

Meteorological measurements at Haut Glacier D'Arolla from 2001–2006 and mass balance estimation for this period using DEM's

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Our goal is to assess the impact of future climate scenarios on water availability in glaciated basins. We are accomplishing this by implementing a combined field observation and distributed modeling approach. Accurate estimation of water stored within the snow and ice cover of these basins requires knowledge of the distributed snow and ice mass balance throughout the year.

Here, we are presenting the continuous meteorological record at the Haut Glacier d'Arolla since 2001. The measurements include meteorological data from weather stations outside and inside the glacier. Measurements from neighboring Meteo Swiss network ANETZ stations can be used to supplement our data. These meteorological data is employed to asses the observed change on the glacier, which is derived from a continuous monitoring of runoff and mass balance. The mass balance is evaluated through ablation/accumulation stakes, snow depth measurements, modeling techniques and the comparison of two recent DEMs.

The DEMs of the Haut Glacier d'Arolla are derived by digital photogrammetry using high resolution areal photographs from September 1999 and 2005. Their grid size is 10 m and the absolute accuracy in both horizontal and vertical direction is 0.6 to 0.7 m.