Geophysical Research Abstracts, Vol. 9, 04137, 2007
SRef-ID:

Analysis of micro-meteorological records (2001–2006) from Storbreen and Midtdalsbreen, two glaciers in southern Norway

R.H. Giesen (1), L.M. Andreassen (2,3), M.R. van den Broeke (1) and J. Oerlemans (1)

(1) Institute for Marine and Atmospheric research Utrecht, Utrecht University, The Netherlands, (2) Section for Glaciers and Environmental Hydrology, Norwegian Water Resources and Energy Directorate, Oslo, Norway, (3) Department of Geosciences, University of Oslo, Norway (R.H.Giesen@phys.uu.nl)

We compared two 5 year meteorological records obtained from automatic weather stations (AWS) located in the ablation zones of Storbreen (1580 m a.s.l.) and Midtdalsbreen (1450 m a.s.l.), two glaciers in southern Norway. Storbreen is located further inland and experiences a more continental climate than Midtdalsbreen. The meteorological data cover the period September 2001–September 2006 and have been recorded by two identical AWS operated by the IMAU, Utrecht University, the Netherlands. Measured variables are incoming and reflected solar radiation, incoming and outgoing longwave radiation, air temperature, relative humidity, air pressure, wind speed and wind direction. In addition, surface height change is monitored. Values are stored every 30 minutes, which enabled a detailed calculation of the surface energy balance. The most striking difference between the two locations is that wind speed is a factor 1.75 larger on Midtdalsbreen, which means that also the turbulent fluxes are larger. During the melt season, the average net longwave radiation is less negative on Storbreen, although the difference is small (5 W m^{-2}). Net shortwave radiation is 20% larger on Midtdalsbreen and mainly a reflection of larger incoming solar radiation. This could be a result of less frequent or less thick clouds. For both locations, approximately 60% of the surface energy flux is determined by net radiation, while turbulent fluxes account for the remaining 40%. The total surface energy flux during the melt season is a factor 1.5 larger for Midtdalsbreen. As winter snow depth at the two locations is comparable, the larger surface energy flux results in an earlier disappearance

of the snow pack on Midtdalsbreen and more ice melt than on Storbreen.