Homogenization of snow depth time series of the Trentino Province (North-East Italy)

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Snow depth and duration are significantly affected by small variations in temperature and atmospheric pressure, and hence represent valuable metrics to detect and quantify the ongoing effects of climate change in Alpine regions. However, long and accurate time series of snow depth measurements are rare. In this work, we present the snow depth dataset collected for the Trentino Province (North-East Italy). It consists of 65 site time series located between 900 m a.s.l. and 2900 m a.s.l. and a temporal extension, which ranges between 2 and 70 years. The time series have been constructed merging data from different sources and collected using different measurement instruments. The dataset has been homogenized using the Standard Normal Homogeneity Test (SNHT), in order to detect and correct breakpoints caused by changes in the instrument's location and other external effect different from climate change. A few approaches have been selected for the construction of the reference time series used to detect the breakpoints in the tested time series (Alexanderson and Moberg 1997, Peterson and Easterling 1994). The results obtained with the selected methodologies provide consistent results and agree on the identification of the breakpoints, which are to a great extent independent on the methodology applied to construct the reference time series. The test was able to detect 16 breakpoints in the time series, 14 of which have been confirmed by metadata. In summary, the SNHT was able to identify breakpoints in long-term snow depth time series. The successive homogenization provided useful datasets to investigate the impact of climate change in the Southern Alps.

References
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