

# CIRCLE-MOUNTAIN

## June 23<sup>rd</sup> 2010

### SUMMARY OF THE SELECTED PROJECTS

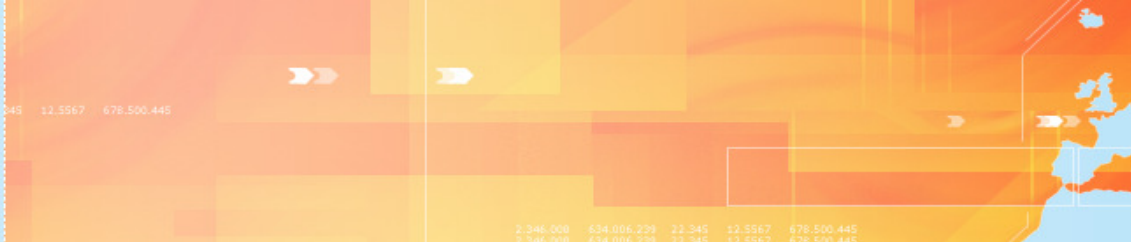
The following four projects will be funded:

Project	Project LEADER (Country)	Partner 1 (lead)	Total (€)
<b>ARNICA</b>	Vincent Jomelli	Centre National de Recherche Scientifique	300.000
<b>EURAS-CLIMPACT</b>	Hermann Haeusler	Department of Environmental Geosciences, University of Vienna	243.000
<b>ChangingRISKS</b>	Malet Jean-Philippe	Centre National de la Recherche Scientifique / Institut de Physique du Globe de Strasbourg UMR 7516	294.010
<b>CAMELEON</b>	Viovy Nicolas	Laboratoire des Sciences du Climat et de l'Environnement - Commissariat à l'Energie Atomique	354.469

The following table shows the funding required for the different selected projects according to the involved teams.

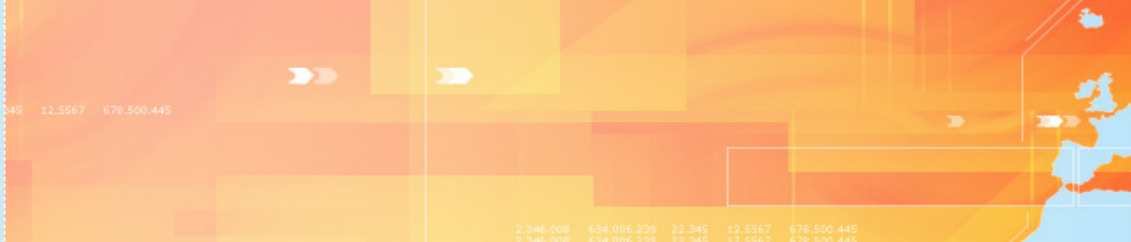


Acronym	Project LEADER	Partner 2	Partner 3	Partner 4	Partner 5	Involved Institution 1	Involved Institution 2	Involved Institution 3	Involved Institution 4	Involved Institution 5	Total (€)
<b>ARNICA</b>	<b>Vincent Jomelli (FR)</b>	Markus Stoffel (Ch)	Marco Borga (It)	Andreas Gobiet (Aut)		Centre National de Recherche Scientifique	dendrolab.ch	University of Padova	University of Graz, WegCenter		300.000
<b>EURAS-CLIMPACT</b>	<b>Hermann Haeusler (Aut)</b>	Gerhard Bax (Swe)	Wolfgang Schoener (Aut)	Helmut Echtler (Ger)		Department of Environmental Geosciences, University of Vienna	Blekinge Institute of Technology, Blekinge Tekniska Högskola	Central Institute for Meteorology and Geodynamics	German Research Center (GeoForschungszentrum Potsdam): Co-Financiation		243.000
<b>ChangingRISKS</b>	<b>Malet Jean-Philippe (Fr)</b>	Begueria Santiago (Sp)	Glade Thomas (Aut)			Centre National de la Recherche Scientifique / Institut de Physique du Globe de Strasbourg UMR 7516	Consejo Superior de Investigaciones Cientificas	University of Vienna, Institute of Geography and Regional Research			294.010
<b>CAMELEON</b>	<b>Viovy Nicolas (Fr)</b>	Choler Philippe (Fr)	Bacour Cédric (Fr)	Bahn Michael (Aut)	Sebastià Maria-Teresa (Sp)	Laboratoire des Sciences du Climat et de l'Environnement - Commissariat à l'Energie Atomique	Zone Atelier Alpes: Laboratoire d'Ecologie Alpine, Cemagref and Laboratoire d'étude des Transferts en Hydrologie et Environnement	NOVELTIS	Universität Innsbruck	Centre Tecnològic Forestal de Catalunya	354.469



