

Forest cover changes in mountainous regions – drivers, trajectories and implications (FORECOM)

Over the past decades agricultural land in Europe has declined and forest area has expanded considerably. Recent trends of land abandonment have been most pronounced in marginal areas, for example in the mountains, like the European Alps and the Carpathians, where agriculture became economically inefficient resulting in a decrease in cropland or grassland area followed by an increase in forest cover. At the same time, the potential upper tree line has shifted upward as a consequence of global warming. Despite their importance, spatially accurate large-scale and long-term reconstructions of forest cover changes in the Swiss Alps and the Polish Carpathians so far have been missing for both mountain regions, and underlying driving forces of the forest cover change trends are still insufficiently understood.

FORECOM (PSPB 008/2010) – a project awarded in the “Environment” pillar of the Polish Swiss Research Programme (<http://www.swiss.opi.org.pl/>) – aims therefore at improving the understanding of past, present and future forest cover changes in the Swiss Alps and the Polish Carpathians in the context of land use and climate changes. The project will be carried out by research teams from the Institute of Geography and Spatial Management (IGSM), Jagiellonian University, Poland, and Swiss Federal Research Institute for Forest, Snow and Landscape Research (WSL), Research Unit Land Use Dynamics. It started in June, 2012, and will end in May 2016.

The FORECOM project has the following objectives:

- [1] to identify trends in forest cover change over the past 150 years for the Polish Carpathians and the Swiss Alps;
- [2] to quantify the relative contribution of climate and land use to the past forest cover change;
- [3] to develop combined climate and land use change scenarios for projecting future forest cover change;
- [4] to assess important implications of forest cover change: historical and future trends in forest carbon pools and potential impacts on biodiversity.

For forest cover change mapping historical maps of the Swiss Alps and the Polish Carpathians will be used together with aerial photos, high resolution satellite imagery and airborne laser scanning data. Spatially explicit models of forest cover change and future scenarios will be constructed on a basis of available data integrated and processed by means of geographic information systems. An important technology-oriented aspect of the project will be the development of robust methodologies and tools to capture, integrate and process cartographic and earth observation data.

Expected results of the project are long-term and large scale reconstructions of historical forest cover dynamics for the Swiss Alps and the Polish Carpathians, quantification of relative effects of climate and land use change on forest cover change, improved models allowing predictions of

forest cover change under various land use / climate change scenarios, and assessments of important consequences of forest cover change.

The FORECOM project will contribute to a better understanding of complex interactions between the biotic, climatic and human dimensions of land cover change in mountain landscapes, taking the advantage of the comparative perspective. The project will also support planning and decision making to develop sustainable land use strategies and to set up appropriate management and conservation priorities.

More information:

Prof. Jacek Kozak, IGSM (jkozak@gis.geo.uj.edu.pl)

Dr. Urs Gimmi, WSL, Research Unit Land Use Dynamics (urs.gimmi@wsl.ch)