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Oral Presentation

Transition from glacial to periglacial processes in the Dolomites: the case of Cima Uomo area (Eastern Italian Alps)

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Several glaciers of the Dolomites were progressively covered by debris during the retreating phase occurred after the LIA, allowing their preservation at relatively low altitudes. In some cases, these ice-debris systems are currently developing under permafrost conditions, leading to examples of transition from glacial to periglacial processes. In this study, we analyze the relationships between ground temperature and climatic parameters (air temperature, snow cover and topographic solar radiation) in order to understand which are the main factors controlling the morphodynamic processes of these environments.

The study area is located in upper Val San Nicolò (Dolomites) between 2200 and 3000 m of altitude. Here, a cirque glacier fed by avalanches was present as a clean glacier until the '50s. This glacier was depicted in historical maps, where its evolution from clean to debris-covered glacier can be observed. Now it is completely covered by a thick layer of debris and the surface morphology suggests that it is developing in a rock glacier-like landform.

In order to detect if Cima Uomo ice-debris mass is under permafrost conditions, BTS and GST measurements were carried out. The observed low ground temperatures suggest that permafrost conditions are largely present in the debris body. In particular, BTS measurements performed in 2010 showed temperatures consistent with permafrost existence (from -3 to -4°C). The GST data of 2009 and 2010 showed winter equilibrium temperature (WEqT) lower than -2°C. The topographic solar radiation was calculated (on a Lidar-DEM) to correlate its influences to the measured ground thermal condition. The geophysical surveys confirmed the existence of an ice body under the debris layer and the topographic measurements have detected small movements of the ice-debris mass.

The study of this transitional processes on Cima Uomo can be considered representative of many other ice-debris masses of the Dolomites.