## Summaries of the selected projects

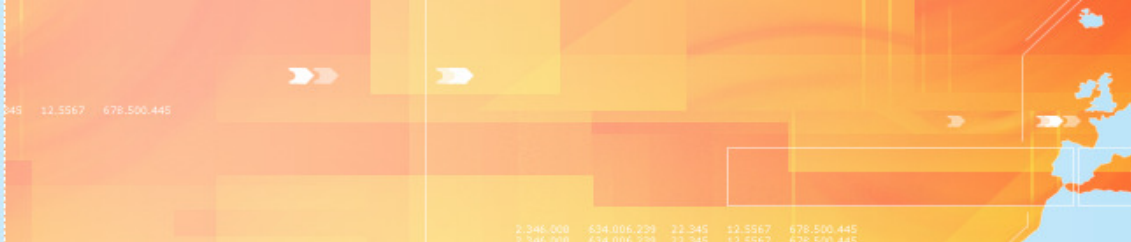
<b>Acronym</b>	<b>ARNICA</b>	
<b>Title</b>	Assessment of Risks on transportation Networks resulting from slope Instability and Climate change in the Alps	
<b>Abstract</b>	<p>The ARNICA project focuses on a probabilistic assessment of slope hazards related to debris flows and landslides and their impacts on transportation networks in the context of future climatic change. We will tackle this issue through 5 work packages that focus on current and future climate scenarios, their impacts on the occurrence (frequency), run-out and spread of debris flows and landslides in three vulnerable Alpine regions located in France, Italy, and Switzerland, and a quantification of their consequences on national and trans-border transportation corridors from various hypotheses of frequentations by cars and trains or interruption of transportation corridors at the regional level. New approaches adapted to the operational needs of local and regional authorities and facilitated solutions for end-users will be proposed. This project involves four partners with different specialties including geomorphology, risk assessment, hydrometeorology and climate modelling.</p> <p>Occurrence probabilistic models and susceptibility maps will be provided based on data bases constructed from direct observations and historical testimonies. Different climatic scenarios will be defined from downscaled output ensemble GCM techniques for three distinct periods (1960-2000, 2030-2060 and 2070-2100). In a subsequent step and based on the data on past events, their triggers and the occurrence of future precipitation events, the vulnerability of transportation networks to these slope processes will be documented. Direct and indirect costs of the dysfunction of national and trans-border road network analysis will be conducted to provide risk analysis and to quantify the risk of accidents (damage, fatalities). Help tools based on graph theory are proposed to local and regional authorities in charge of national network regulation. Tests of interruptions considering different socio-economic scenarios will be suggested to estimate costs and best solutions. The dissemination of the results will be assured through the direct involvement of the technical services in charge of land-use planning during the database construction phase and the diffusion of a film intended for the local authorities.</p>	
<b>Key words</b>	slope Instability caused by Climate change, impacts on transportation networks, current and future climate scenarios, probabilistic models and susceptibility maps, risk analysis and quantifying the risk of accidents	
<b>Lead Partner</b>	Centre National de Recherche Scientifique	France
<b>Partner 2</b>	dendrolab.ch	Switzerland
<b>Partner 3</b>	University of Padova	Italy
<b>Partner 4</b>	University of Graz, Wegner Center	Austria



