ENERGY AND HYDROLOGICAL BALANCE OF THE ADAMELLO GLACIER IN THE 2002 AND 2003 ABLATION SEASONS

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The energy and hydrological balance of the Adamello Glacier, the largest glacier in the Italian Alps, was computed for the 2002 and 2003 melt seasons, from April to September. A network of meteorological stations in the surrounding area, operated by Provincia di Trento, provided precipitation, global radiation, wind speed, air temperature and humidity data. One additional station was installed at Passo della Lobbia Alta, in the core of the glacierised area at an altitude of 3020 m a.s.l. and provided also hourly net radiation measurement in the month of August, when the ice melt rate is higher. Hourly streamflow measurements at a hydrometric station downstream provided data to verify the timing and the rate of the simulated ablation.

Albedo maps were derived by processing two ASTER images retrieved during the 20.06.2003 and 23.08.2003 overpasses of the TERRA satellite. From those images and others collected in the 2002, a retreat of the glacier’s terminus of 165 m since 1997 was estimated and of 2085 m since the beginning of the XIX century, at the end of the Little Ice Age. The altitude of the terminus passed from 1780 m at that time to the actual 2580 m a.s.l. With an estimated glacier’s mass loss of about 1400 mm and 2800 mm in the 2002 and 2003 melt seasons, respectively, a continuous retreat in the next decades toward a new equilibrium size and shape is foreseen.

A comparison of the glacier’s extent with maps from the 2nd half of the XIX century and the beginning of the XX century is presented.