Geophysical Research Abstracts
Vol. 16, EGU2014-9491, 2014
EGU General Assembly 2014

Mass balance measurements of Vatnajökull ice cap, Iceland, 1992–2013

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Analysis of the annual mass balance measurements on Vatnajökull ice cap is presented. Stake measurements are done on about 60 locations on the ice cap in spring and autumn to assess the total mass balance. Measurements commenced in autumn 1991 and during the first three years the average net balance was positive, but since then it has been negative for the whole ice cap. During the period of net mass loss the northern outlets have had several years of close to zero and positive mass balance. The variability in winter accumulation is considerably smaller than summer ablation and is largely dependent on the prevailing wind direction. Cloud cover and albedo variability due to windblown dust or ashes control the ablation. The 2010 ablation season had anomalously high ablation due to windblown ashes from the Eyjafjallajökull eruption that lowered the albedo . The years 1997, 2003, 2010 and 2012 had higher than average ablation. During the period of negative mass balance the total mass loss was 13.7 $m_{w.e.}$ or an average surface lowering of 0.83 m a^{-1}. This is equivalent to a total ice volume of 122 km^3 or about 4% of the total ice volume.