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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

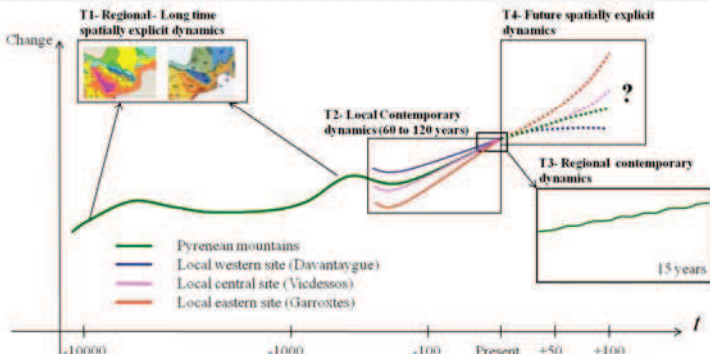
Context

- 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

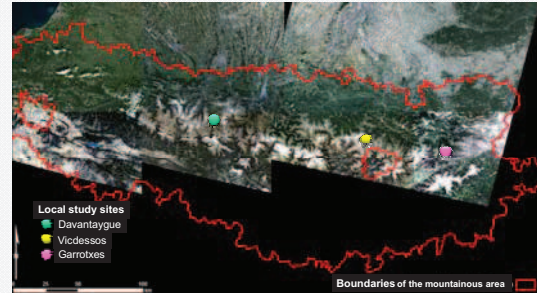
Task 3: Regional LUCC over last 15-20 years using high resolution satellite imageries



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

STUDY SITES

The Pyrenees



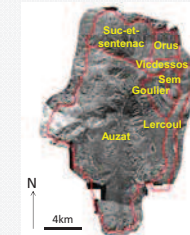
Davantaygue

Long Term Ecological Research site
76 km² - 6 municipalities



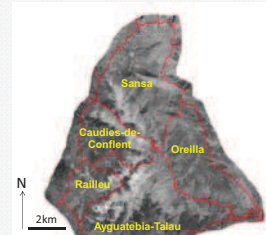
Vicdessos

Human-Environment Observatory
244 km² - 7 municipalities



Garrotxes

25 years of observations / studies
85km² - 5 municipalities



PRELIMINARY RESULTS

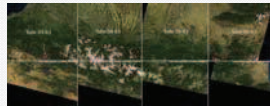
LUCC databases

Constitution of LUCC databases based on a reliable land use and cover typology

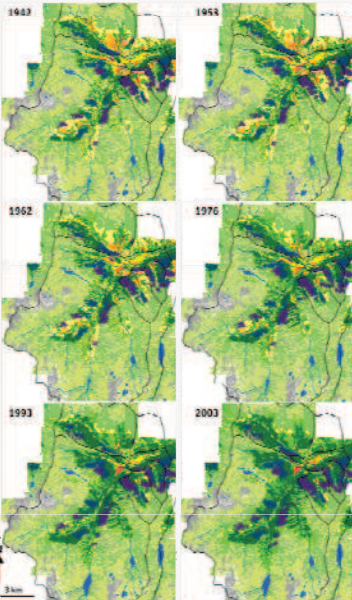
- Palaeo database (PALEOPYR and in situ cores)



- 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)

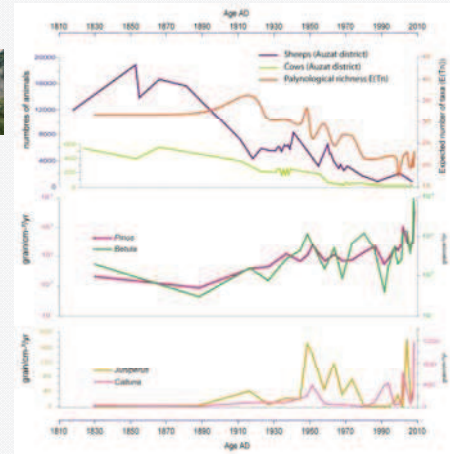
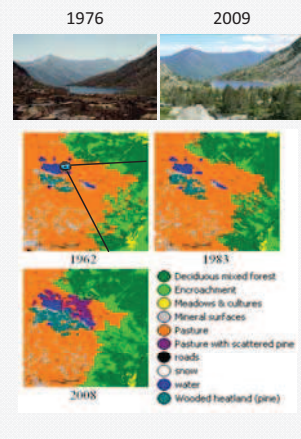


Local LUCC over the last Century

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

→ Combining palaeo and GIS data for understanding LUCC

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



CONCLUSION

MODE RESPYR (2011-2015) is an 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

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WEBSITE

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



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

