



Project Short Title

PermaNET



Priority 1
Competitiveness and
Attractiveness



Priority 2
Accessibility and
Connectivity



Priority 3
Environment and
Risk Prevention

Project Long Title

Permafrost long-term monitoring network

Lead Partner

Autonome Provinz Bozen-Südtirol, Amt für Geologie und Baustoffprüfung
Provincia Autonoma di Bolzano-Alto Adige, Ufficio Geologia e Prove
Materiali

Project Partners

Bayerisches Landesamt für Umwelt, Abteilung 10: Geologischer Dienst,
Wirtschaftsgeologie, Bodenschutz (D)
ARPA Piemonte - Agenzia Regionale per la Protezione Ambientale
Centro regionale per le ricerche territoriali e geologiche (I)
Regione Autonoma Valle d'Aosta, Assessorato Territorio e Ambiente,
Dipartimento Territorio e Ambiente, Direzione Ambiente (I)
Regione del Veneto, Direzione Geologia e Attività Estrattive, Servizio
Geologia (I)
Provincia Autonoma di Trento, Protezione Civile e Tutela del Territorio,
Servizio Geologico (I)
Österreichisches Bundesministerium für Landwirtschaft, Forstwirtschaft,
Umwelt und Wasserwirtschaft (A)
Universität Innsbruck, Institut für Geographie (A)
Universität Graz, Institut für Geographie und Regionalforschung (A)
Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Regionalstelle für
Salzburg und Oberösterreich (A)
Université Joseph Fourier - Grenoble I, Institut de Géographie Alpine,
Laboratoire PACTE-Territoire (F)
Centre National de la Recherche Scientifique - Laboratoire EDYTEM (F)
Grenoble INP, GIPSA-lab (F)
Bundesamt für Umwelt BAFU (CH)

Project Website

www.permanet-alpinespace.eu

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3,303,468.00

ERDF in EUR

2,472,634.68

Abstract

PermaNET aimed at giving an important contribution to mitigate natural hazards and manage their consequences, with specific regards to climate change impacts. The goals set and even more have been achieved. The interdisciplinary and integrated approach of compiling the existing knowledge about permafrost in the European Alps resulted in many valuable products that can be used in natural hazard management practice and in territorial planning. PermaNET established a permafrost monitoring network of the Alps, being a roof for already existing and newly established regional and national monitoring networks. The evolution of permafrost can now be monitored. For the first time, a harmonized and standardized dataset of permafrost distribution in the Alps exists. The permafrost evidence inventory is open for further updates and data compilation by all regions of the Alps. Moreover, PermaNET compiled a state-of-the-art of the effects of climate change to permafrost and natural hazards, a report of the thermal reaction scenarios of permafrost in a warming climate and recommendations for the consideration of permafrost in risk management. Bringing together all data and experiences of permafrost investigations throughout the Alps has resulted in a huge step forward in permafrost research and in natural hazard management practice. The elaborated decision basis provides valuable information for authorities and companies working in high-mountain areas.

Relevance

Prior to PermaNET, knowledge and data regarding permafrost existence, permafrost related problems and their consideration in natural hazards and risk management differed regionally and sectorally throughout the Alps. Now, a state-of-the-art of permafrost monitoring and permafrost detection in the Alps is available. All the available data on permafrost existence was compiled into one harmonized inventory. Only this inventory allowed the elaboration of a consistent map of permafrost distribution in the Alps. All regions now have a comparable map and a decision basis for territorial planning purposes at hand. The established permafrost monitoring network closed the gaps in regional distribution of monitoring sites in the Alps; it extends the knowledge databases of the thermal state of permafrost in the Alps and allows the monitoring of the future thermal response of permafrost to climate change. On one hand, this long-term monitoring network allows the ongoing signal of global warming to be recorded and on the other hand it provides fundamental data for assessing the consequences of climate changes to permafrost and related natural hazards. With these products, PermaNET contributed to optimizing the decision bases in territorial planning, natural hazard management and water resources management. The participating regional authorities incorporate the elaborated products into their practice. The PermaNET Synthesis Report will contribute to awareness-rising.

Key Achievements

The main outputs of the PermaNET project were

- the PermaNET Synthesis Report (already available in English and German, published in Italian and French in January 2012)
- the Alpine Space permafrost monitoring network consisting of new key monitoring sites, a metadataset of monitoring activities in the Alps, an overview map of permafrost monitoring sites in the Alps, and a handbook for the installation and maintenance of an Alpine-wide permafrost monitoring network and for selected permafrost detection and monitoring methods,
- the inventory of permafrost evidence, available as an online database that can be further updated and maintained after PermaNET closure,
- the map of permafrost distribution in the Alps, available as a Google Earth file and as a web map service (WMS service) with a legend and an interpretation key,
- a state-of-the-art report of permafrost related hazard, consisting of a compilation of examples and case studies showing the influences of permafrost to the different kinds of natural hazards and a selection of method sheets for monitoring techniques of slope movements and natural hazards in permafrost areas,
- recommendations for the consideration of permafrost in natural hazard management,
- a report of the thermal and geomorphic response of permafrost to present and future climate change,
- a report of permafrost and water resources management,
- a documentary film about permafrost and permafrost monitoring in the Alps,
- an educational toolkit.

Lessons Learnt

The partnership between regional authorities responsible for natural hazard management and water resources management with scientific institutions and the involvement of private companies working in the high mountains as subcontractors or as observers resulted in a very fruitful collaboration. The authorities could learn from new scientific findings and newly developed methods, the scientific institutions could benefit from the experiences of the authorities out in the field and of the data. The permafrost inventory, the permafrost distribution map and all of the elaborated guidelines and handbooks could not be elaborated by one single institution alone. In this sense, PermaNET took out the most of synergies of transnational and cross-sectoral collaboration. A key factor for success was the investment of the Lead Partner in an intensive project preparation. With this, the way for implementing the project activities was clear from the beginning and fundamental discussions of implementation topics could be avoided. Another key factor for success was that all project partners implemented and understood all their activities as contributions to the implementation of the whole project, e.g. all project partners mapping permafrost evidence were doing it in the same way and contributed to the same dataset. Not one activity was implemented without having a connection to the aims of the project.

Replication / Roll out

PermaNET aimed from the beginning at covering permafrost monitoring in the whole Alps. Most of the project outcomes cover the whole Alps, e.g. the permafrost distribution map. The permafrost evidence inventory is programmed in a way that allows other regions not participating in PermaNET to enter their data. Therefore, the extension of the PermaNET monitoring network and the databases is only a question of willingness to extend this valuable Alpine-wide activity. The PermaNET partnership is promoting this extension of further partners and will further do it so after PermaNET closure. The idea of elaborating a trans-national permafrost evidence inventory was also welcomed in the global scientific community. The PermaNET partnership is promoting the consideration of the PermaNET outcomes in national policies, e.g. the continuing resp. foundation of national permafrost monitoring networks and the consideration of the findings in national adaptation strategies. The publication of the PermaNET Synthesis Report in the Journal Series of the INTERPRAEVENT, an expert network of public authorities and universities, will support to disseminate the PermaNET outcomes directly to the targeted stakeholders.

