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The Regional Mass Balance of Lombardy Alps (Italy) during 2007-2011

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The regional mass balance project aims to estimate the mass balance of Lombardy glaciers (Central Alps, Italy) over the survey period 2007-2011. A network of 52 stakes was established, where measurements were taken yearly. The network was designed to cover 15 of the largest glaciers within the region, as well as to inspect all the glaciarized mountain sectors. Given the geographical representativity, the methodology applied for surveying mass balance at a regional scale followed an elevation criteria. The 244 Lombardy glaciers, for a total surface of 90.4 km^2, were considered as one and a classical glaciological mass balance was implemented. Seven elevation ranges were identified, and stakes where positioned accordingly. The correlation between the specific balance and aspect of single stakes was so weak that this parameter was not taken into account.
A mass balance value was associated to each altitude range, averaging the measurements taken at the correspondent stakes. In cases of stakes showing a considerably different trend in comparison to the average of the same altitude, a separate analysis was carried out and they were considered representative of the specific glacier only.
The consistency of the field measurements was confirmed by the evidences emerged from the monitoring data and pictures collected every year for the Servizio Glaciologico Lombardo glaciological survey, and from projects of glaciological and geodetic mass balance carried out on specific glaciers.Altitude ranges and glaciers surface have been updated to 2007 thanks to newly available Digital Surface Models and aerial photos.
The results show a strong negative mass balance: approx. – 615 million cubic meters of water over five years. The hydrological year 2006/2007 accounted for 30% of the loss while the less negative mass balance was recorded in 2008/2009 and 2009/2010 (accounting for 15% of the total loss each). Considering the regional glaciers volume in 2003, it is relevant to notice that 16 % of the ice vanished in the considered time span.