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The PermaFRANCE network

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A French long term monitoring network of permafrost and frost related processes, named PermaFRANCE, is being built since two years. It will represent the French contribution to the Alpine wide PermaNET network.

The PermaFRANCE network will focus not only on permafrost, but on all frost related phenomena at different altitudinal levels, including both thermal monitoring and process observation and monitoring :
1) continuous and discontinuous permafrost in rock walls :
- thermal monitoring is mainly performed at the Aiguille du Midi (Mont Blanc massif) and includes rock surface temperature (RST) and temperature profils in medium depth boreholes (10 m) ;
- inventory and observation of rockfall activity in high mountain rock walls : this action concerns the whole Mont Blanc area and is based on a hitorical inventory and an observation of current activity based on a network of observers and contributors ;
2) discontinuous permafrost is surficial deposits and flat bedrock :
- thermal monitoring is performed on five rockglacier sites and includes ground surface temperature (GST) and annual BTS campaigns on some sites. Two medium depth boreholes (15 m) have been made in 2009 on one site, and equipped for thermal profile monitoring. A deep borehole (100 m) will be made in 2010 at 45° N latitude ;
- geophysical monitoring is performed on 4 sites : repeated vertical electrical soundings exist for some sites since 20 years, and have been complemented since 2007 by eletrical resistivity tomography (ERT) and refraction seismics ;
- surficial displacements of rockglaciers : surficial displacements are measured either by classical geodesy or by DGPS on 6 rockglaciers ;
3) sporadic permafrost at middle altitudes :
- an inventory of cold scree slopes and biological investigations on soil and tree growth (dendrogeomorphology) have already been achieved ;
- a thermal monitoring should be initiated on selected sites in 2010 ;
4) seasonal frost and frost/thaw cycles at middle and low altitudes (infra-periglacial belt) :
- the effect of frost/thaw cycles on rock weathering is monitored on 3 sites on various lithologies ;
- a network of seasonal frost monitoring sites (frost occurrence and frost depth) at different altitudes is not yet implemented, but is in discussion.
The scope is to gain a complete view of frost related phenomena, of their distribution over altitude, and of their evolution at different altitudinal levels. It is actually expected that some phenomena will migrate to higher altitudes and evolve accordingly in intensity and frequency.

The PermaFRANCE network is mainly supported by three research laboratories : PACTE/Institut de Géographie Alpine at the Université de Grenoble, EDYTEM at the Université de Savoie, and PRODIG at the Université Paris 7. Several other partners (labs, private companies, individuals, institutions) will be associated. Financial support is provided by several research projects : the Interreg PermaDATARock project for the permafrsot in rockfaces, a Fondation MAIF project for the monitoring of rockglaciers, and now mainly the ETC Alpine Space PermaNET project until 2011. For further financing, the scope si to be recognized as a long term observation service (SOERE), a status that would ensure financing for several years.

The longest time series amount to 25 years for displacement of one rockglacier, 6 years for GST monitor-

ing on one site, 5 years for RST, but most time series have only 2 years or less. The first monitoring report should be printed in the mean time and presented at the conference.