

# Research finds Greenland glacier melting faster than expected

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A key glacier in Greenland is melting faster than previously expected, according to findings by a team of academics, including Dr Edward Hanna from University of Sheffield.

Dr Hanna, from the University of Sheffield's Department of Geography, was part of a team of researchers that also included Dr Sebastian Mernild from the Los Alamos Laboratory, USA, and Professor Niels Tvis Knudsen from the University of Aarhus, Denmark. The team's new findings present crucial insight into the [effects of climate change](#).

The researchers found that Greenland's longest-observed glacier, Mittivakkat Glacier, made two consecutive record losses in mass observations for 2010 and 2011. The observations indicate that the total 2011 mass budget loss was 2.45 metres, 0.29 metres higher than the previous observed record loss in 2010. The 2011 value was also significantly above the 16-year average observed loss of 0.97 metres per year.

The 2011 observations further illustrate, even comparing the mass balance value against simulated glacier mass balance values back to 1898, that 2011 is a record-breaking glacier mass loss year.

Mittivakkat Glacier has been surveyed for mass balance and glacier front fluctuations since 1995 and 1931 respectively. In 2011 the glacier terminus has retreated about 22 metres, 12 metres less than the observed record of 34 metres in 2010, and approximately 1,300 metres in total

since the first photographic observations in 1931.

These observations suggest that recent Mittivakkat Glacier mass losses, which have been driven largely by higher [surface temperatures](#) and low precipitation, are representative of the broader region, which includes many hundreds of local glaciers in Greenland. Observations of other glaciers in Greenland show terminus retreats comparable to that of Mittivakkat Glacier. These glaciers are similar to the Mittivakkat Glacier in size and elevation range.

Local glacier observations in Greenland are rare, and the Mittivakkat Glacier is the only glacier in Greenland for which long-term observations of both the surface mass balance and glacier front fluctuations exist.

Since 1995, the general trend for the Mittivakkat Glacier has been toward higher temperatures, less snowfall, and a more negative glacier mass balance, with record mass loss in 2011. In 14 of the last 16 years, the Mittivakkat Glacier had a negative surface mass balance.

Principal Investigator on this summer's fieldwork, Dr Edward Hanna, commented: "Our fieldwork results are a key indication of the rapid changes now being seen in and around Greenland, which are evident not just on this glacier but also on many surrounding small glaciers. It's clear that this is now a very dynamic environment in terms of its response and mass wastage to ongoing climate change.

"The retreat of these small glaciers also makes the nearby Greenland Ice Sheet more vulnerable to further summer warming which is likely to occur. There could also be an effect on North Atlantic Ocean circulation and weather patterns through melting so much extra ice. An extended glacier observation programme in east Greenland for the next few years is clearly needed to improve understanding of the links between climate change and response of the [glaciers](#) in this important region."

The project marks an important practical collaborative venture of both the joint research centre of the Universities of Sheffield and Aarhus, and Los Alamos, with funding support provided by the European Community's Seventh Framework Programme.

**More information:** Mernild, S.H., N. T. Knudsen, W. H. Lipscomb, J. C. Yde, J. K. Malmros, B. Hasholt, and B. H. Jakobsen (2011) Increasing mass loss from Greenland's Mittivakkat Gletscher. *The Cryosphere*, 5, 341-348.

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