<b>Acronym</b>	<b>EURAS-CLIMPACT</b>	
<b>Title</b>	Impact of climate change and related glacier hazards and mitigation strategies in the European Alps, Swedish Lapland and the Tien Shan Mountains, Central Asia	
<b>Abstract</b>	<p>The quality of global models on climate change depends on regional data input. In order to improve the knowledge on climate change impacts in high mountain regions at continental scale, we first apply state of the art – and newly developed – methods to assess climate change in Europe, and second, we will apply our methods to Central Asia, where data on environmental change, and in particular on glacier hazards are hardly available.</p> <p>The EURAS-CLIMPACT initiative focuses on meteorological and climatologic aspects of glaciers and permafrost during the last fifty years. Therefore the change of four glaciers in Europe will be studied, namely the Pasterze- and Sonnblick Glacier in Austria, and the Storglaciären and Kårsa Glacier in Sweden, by reanalysing and downscaling global climate models of these regions. Based on these experiences, the impact of climate change on two glaciers in Central Asia will be quantified, namely on the Inylchek- and Karabatak Glacier in the central Tien Shan, where the Global Change Observatory "Gottfried Merzbacher" serves as a platform for international studies. The evaluation of reanalysing and downscaling global models in Central Asia will contribute to a better understanding of future IPCC- A1, -A1B and -B2 scenarios.</p> <p>Modelling the mass balance of the above described six glaciers compared to time series analyses of high resolution airborne and spaceborne remote sensing data such as CORONA, HEXAGON, LANDSAT-EM, ASTER, RAPID EYE, ALOS, TERRA SAR-X, digital camera- and thermal camera images will allow for assessing the change of these glaciers, and the increase of geo-hazards depending on climate change. As the European glaciers have been monitored since decades, an additional ground check of remote sensing data is mainly planned for the retreating but also advancing glaciers of the central Tien Shan.</p> <p>The probably most important outcome of the EURAS-CLIMPACT project will be the proper dissemination of results to stakeholders, and capacity building at national and regional level. This is of particular interest for e.g. mountain risk engineering, and for tourist offices in Austria, for the authority of Land Survey and environmental research organisations in Sweden, and for regional and local mitigation measures to be undertaken by the Ministry of Emergency Situations in Kyrgyzstan.</p>	
<b>Key words</b>	glaciers and permafrost during the last fifty years, reanalysing and downscaling global climate models of 4 testing regions, remote sensing, dissemination of results to stakeholders	
<b>Lead Partner</b>	Department of Environmental Geosciences, University of Vienna	Austria
<b>Partner 2</b>	Blekinge Institute of Technology, Blekinge Tekniska Högskola	Sweden
<b>Partner 3</b>	German Research Center (GeoForschungsZentrum Potsdam): Co-Financiation	Germany
<b>Partner 4</b>	Central Institute for Meteorology and Geodynamics, ZAMG	Austria



Acronym	<b>ChangingRISKS</b>	
<b>Title</b>	Changing pattern of landslide risks as response to global changes in mountain areas.	
<b>Abstract</b>	<p>Landslides across the Alpine countries are recognised by practitioners, politicians and scientists as having a major socio-economic impact, and may represent a significant risk for the population and the properties in particular locations. Even if many scientific advances have been made in numerous fields of landslide research in the last 10 years, there is no consensus reached on an integrated concept and methodology for landslide risk assessment (1) adaptable to a large range of climatic, environmental and socio-economic conditions, (2) applicable to perform scenario analysis taking into account global changes (climate, landuse, socio-economic development), and (3) directly connected to the practical demands of the stakeholders.</p> <p>The ChangingRISKS project intends to develop an advanced understanding of how global changes (related to both environmental and climate change as well as socio-economical developments) will affect the temporal and spatial patterns of landslide hazards and associated risks in two territories of the Alps, and how these changes can be assessed, modeled and communicated (through mapping procedures) to stakeholders.</p> <p>The multidisciplinary background of the members could potentially lead to the development of new concepts and emerging strategies for mountain hazard/risk analysis in the context of global changes. The project work is focused on two mountain study areas located in France (Barcelonnette Basin, South East France) and in Austria (district Waidhoffen/Ybbs, Lower Austria). These research areas, characterized by a variety of environmental, economical and social settings, are severely affected by landslides, and have experienced significant landuse modifications and human interferences over the last century.</p> <p>From a scientific viewpoint the main outcome is the development of a generic methodology for quantitative landslide hazard, vulnerability and risk assessment taking into account changing patterns in the conditioning factors. ChangingRISKS will improve our ability to forecast landslide hazard and detect future risk zones, and pave the way to new adaptation strategies in response of changes in the frequency of landslide events or in the exposure of the social system. From a technical viewpoint, the main outcome consists in the setting up of reliable solutions for mapping landslide susceptibility, hazard, vulnerability and risk in a quantitative framework, through the development and implementation of a GIS-based experimentation and demonstration platform.</p> <p>Active stakeholders' participation is a key feature of the project. Stakeholders from governmental organisations dealing with various aspects of risks will be involved in the activities of the project, to guarantee user oriented development and feasible application of the results.</p>	
<b>Key words</b>	Changing pattern landslide risks as response to global changes, assessment, models and communication to stakeholders, improvement the ability to forecast landslide hazard and detect future risk zones	
<b>Lead Partner</b>	Centre National de la Recherche Scientifique / Institut de Physique du Globe de Strasbourg UMR 7516	France
<b>Partner 2</b>	Consejo Superior de Investigaciones Científicas	Spain
<b>Partner 3</b>	University of Vienna, Institute of Geography and Regional Research	Austria



