



## Documentation of MeteoSwiss Grid-Data Products

# Anomalies of Mean Temperature: TanomD8110, TanomM8110 and TanomY8110

Monthly Temperature Anomaly (degC) Nov 2010 (Ref. 1981–2010)

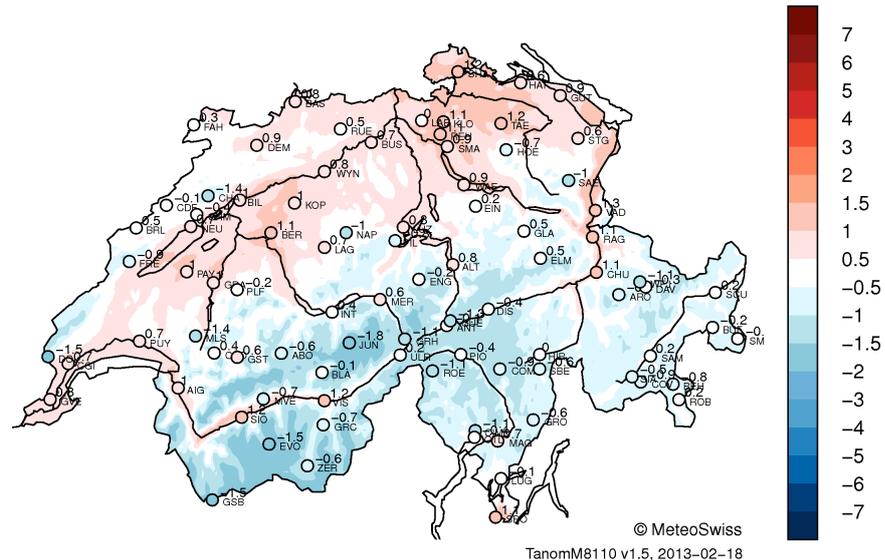


Figure 1: Monthly mean surface temperature anomaly (degrees C, reference 1981–2010) for November 2010.

<b>Variable</b>	Difference of surface mean temperature from the long-term mean of 1981-2010 (norm period) in degrees Celsius. Daily, monthly and yearly anomalies are relative to the long-term mean of the corresponding calendar day, month and the year.
<b>Application</b>	Climate monitoring. Monitoring of temperature-related natural systems (e.g. glaciology) and weather impacts on socio-economic sectors (e.g. agriculture and energy production).
<b>Overview</b>	TanomD8110, TanomM8110 and TanomY8110 are spatial analyses of deviations of daily, monthly and yearly mean temperatures from the corresponding climatological norm (reference 1981-2010). They are based on homogeneous measurement time series at about 80 stations and cover a multi-decadal period (1961-present). The interpolation is estimated using a km-scale digital elevation model in combination with non-linear and regionally variable topography temperature relationships. The datasets are intended primarily for monitoring purposes, such as those placing variations in glacier extent/volume, energy consumption and agricultural yields in relation to temperature evolutions.

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<b>Data base</b>	The data underlying the three data products are daily, monthly and yearly mean temperature measurements, exactly like those used for products TabsD, TabsM and TabsY. (See the documentations of the pertinent data products.)
<b>Method</b>	The anomaly fields are calculated simply as the difference between the analyses for absolute temperature (products TabsD, TabsM and TabsY) and those for the long-term mean conditions (products TnormD8110, TnormM8110 and TnormY8110). Refer to the corresponding product documentations and to Frei (2014) for details on their calculation.
<b>Target users</b>	The primary purpose of the temperature anomaly products is the monitoring of long-term temperature variations in Switzerland, including the study of its regional variations and height dependencies (see e.g. Ceppi et al. 2010). The long-term consistency of TanomM and TanomY makes them useful for the interpretation of variations in other natural systems (e.g. glaciers, permafrost, water resources, see Glaciological Commission 2007, PERMOS 2009) and of climate-sensitive quantities in economic sectors, such as in agriculture or the energy sector. The datasets may also be interesting for quantitative empirical modeling in these fields.
<b>Accuracy and interpretation</b>	<p>The remarks on utility and interpretation as well as the figures of accuracy are similar to those given for absolute temperature products (TabsD, TabsM and TabsY). The user is referred to the corresponding product documentations for detail.</p> <p>Of particular note is that, even though the measured time series are of good long-term consistency (Begert et al. 2003, 2005), the homogeneity of the data products may be compromised by changes in the station network over time. This is particularly relevant for TanomD8110, where we have clear signs of inhomogeneity as a consequence of network variations. A comparison between TanomY8110 and a similar analysis but with a fixed station sample showed similar long-term trends, which lends confidence into the homogeneity of the monthly and annual temperature anomalies, at least for mean values. The possibility of inhomogeneities in variability (both temporal and spatial) has not been investigated so far.</p>
<b>Related products</b>	<p>TabsD, TabsM and TabsY: Daily, monthly and yearly mean surface temperature. Absolute temperature instead of anomalies from the norm.</p> <p>TnormD8110, TnormM8110 and TnormY8110: Long-term mean temperature for calendar days, months and the year of the norm period 1981-2010.</p> <p>There is full consistency of TanomD8110, TanomM8110 and TanomY8110 with these related products in the sense that they correspond exactly to the difference of absolute quantities (mean temperatures) from the long-term mean over the norm period.</p>
<b>Grid structures</b>	TanomD8110, TanomM8110 and TanomY8110 are available in the following grid structure: ch02.lonlat, ch01r.swisscors

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- Versions** Current versions: TanomD8110 v1.4, TanomM8110 v1.5, TanomY8110 v1.5
- Previous versions:
- TanomM v1.2 and TanomY v1.2 were calculated with a less robust estimation procedure for the vertical profile and layering scheme compared to the actual version.
- TanomM v1.0 and TanomY v1.0 were calculated directly from the anomalies from the norm using a simpler functional form of the vertical profile.
- Update cycle** TanomD8110 for day D is calculated firstly in the morning of day D+1, but is updated at the beginning of the subsequent calendar month to include changes of station measurements from ongoing data quality control. TanomM8110 is updated monthly and is usually available at the beginning of the following month. TanomY8110 is updated yearly and is available in January.
- References**
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