



The glaciers in South Tyrol - 1983, 1997 and the future

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The recently completed glacier inventory for South Tyrol (259 glaciers, 109 km²), which is based on air photos of September 1997, is compared with the inventory for 1983 (136 m²). It shows a general and pronounced loss of glacier area (-26,9 km² or 20% from 1983) within 14 years. Estimated glacier volume diminished from 4400 Mio m³ to 3500 m³ (20%). The mass loss is equivalent to an annual thinning of about 0,5 m. The ELA in 1997 was above the highest peaks (> 3893 m). Compared with a theoretical balanced average ELA (ELA 0) of 2910 m the glaciers were (and still are) in a clear imbalance with modern climate. Scenarios for vertical shifts of ELA 0 show that in the case of a vertical shift of +300 m, which is equivalent to a summer temperature rise of 2,4 K, about 50% of the glacier area of South Tyrol will be lost. In the case of a rise of +400 m, only 20% of the glacier area confined to 37 glaciers will be left. 222 glaciers will disappear completely. If a summer temperature rise is accompanied by a drastic reduction in winter precipitation, which is not unlikely under increasingly anticyclonic conditions south of the alpine main ridge, the ELA shift may be even more pronounced and may result in the disappearance of all but a few glaciers, which are confined to the highest areas. The scenario of an ELA rise by 400 m will expose almost 90 km² of (potentially) unstable area to subaerial erosion and may rise the risk for mudflows and small-scale gravitative processes in the valley headwaters.