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Climate variability changes in the greater alpine region in the past two centuries

R. Boehm, I. Auer, A. Jurkovic, A. Orlik, R. Potzmann, W. Schoener, M. Ungersboeck

Central Institute for Meteorology and Geodynamics, Vienna, Austria

It is often claimed that climate in the future (mainly anthropogenic) will be more variable than in the (mainly natural) past and that this change is already visible in measured climate data series. This should produce increasing climate extremes on both sides of the tails of the spectrum of events. Due to the given statistical interrelation of variability in space and time short term extreme events (hail, flash-flood, wind-gusts,...) are more limited in space (and thus afford a much higher spatial density of measuring networks) than such of longer duration (heat(cold), dry(wet) spells of a month or a season, extraordinary years,...). Therefore an adequate database for studies is easier to obtain for the latter type of extremes than for the former.

Concerning the latter type, recently enhanced efforts of supra-national collaboration in the field of long-term climate data QC in the "greater alpine region" (GAR: 4 to 19 deg E, 43 to 49 deg N, 0 to 3580m asl.) have produced long-term monthly instrumental datasets of yet not available length, spatial density and quality in terms of inhomogeneity- and outlier detection and correction. Major improvements could be achieved also in the pre-1850 early instrumental period – allowing so far to study climate variability in the region back to 1760 (temperature) and 1800 (precipitation). In particular the intensive outlier detection and correction activity recently executed, made the datasets fit also for studies of extreme events and changes of climate variability down to a time unit of one month.

The presentation discusses the long-term evolution of variability-measures (variance, standard deviation, inter-percentile range, variation coefficient) in moving windows of variable length along the regional, subregional and single station (grid-point) monthly, seasonal and annual detrended series of the greater alpine region. The main (surpris-

ing) result is the general “non-existence” of any increasing trends of climate variability in the region. If at all there is a general decrease of interannual variability (stronger for temperature, weaker for precipitation), and there are interesting multi-decadal ups and downs exceeding the long-term trends. Some of the variability changes can be assigned to a parallel evolution of thermal continentality in the region (roughly spoken a generally higher continentality in the 19^{th} vs. a lower in the 20^{th} century, but also decadal scale similarities are visible). This indicates at large (continental?) scale circulation influences in the study region which is situated at the crosspoint of three main climate regions (Atlantic, Mediterranean, Continental) of Europe – and therefore may be particularly sensitive for circulation-driven climate effects.