



## **Temperature Trends at high Mountain Sites of Central Austria during the Period 1961-2006**

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Observed atmospheric warming in the European Alps is much higher compared to the global average as indicated by long time-series from meteorological stations of central Austria (e.g. Sonnblick Observatory) and the IPCC report of 2007. In this study, monthly mean temperature time series (46 years) for the altitude level 2500 m asl have been calculated from 15 meteorological stations for five selected high-altitude areas in the high mountains of central Austria (46°52'-47°05', 12°41'-13°26'; Hohe Tauern Range). These five areas are investigated by a project focussing on the effects of climate change on high mountain environments ([www.alpchange.at](http://www.alpchange.at)). Temperature trends for these five areas have been analysed by applying different statistical approaches. Correlation analyses have been applied for filling data gaps, linear regressions to calculate the temperature at the reference altitude 2500 m asl, the overall linear trend and the mean difference of two 23-year periods (1961-1983 versus 1984-2006) for quantifying long-term changes. The statistical significance was tested with signal-to-noise ratios and Student's t-tests (95% confidence limit). Our results indicate a significant temperature rise of 1.3 to 1.5°C since 1961 in all five areas. The highest increase in temperature occurred during the summer months (JJA) and is around 2°C. Of particular interest is the month May with exceptional high values in the range of 2.4 to 2.6°C. Based on the IPCC report of 2007 the global linear warming trend over the studied 46-year period is the range of 0.46-0.74°C indicating that warming in the high mountains of central Austria is two to three times higher. Amongst other environmental effects, this significant warming caused substantial glacier retreat and perennial snow

field reduction at all five sites obviously strongly affecting their hydrological systems.