



Comparison of mass balance, ice flow velocity and volume changes in different time scales on Kesselwandferner, Ötztal Alps.

A. Fischer (1), H. Schneider (1), T. Geist (2,3), H. Stötter (3), and M. Kuhn (1)

(1) University of Innsbruck, Meteorology and Geophysics, Innsbruck, Austria (andrea.fischer@uibk.ac.at), (2) Austrian Research Promotion Agency (FFG), Vienna, Austria, (3) Institut für Geographie, Universität Innsbruck, Austria (former affiliation)

Kesselwandferner is a fast reacting glacier with an area of 3.2 km² (46° 50.3' 10° 47.9', 3500-2600 m a.s.l.) near the main alpine ridge in the southern Ötztal Alps, Austria. After reaching a minimum velocity in 1965, Kesselwandferner speeded up in the following years and advanced several hundred meters in the 1980s and receded since mid of the 80s, although the higher parts of the glacier thickened. In 1997, the glacier area was still larger than in 1971. Surface mass balance of Kesselwandferner is measured since 1952/53 with the direct glaciological Method. Since 1962, the horizontal and vertical ice flow velocities are measured annually with the help of an extended stake network. The Austrian glacier inventories 1969, 1998 and 2006 contain data on surface elevation and area of Kesselwandferner. Additional DEMs were acquired in 1971 and during several laser scan flights between 2001 and 2006. The results from geodetic method and direct determination of surface mass balance disagree by up to 0.5 m w.e./year. The comparison of volume change and mass balance measured at the stakes to volume changes calculated from the DEMs on decadal and annual time scale shows that dynamic effects and changes in mean density can explain that difference. The error for the geodetic method is estimated for larger and smaller time scales with relation to the mean annual mass balance in different periods.