<b>Acronym</b>	<b>CAMELEON</b>	
<b>Title</b>	CArbon dynamics in Mountain Ecosystems: analyzing Landscape-scale Effects Of aNthropogenic changes (climate and land-use)	
<b>Abstract</b>	<p>The combination of climate and land use changes has triggered important land cover changes in European mountains over the past 50 years. Interactive effects between land use and climate changes still represent a critical gap in our understanding of carbon dynamics. Here, we attempt to understand and forecast changes in the carbon stocks and fluxes in mountain ecosystems. A key objective is to model the effects of climatic changes on carbon dynamics at the landscape scale, with explicit incorporation of land cover changes.</p> <p>Our project targets three long-term mountain research areas located in Eastern Pyrenees (Spain), South-Western Alps (France) and Eastern Alps (Austria), representing contrasting historical and climatic contexts.</p> <p>First, we will produce consistent and high-quality land cover and land cover change maps from 1950-onwards and model corresponding changes in Plant Functional Diversity (PFD). Our hypothesis is that PFD will provide a link between the variety of environmental drivers in complex terrains and carbon-cycle related ecosystem processes.</p> <p>Second, we will provide a synthesis of on-ground measurements of carbon stocks and fluxes available in the three investigated areas. The database will be completed by using moderate resolution remotely-sensed data to characterize the seasonal and multiannual dynamics of vegetation. Then, we will evaluate the ability of a widely used ecosystem-process model (ORCHIDEE) to reproduce components of carbon dynamics in complex terrains. A new parameterization of ORCHIDEE featuring continuous changes of PFD along environmental gradients will be tested.</p> <p>Third, we will develop downscaled, regional climate and land use change scenarios and examine their impacts on carbon stocks and fluxes for the 21st century.</p> <p>Land use scenarios will be defined with stakeholders. Key findings will be summarized in short assessment reports and discussed with stakeholders and policymakers in workshops at the end of the project.</p> <p>Our project is the first attempt to provide reliable and comparative regional-scale simulations of carbon dynamics in European mountain ecosystems that incorporate our best ecological knowledge of these hot-spots of biodiversity. It is a milestone towards a better understanding of climate and land use change impacts on carbon cycling in European mountains.</p>	
<b>Key words</b>	Interactive effects between land use and climate changes, carbon dynamics, high-quality land cover and land cover change maps, synthesis of on-ground measurements of carbon stocks and fluxes, regional climate and land use change scenarios	
<b>Lead Partner</b>	Laboratoire des Sciences du Climat et de l'Environnement - Commissariat à l'Energie Atomique	France
<b>Partner 2</b>	Zone Atelier Alpes: Laboratoire d'Ecologie Alpine, Cemagref and Laboratoire d'étude des Transferts en Hydrologie et Environnement	France
<b>Partner 3</b>	NOVELTIS	France
<b>Partner 4</b>	Universität Innsbruck	Austria
<b>Partner 5</b>	Centre Tecnològic Forestal de Catalunya	Spain