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The Alpine Space "PermaNET" project in Trentino (eastern Italian Alps): advance of the research and monitoring activities

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Research and monitoring activities on rock glacier and permafrost in Trentino (eastern Italian Alps) have received a significant increase by the recent approval of the Alpine Space PermaNET project. In order to describe the permafrost presence and condition in the territory, a number of investigations have been put in place since many years, providing an extensive dataset of information that will form the basis for new studies.
First of all, a GIS-based inventory of permafrost evidences (i.e. rock glaciers) has been carried out for the whole territory. The inventory is based on aerial photo interpretation and field observations, and describes the activity status, geometry and geomorphological characteristics of rock glaciers. Part of these rock glaciers were selected as test sites for further investigations like: a) surface velocity measurements using terrestrial topographic surveys (total station and RTK-GPS); b) BTS measurements on an active landform and on nearby slopes; c) near-surface continuous ground temperature measurements using MTDs (miniature temperature dataloggers) in the area of four active rock glaciers and on nearby slopes.
Furthermore, ground temperature monitoring has started in a 20 m deep borehole - initially drilled for inclinometer measurements - near the "Ai Caduti dell'Adamello" alpine hut (3030 m a.s.l., Adamello Group); this area will therefore become a key-monitoring site for high altitude infrastructures and related permafrost-degradation problems.
Finally, a 50 m deep borehole has been drilled at the Cavaion basin (2900 m a.s.l.), in the Ortles-Cevedale group. This site is going to be fully instrumented with a thermistor chain and a meteorological station.
The aim of this contribution is: (i) to give an overview on the investigations of permafrost occurrence in Trentino, (ii) to summarize the main results of the monitoring activities on rock glaciers obtained so far, and (iii) to describe and evaluate the procedure used to choose the Cavaion site, based on geomorphological investigations, ground surface thermal monitoring using MTDs and extensive BTS measurements.
These activities will eventually provide the ground temperature validation data set, upon which the statistical model of permafrost distribution in Trentino will be based.