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Temporal variability of the contribution of glaciers in western Austria to water discharge

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In general, the fraction of glacial melt water in alpine river discharge is rather small on an annual basis. In the main melt period (June – August), however, some rivers are strongly influenced by the daily melt cycle of the upstream glaciers, which needs to be taken into account for long-term hydrological planning. Also, during periods of glacier retreat, melt water from glaciers provides excess water, not available in years with zero or negative glacier mass balances. Since the middle of the 19^{th} century alpine glaciers have lost a considerable amount of their volume. The temporal variability of this excess discharge for different timescales (months to decades) is only estimated so far.

The existing Austrian Glacier Inventories allow the determination of a very accurate glacier volume change between 1969 and 1998. These data were used to calculate the excess discharge for different catchment basins in western Austria for this period, which then was compared to the accumulated river run-off of the individual basins. The inter-annual distribution of the total excess could be determined by the use of existing mass balance series from several glaciers in the different basins as scaling function. In addition, a differentiation was made for accumulation and ablation seasons, which provides an improved estimate for the role of glacial melt water in the summer months on a year-by-year basis. Considering different gauging stations along the rivers, the relative importance of glacial melt water on the downstream river hydrology could be determined.