

# Monitoring of glacier mass balance on Mullwitzkees, Hohe Tauern

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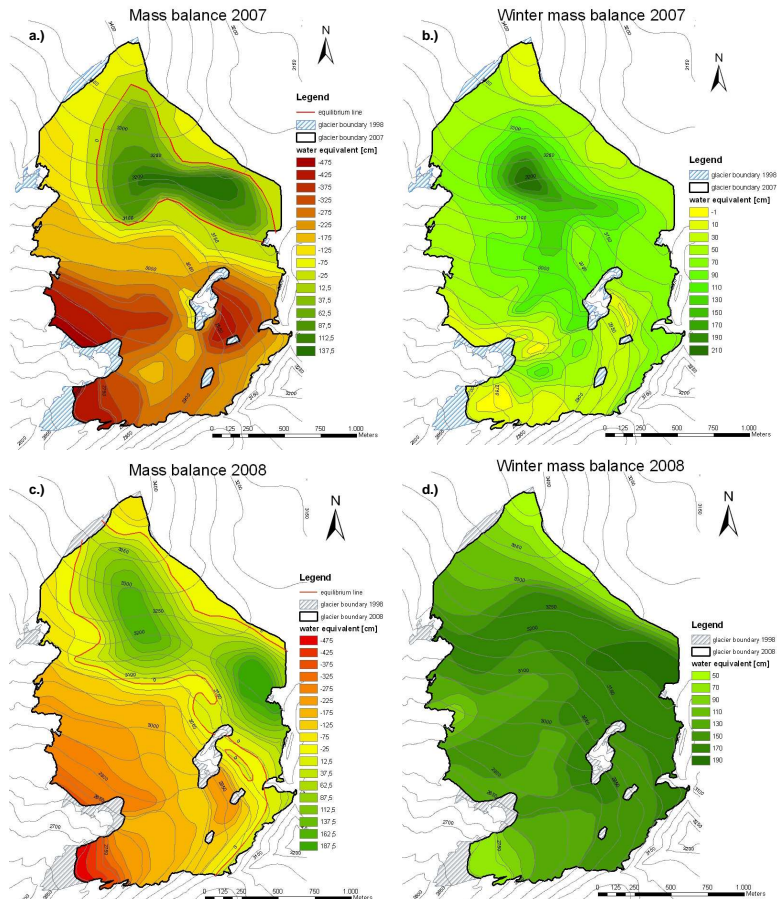
## INTRODUCTION

The Mullwitzkees is situated in the Venediger Massive within the core zone of the Hohe Tauern National Park. The upper part of the glacier is exposed to the south and is confined by a ridge with the highest point Hohe Zaun at an altitude of 3450 m. South-westerly exposed is the snout called Zettalunitzkees which reaches down to an elevation of 2690 m. In 1998, the Mullwitzkees covered an area of 3.24 km<sup>2</sup>. The glacier area diminished to 3.08 km<sup>2</sup> in 2007. To calculate the mass balance the direct glaciological method with fixed date is used. A monitoring network was set up on the Mullwitzkees in September 2006 and includes about 15 ablation stakes, several snow pits, a rain gauge and an automatic weather station, where the temperature is measured. The ambition of this project is to detect the gain and loss of a southern exposed glacier and to find a correlation between climate conditions and the results after five years of mass balance measurements. At this point the results of the first two years are presented. The project is funded by the Hohe Tauern National Park and the Hydrological Service at the government of Tyrol.



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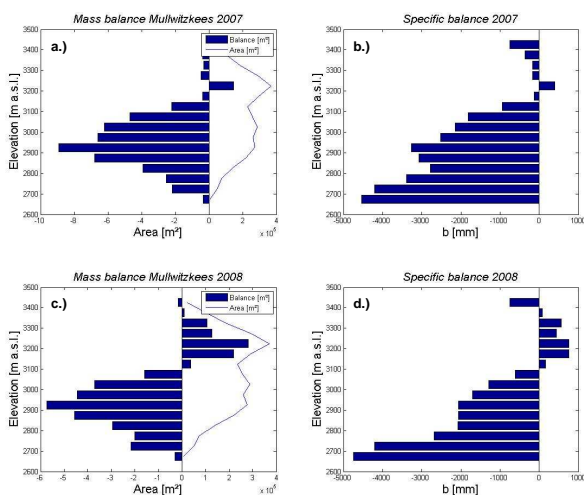
## Illustration of the mass balance 2006/2007 – 2007/2008



## Results 2006/2007 – 2007/2008

	2006/2007	2007/2008	
Sc (accumulation area)	0.639	1.22	km <sup>2</sup>
Bc (total accumulation)	0.44	0.93	10 <sup>6</sup> m <sup>3</sup>
bc (mean specific accumulation)	682	764	mm
Sa (ablation area)	2.444	1.864	km <sup>2</sup>
Ba (total ablation)	-4.90	-2.91	10 <sup>6</sup> m <sup>3</sup>
ba (mean specific ablation)	-2004	-1562	mm
S (glacier area)	3.08	3.08	km <sup>2</sup>
B (total mass balance)	-4.46	-1.98	10 <sup>6</sup> m <sup>3</sup>
b (mean specific mass balance)	-1447	-642	mm
AAR (accumulation area ratio)	0.207	0.396	
ELA (equilibrium line altitude)	3163	3115	m

**Table 1:** Characteristic numbers of the mass balance measurements on Mullwitzkees for the hydrological years 2006/07 and 2007/08, separated into terms of accumulation and ablation, as well as the accumulation area ratio and the equilibrium line altitude.



**Figure 1:** a. c.) Allocation of the total mass balance (blue bars) and area (blue lines) and b. d.) the distribution of the mean specific mass balance (blue bars), as a function of the elevation on Mullwitzkees for the hydrological years 2006/07 and 2007/08.

**Figure 2:** Distribution of the mean specific mass balance on Mullwitzkees in centimeter water equivalent for the hydrological years 2006/07 and 2007/08 (a. c.) and the corresponding winter balance for each year (b. d.). The mass balance is colored gradually into 50 cm intervals within the ablation area and into 25 cm intervals within the accumulation area, the equilibrium line is plotted as a red line (a. c.). The gradually colored interval of 20 cm is valid for each winter mass balance (b. d.). The glacier boundary is shown for the years 1998, 2007 and 2008, where it was reduced on the basis of photos and GPS.

## Conclusions

Comparing the first two years of mass balance measurements on Mullwitzkees one of the most conspicuous results is the position of the accumulation area, which is displaced from the ridge to lower elevations due to wind drift during the winter. Therefore the ice thickness is even decreasing at the highest elevations of this glacier.



**Figure 3:** Map of Austria and the Location of the Mullwitzkees.

