



## AdaptAlp

The extremely hot summer of 2003 led to drought conditions in many regions, causing rockslides and accelerating the process of glacial retreat. In 2005 the Bavarian Alps suffered flooding and other related natural disasters such as soil erosion and mudslides. These are just two of many recent examples of the consequences of climate change within the alpine region. The fact is that climate change is taking place, and its effects can have dangerous consequences. According to the majority of available projections, the negative impact of climate change on the alpine area can no longer be avoided. What does this mean exactly? What changes can we expect? And what risks will come with them? How can we react appropriately to the situation? Which adaptation measures are needed, and which of those are realistic? In an attempt to deal with precisely these questions leading experts from all countries containing alpine regions came together as part of the "AdaptAlp" project. Together they develop strategies within four work packages in order to prepare an appropriate response to the threat of natural disasters resulting from climatic change.

## Aims of the Project

AdaptAlp aims to:

- improve information on the potential impact of climate change at the regional level using state-of-the-art approaches (e.g. common databases, high resolution modelling, design events).
- evaluate and harmonise different methods of risk assessment, hazard mapping and risk management in the Alpine environment.
- identify best practice methods and transfer best practice experiences into adaptation measures in model regions.
- reduce risk by raising awareness among local stakeholders.

The know-how generated in AdaptAlp will be synthesized and integrated into practice by regional authorities. Recommendations will be given to policy makers and local stakeholders.

### PARTNER

Bavarian State Ministry of the Environment and Public Health, Department 78 - Unit for Climate Protection (StMUG/GER)

Bavarian Environment Agency, Department 10: Geological Survey, Economic Geology, Soil Protection, Unit 106: Applied Geology Southern Bavaria, Unit 81: Climate Change, Impacts of Climate (LfU/GER)

Federal Institute of Hydrology, Department M2 - Water Balance, Forecasting and Prediction (BfG/GER)

Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW/AUT)

Autonomous Province of Bolzano - South Tyrol, Department of Hydraulic Engineering (WBV/ITA)

Ministry for the Environment, Land and Sea - Department for Environmental Research and Development (MATTM/ITA)

Geological Survey of Slovenia (GeoZS/SLO)

CIPRA Germany (CIPRA/GER)

Regional Government of Carinthia, Department 18, Water Management (BWV/AUT)

Office of Government of Tyrol, Department of Water Economy (WWT/AUT)

Piemonte Regional Agency for Environmental Protection, Regional Centre for Territorial and Geological Research (ARPA/ITA)

Aosta Valley Autonomous Region - Regional Administrations Committee for Territory, the Environment and Public Works, Department for the Territory, Environment and Water Resources, Section Environment (RAVA/ITA)

Grenoble Institute of Research and Study for Prevention of Natural Hazards (PGRN/FRA)

Agricultural and Environmental Engineering Research Institute, Hydrology and Hydraulics Research Unit (CEM/FRA)

European Academy Bozen/Bolzano (EURAC/ITA)

Federal Office for Environment (BAFU/SUI)

### OBSERVER

Carinthian Institute for Climate Protection (AUT)

Geologic Institute of Catalonia (ESP)

Emilia-Romagna Region (ITA)

British Geological Survey (GBR)

Ministry of Environment, Energy, sustainable Development and spatial Planning (FRA)

Rhone-Alpes Region (FRA)

Veneto Region - Environmental Protection Department (ITA)

### Program

European Territorial Cooperation Alpine Space 2007-2013

### Priority

Priority level 3 - Environment and Risk Prevention

### Time Frame of the Project

01/09/2008 - 31/08/2011

### Total Cost of the Project

€ 2,870,635

### CONTACT Lead Partner

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Adaptation to Climate Change in the Alpine Space

[www.adaptalp.org](http://www.adaptalp.org)



Bayerisches Staatsministerium für Umwelt und Gesundheit





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## Water Regime in the Alps

Climate change is having a strong impact on hydrological balance in the Alps. Precipitation patterns - that is the distribution of rainfall over the year - are shifting noticeably in the different alpine regions. Instances of extreme weather, such as storms or dry spells, are on the rise. Protective measures against potential flooding therefore need to reflect these changing conditions. However, very little empirical data concerning volume flow over longer periods of time is available, particularly in the case of small rivers and streams. Through a close, cross-border collaboration between scientists and practitioners, existing data of the entire alpine region will be collected, harmonized and analysed. At the same time, new approaches relating to an assessment of the consequences of climate change regarding water resources will be tested. The expertise gained during the process will subsequently be integrated into the planning of protective measures. The new methods are to be tested in the catchment areas of the rivers Inn, Soča and upper Rhine. Additionally, models that simulate soil erosion will be tested in these areas in order to cover the most important risks linked to the water cycle.

## Hazard Mapping

Hazard zones are designated areas threatened by natural risks such as avalanches, landslides or flooding. The formulation of these hazard zones is an important aspect of spatial planning. AdaptAlp will evaluate, harmonise and improve different methods of hazard zone planning applied in the alpine area. Focus will be on a comparison of methods for mapping geological and water risks in the individual countries. A glossary will facilitate transdisciplinary and translingual cooperation as well as support the harmonisation of the various methods. In selected model regions methods to adapt risk analysis to the impact of climate change will be tested. This should support the development of hazard zone planning towards a climate change adaptation strategy. The results will be summarized in a synthesis report.

## Risk Prevention and Risk Management

Protection against natural hazards under climate change is a challenge facing states and societies in the alpine region. An example would be the 2005 storm in Switzerland that caused unprecedented damage totalling over 2 billion Euros. As both the financial resources and the technological possibilities for protecting human beings and facilities from natural disasters are limited, a 100-percent level of safety cannot be guaranteed. Therefore, available resources must be applied in proportion to the potential risks.

Within this work package, the most efficient methods will be identified for the rapid and cost-effective estimation of possible damage scenarios and risk situations in the regions and valley municipalities. The aim is to elaborate planning criteria that permit a comparison between risk conditions of different municipalities. This would support the definition of priorities for measurement packages and individual measures. Employment of a database covering the entire alpine area and examples of "best practice" (those taken from practical experience) will be included so that other practitioners can refer to them for orientation. In addition, and on the basis of these examples, expert hearings will be held and a series of recommendations for practical implementations will be elaborated. One focus in this context will centre on strategies to deal with uncertainties involved in risk assessment.

## Pilot Actions and Synthesis

This work package is geared towards the collection and organisation of all knowledge acquired within the scope of the project, in order to make it accessible to local and regional decision-makers in the fields of civil protection and land-use planning. The strategies and methods developed in the previous working packages will be tested and put into practice within the designated pilot regions. All activities in the pilot regions aim to identify potential hazard zones and communicate possible dangers and risks. This is done in order to create an awareness of potential dangers and develop strategies and recommendations for sustainable land use that also take into account climate change. The pilot regions chosen are the Großwalsertal in Vorarlberg, Gasen/Haslau in Styria and two municipalities in Oberallgäu in Bavaria. These regions are susceptible to a variety of natural hazards such as landslides or flooding. Therefore, different methodological approaches will be tested in each region: from analysis of historical data and events to mapping of hazard zones, as well as intensive communication of potential risks relating to the natural hazard event in those municipalities involved in the project.