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Description of Case Study Areas for Deriving Management Strategies to Adapt Alpine Space Forests to Climate Change Risks

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1. Introduction

The Alpine Space is a heterogeneous region and practical forestry represents the cultural richness. In the transnational collaboration the intention was the selection of a number of representative regions for particular challenges of forestry in the Alpine Space. Forests are serving numerous societal demands and timber production is not always the prime priority [1].

Figure 1 shows the geographical distribution of the partners participating in the case studies. The case study areas are geographically widely distributed (Figure 2). In each case study area the scientists invoked a discussion with forest owners and stakeholders in forestry issues.

2. The case study areas

The forest stands of the case study area Rhône Alps (Drôme, Isère, Haute Savoie; France) and Val d'Aosta (Italy) represent the prevention of *natural hazards* (Figure 2). The area encompasses the Val d'Aosta, forests in the district of Vercors (France), Verbier (Switzerland), the region of Solčava-Lučé (Slovenia), and the Montafon valley (Austria). In the test area an education program was developed enabling foresters to evaluate the current potential of forests of fulfilling their protective function. The areas are in difficult terrain. The eminent challenges are the continuous protection against rockfall and snow avalanches and the taking into account of the probable consequences of climate change on this protective function [2, 3].



Figure 1. Geographical distribution of the partner institutions of the Interreg project "MANFRED - Management strategies to adapt Alpine Space forests to climate change risks".

The transnational case study Slovenia-Austria covers a region with physico-geographical similarities, that has been divided by politics in the past (sites Solčava-Lučé, Ossiacher Tauern, Dobrova in Figure 2). The regions have in common that *timber production* is the main target of forestry. Differences in the forest-management practice are visible. Slovenia has since long adopted the concept of continuous-cover forestry and is renown for its shelter-wood forests. In Austria, clear-cutting is still widely practiced within the regulations of the Austrian Forest Act. Presently, no severe challenges for practical forestry are identified, but the consequences of climate change on forests are only vaguely known [4]. In the case study area an intensive exchange of views and experiences was conducted.

The case study area Valle Camonica within the province Lombardia (Italy) is expected to face a quick change in climatic conditions with adverse effects on forest productivity, an increase in the risk of *ozone damages* and *forest fires* (site Val Cominica, Lombardia in Figure 2). It is expected that the current forests cannot cope with the expected conditions and forestry will require a focus on tree species that are currently not dominantly managed [5]. The scientific work on the ozone exposure of forests was conducted jointly with the "Comunità Montana Valle Camonica - Parco dell'Adamello".

The focus of the transnational case study Montafon (Vorarlberg, Austria) - Baden Württemberg (Germany) - Bavaria (Germany) - Prättigau (Switzerland) is the increase in abiotic risks, most prominently the increasing risk of *storm damages* and *rock fall* (Baden-Württemberg, Bavaria, Vorarlberg in Figure 2). Evidence is given by the cumulation of storm damages in the recent past [6]. The geographical setting of the area includes mountains and the foothills of the Alps. A common consequence of storm damages is the disposition to *bark beetle* attacks, which is even attenuated by changing climate conditions. A part of the forests is dominated by secondary Norway spruce stands that are particularly vulnerable to biotic damages [7]. The intention of the case study work is providing tools for an up-to-date risk assessment for forester practitioners.

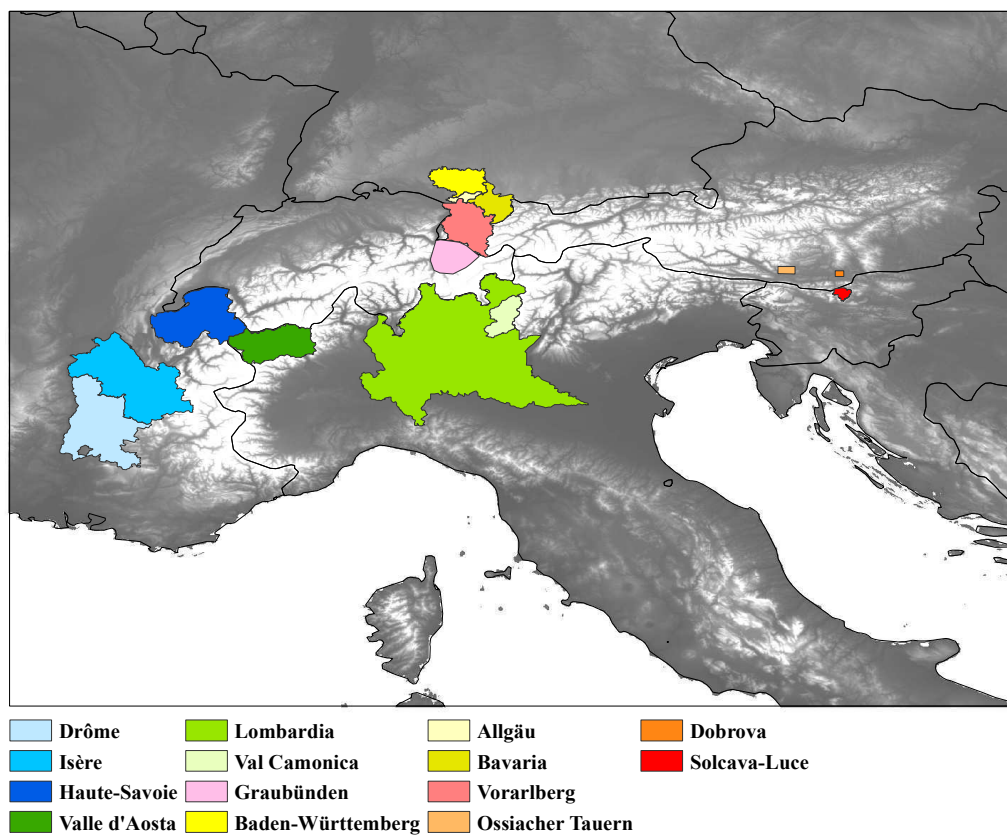


Figure 2. The test areas for the derivation of concepts of adaptive forest management. The sites Drôme, Isère, Haute-Savoie are in France, Valle d'Aosta, Valle Camonica, and Lombardia are in Italy, Baden-Württemberg, Bavaria, Allgäu are in Germany, Vorarlberg, Ossiacher Tauern, Dobrova are the Austrian sites, Solcava-Lučé is located in Slovenia. Note that the site names are experimental codes and not political entities.

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