



Updated historical snow cover and winter temperature evolution in Austria

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Based on results of the project SNOWPAT and further work at ZAMG we present an extension and update of an analysis of snow cover changes (daily total snow depth and new snow amount) at selected and regionally representative long-term Austrian snow stations in the altitudinal range 198 m a.s.l. to 2140 m a.s.l. over the period 1950 to 2019 using a running trend analysis (Mann-Kendall). In addition, high altitude winter time series are analyzed to support the interpretation. Generally, snow as well as winter temperature data show a strong interannual and multi-decadal variability, which is accompanied by differently strong but significant negative long-term trends at the majority of the stations. Temperature data show increasing high altitude winter temperatures, but only on rather long time-scales. On shorter timescales (up to 30 to 50 years) decadal variability dominates. The long-term snow cover reduction is found in all altitudes and most regions of Austria, but especially in the west and south. This study shows that long and consistent snow and winter mountain temperature time-series are needed (at least around 50 years) to detect long-term climatic trends of snow conditions, which is due to the high temporal variability. On a shorter timescale most stations show very strong negative anomalies in the winters 2014/15 to 2016/17 and positive anomalies at medium and high elevation in winter 2017/18.