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SURFACE ENERGY BUDGET AND MELT AMOUNT FOR THE YEARS 2009 AND 2010 AT THE FORNI GLACIER (ITALIAN ALPS, LOMBARDY)

ABSTRACT: SENESE A., DIOLAIUTI G., VERZA G.P. & SMIRAGLIA C., *Surface energy budget and melt amount for the years 2009 and 2010 at the Forni Glacier (Italian Alps, Lombardy)*. (IT ISSN 0391-9838, 2012).

This paper reports the surface energy budget and the melt amount evaluated at one location at the Forni Glacier (Italian Alps, Lombardy) during the years 2009 and 2010. The analysis was supported by high resolution meteorology and energy data collected by an Automatic Weather Station (named AWS1 Forni) which has been running at the glacier surface (2669 m, ellipsoidal elevation) since 26 September 2005. The AWS is also equipped with a sonic ranger to measure snow depth and its variability. It resulted that in the years 2009 and 2010 the glacier melt at about 2700 m of altitude was equal to -11.32 m w.e.; these results were confirmed by comparisons with field ablation data collected nearby the AWS during the summer season 2009 and 2010.

KEY WORDS: Forni Glacier (Alps); Energy Budget; Ice and Snow Melt; Automatic Weather Stations.

RIASSUNTO: SENESE A., DIOLAIUTI G., VERZA G.P. & SMIRAGLIA C., *Quantificazione del bilancio energetico e dell'ablazione alla superficie del Ghiacciaio dei Forni (Lombardia) per gli anni 2009 e 2010*. (IT ISSN 0391-9838, 2012).

Si riportano i dati di bilancio energetico superficiale e di fusione calcolati per gli anni 2009 e 2010 sul Ghiacciaio dei Forni (Alpi Italiane, Lombardia) a partire dai dati meteorologici ed energetici rilevati dalla stazione meteorologica automatica AWS1 Forni posta alla superficie del ghiacciaio (a

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2669 m di quota ellissoidica) ed in funzione dal 26 Settembre 2005. La stazione misura anche lo spessore del manto nevoso e ne registra la variabilità. È risultato che nei due anni considerati la fusione nivoglaciale a circa 2700 m di quota è stata pari a -11.32 m w.e. I valori di fusione ottenuti attraverso il calcolo del bilancio energetico sono risultati in ottimo accordo con i dati di terreno ottenuti da paline ablatometriche poste nelle estati 2009 e 2010 sulla superficie del ghiacciaio in prossimità della stazione AWS1 Forni.

TERMINI CHIAVE: Ghiacciai dei Forni, Alpi; Bilancio Energetico; Fusione di Ghiaccio e Neve; Stazione Meteorologica Automatica.

MICROCLIMATE OF GLACIER: FROM THE FIRST PIONEER INVESTIGATIONS TO THE ACTUAL ALPINE MEASUREMENTS

In spite of the oldest series of direct mass balance measurements in the world was from the Claridenfirn in Switzerland (Vincent & alii, 2004) where observations have been carried out since 1914, the first studies performed to describe and analyse glacier microclimate started later, only after the second world war. At the end of the forties Ahlmann (1948) studied processes and mechanisms involved in the strong glacier reduction he observed around the North Atlantic Ocean. Moreover in the same period, a comprehensive study of water, ice and energy budgets was started on several glaciers in Oetztal, Austria, and greatly expanded during the International Hydrological Decade in the 1950s (Hoinkes & Untersteiner, 1952; Hoinkes, 1955), during which several long-term mass balance series were initiated (Hoinkes & Steinacker, 1975; Reinwarth & Escher-Vetter, 1999).

Actual systematic investigations of the meteorological parameters on melting glaciers were performed only from the 1960s (Capello, 1959-1960; Ambach, 1963; Björnsson, 1972; Wendler & Weller, 1974; Munro & Davies, 1978; Hogg & alii, 1982; Munro, 1989; Ohata & alii, 1989; Ishikawa & alii, 1992). These studies provided supraglacial meteorological data and energy fluxes measurements only