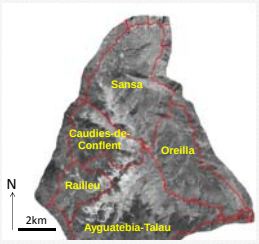
Vicdessos

Human-Environment Observatory
244 km² - 7 municipalities



Garroxtes

25 years of observations / studies
85km² - 5 municipalities

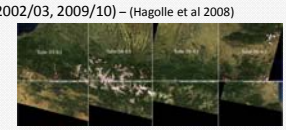


PRELIMINARY RESULTS

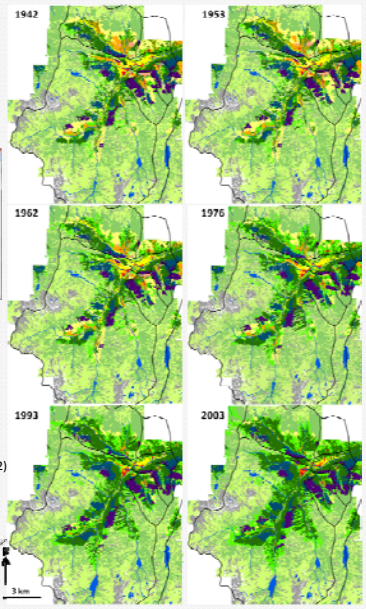
LUCC databases

Constitution of LUCC databases based on a reliable land use and cover typology
- Palaeo database (PALEOPYR and in situ cores)

-Satellite imageries pre-treatment and classification (1994, 2002/03, 2009/10) – (Hagolle et al 2008)



- Land use and cover maps from 1940's (Houet et al 2012)

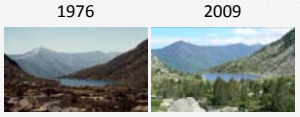


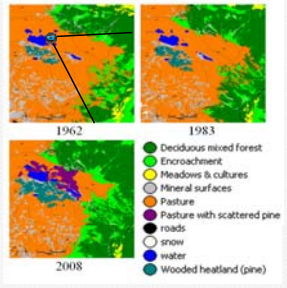
Local LUCC over the last Century

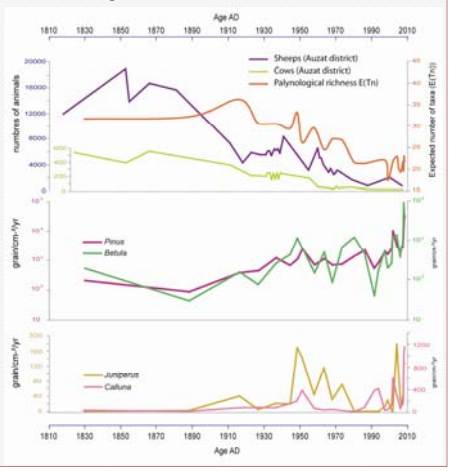
→ **Comparison of local LUCC** (cf. Sheeren et al 2012 - Poster AGILE'2012)

→ **Combining palaeo and GIS datas for understanding LUCC**

Linking grazing activities and land use and cover changes (Galop et al. 2011)







CONCLUSION

MODE RESPYR (2011-2015) is a ongoing project integrating heterogeneous spatially explicit LUCC data and coupling various disciplines.
→ LUCC databases are nearly finalized and multi-scaled analyses have started as well as model comparison and exploration.
→ Local landscape changes are mostly attributed to human land use changes rather than global warming and have to be compared with regional trends
→ Participatory and scenarios approaches will be performed for modelling future and past local and regional land use and cover changes

WEBSITE

http://w3.mode-respyr.univ-tlse2.fr

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Project founded by ANR Jeune Chercheur / Jeune Chercheuse
MODE RESPYR (2010 JCJC 1804 01 – 01)