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MOTIVE - models for adaptive forest management

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The project MOdels for AdapTIVE forest Management (MOTIVE) is a large scale integrating project within the 7th framework program of the EU that consists of a consortium of 20 partners in 14 European countries. MOTIVE evaluates the consequences of the intensified competition for forest resources given climate and land use change. The project focuses on a wide range of European forest types under different intensities of forest management. In particular, MOTIVE examines impacts with respect to the disturbance regimes determining forest dynamics.

MOTIVE seeks to develop and evaluate strategies that can adapt forest management practices to balance multiple objectives under changing environmental conditions. The evaluation of different adaptive management systems will take place within a scenario analysis and a regional landscape framework. A wide range of possible scenarios will be taken into account from optimistic predictions (“no major change for forest ecosystems”) including possible opportunities offered by climate change (e.g. increased tree growth in northern areas) to worst case scenarios (“extreme deterioration of the growth conditions for trees”) on different time scales (short - , mid-, long term). The main forest types in Europe for the most important bioclimatic regions will be covered.

MOTIVE aims at developing new approaches to forest management and improved silvicultural regimes to enable forest biomass production and the use of forests multiple goods and services to adapt to climate change and other associated environmental changes. The design of decision-support tools to help manage risk and uncertainty is a focus of MOTIVE, as is the development of new methods to plan for the optimal selection of tree species and silvicultural concepts in future climate regimes. Silvicultural risk control mechanisms will be created to minimize the consequences of natural disasters.

The ultimate objective of the MOTIVE project is to provide insights, data and tools to improve policymaking and adaptive forest resource management in the face of rapidly changing climatic and land-use conditions. Specifically, the following objectives are of primary importance for the integrated project MOTIVE:

- To provide an integrated assessment of forest management strategies that simultaneously considers multiple ecosystem goods and services rather than focusing on individual aspects such as timber production or biodiversity alone
- To provide a comparative assessment by using the same protocol across a wide range of climatic and socio-economic conditions by adopting a regional case study approach
- To consider the influence of feedback loops from socio-economy and policy making on resource management, thus leading to tools for adaptive resource management rather than to assume a priori defined management scenarios that are fed through a chain of models
- To translate scientific state of knowledge about expected climate change impacts into decision support for policy makers and forest practitioners taking into account uncertainties with respect to exogenous factors (climate, markets), so as to improve the robustness of the assessment tools in real-world decision making

In order to reach these objectives, MOTIVE is organized into six scientific work packages in addition to a management-oriented work package (WP1):

- WP 2: Baseline trends and possible futures for the EU
- WP 3: Development of improved models for Adaptive Forest Management
- WP 4: Testing and evaluating management options and risks
- WP 5: Evaluating and selecting good adaptive forest management strategies
- WP 6: Improved decision support in adaptive forest management
- WP7: Stakeholder/Decision maker interaction and Dissemination

MOTIVE engages in a series of case study regions which represent a wide variety of European forest conditions. The project works with two types of case studies: In each region there will be a guiding case study, where generally valid process based models will be applied and an additional case study, where mainly regional empirical models will be used.

The case study regions will serve four main purposes: (1) promote and accelerate interdisciplinary and transdisciplinary research efforts in the development of adaptive forest management (AFM), (2) provide the data and information base to develop and test forest models and methods and promote participative model-data fusion for AFM, (3) demonstrate the application of the AFM Tool Box (see below; clearly defined decision making problems, data, models, methods selection, analysis, results, stakeholder interaction), (4) to produce per case study region stand and landscape level results for generic AFM decision making problems and develop general recommendations and guidelines for AFM in European forestry (vulnerability, adaptive management options). Stand level silvicultural treatment concepts will be tested and analysed for the main tree species and stand types in every selected case study region. Additionally, for the core set of case studies adaptive forest management will be analysed at the landscape level. Regional stakeholder panels will secure ample relevance of stakeholder consultation.

Implementing different management strategies in different parts of Europe leads to the need to upscale these management approaches and to analyse the likely consequences of adaptive forest management at the European scale. This need will be taken into account by a large scale forest scenario model which will integrate region-specific management in simplified yet consistent form.

The paper presents the project in detail and shows how this large-scale integrating project can cope with the challenge of designing forest management strategies that can help adapting forests to climate change.