Geophysical Research Abstracts
Vol. 12, EGU2010-12379, 2010
EGU General Assembly 2010

Towards a third Austrian glacier inventory: First results and a climatic interpretation

Jakob Abermann (1,2), Bernd Seiser (2), and Andrea Fischer (2)

(1) Commission for Geophysical Research, Austrian Academy of Sciences, Vienna, Austria, (2) University of Innsbruck, Meteorology and Geophysics, Innsbruck, Austria (jakob.abermann@uibk.ac.at)

Glaciological research in the Alps benefits from an abundance of data. In terms of glacier inventories, the first complete one of Austria has been compiled already in 1969, followed by a second one between 1996 and 2002. For the study area, the second one dates back to 1997. Both inventories are based on a photogrammetric evaluation of aerial photographs. Since then, glaciers have continued to shrink with a significant acceleration. A simple, reliable and accurate method based on LIDAR (light detection and ranging) data has thus been applied to derive a recent state of the Austrian cryosphere for the year 2006. So far, two mountain groups have been examined: The Ötztal Alps and the Stubai Alps with 116.1 km^2 and 49.4 km^2 of ice cover, respectively. Together, these two groups cover approximately 40 % of the Austrian glacier area. The glaciers of the study areas comprise altitudes extending from 2150 m up to almost 3800 m. In total, glacier area shrunk by -20.3 % since 1969 and -8.5 % since 1997. Volume loss was about 1.3 km^3 resulting in a mean thickness change of -7.3 m between 1997 and 2006. The two neighbouring mountain groups are located in a slightly different climatic setting, which has been investigated using ERA40 reanalysis data as well as a gridded precipitation dataset (HISTALP data-base). Temperatures in the Ötztal Alps are generally slightly higher than in the Stubai Alps, comparing same altitudes. The temporal evolution of the temperature is insignificantly different. The Ötztal Alps receive less precipitation due to being more shaded towards the north-west than the Stubai Alps. There is a significantly more positive trend of winter precipitation anomalies in the Stubai Alps during the latter part of the investigated period than it is in the Ötztal Alps. These climatic differences are reflected in a different response of the glaciers: mean thickness changes are about the same for both, the glaciers in the Stubai Alps as well as the glaciers of same size classes in the Ötztal Alps for the period 1969 to 1997 (Stubai: -8.2 m; Ötztal: -8.3 m). For the period from 1997 to 2006 we detected a significantly less negative mean thickness change in the Stubai Alps (Stubai: -5.3 m; Ötztal: -7.2 m). We suspect that the stronger winter precipitation anomalies in the Stubai Alps mitigate the glacier volume loss there.