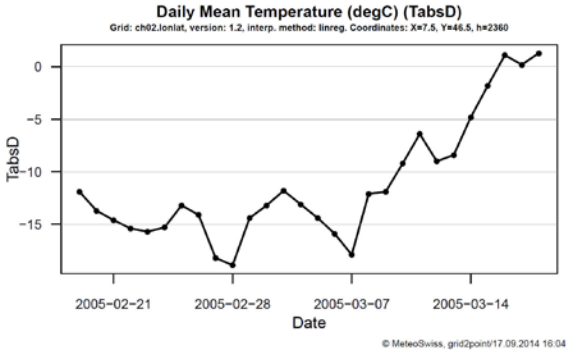
Documentation of MeteoSwiss Grid-Data Products
Local Time Series (LTS)

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Daily Mean Temperature (degC) (TabsD)
Grid: ch02.lonlat, version: 1.2, interp. method: linreg.
Coordinates: X=7.5, Y=46.5, h=2360
© MeteoSwiss, grid2point/17.09.2014 16:04
20050219000000 -11.9
20050220000000 -13.7
20050221000000 -14.6
20050222000000 -15.4
20050223000000 -15.7
20050224000000 -15.3
20050225000000 -13.2
20050226000000 -14.1
20050227000000 -18.2
```

Figure 1: Daily mean temperature (°C) local time series (time series diagram and text file) from 19. February 2005 to 18. March 2005 at 7.5°E, 46.5°N (2360 m above mean sea level), derived from Grid-Data.

Overview

This product provides local time series (LTS) of meteorological variables at user defined locations in Switzerland. Any location in Switzerland is eligible provided it is on the earth surface. Local time series are available for daily/monthly/yearly precipitation, temperature and sunshine duration.

The product addresses needs of users interested in conditions at specific sites that do not necessarily correspond to a grid point of the Grid-Data products. To obtain local time series or for more information please contact the customer service of MeteoSwiss.

Method

The data source for LTS are grid datasets that are obtained by spatial interpolation of measurements at stations on to a regular grid (see the documentation of the Grid-Data products for details). The local time series are calculated by an additional interpolation of the Grid-Data to the locations defined by the user (coordinates and height). Thus, the time period as well as the choice of the variable, the coordinate system and the time steps correspond to the availability of Grid-Data products at MeteoSwiss.

The method adopted for the additional interpolation to the locations is designed specifically for the different variables. All methods incorporate data from several grid points around the location of interest. Methods used are bilinear interpolation and local linear regression with height.

Accuracy and interpretation

Errors in the local time series arise (a) from errors in the underlying Grid-Data products and (b) the subsequent interpolation from the grid to the locations defined by the user. Cross-validation tests show that generally the error of the Grid-Data largely dominate while the contribution from the additional interpolation is comparatively small. The error is larger for

locations in a region with coarse measurement stations density and in regions with peculiarities such as lakes of cold air pooling. Measures of the accuracy of the Grid-Data are described in the corresponding product documentation. These measures and the pertinent limitations for interpretation reasonably apply also for the LTS products.

To generate local times series as robust as possible, several grid points are used during the interpolation, increasing generally the reliability of the estimation.

The local time series are calculated for a certain location but the series are rather spatially representative for the area where the location is placed. This is due to the limited effective resolution of the Grid-Data. Thus, the user should be careful because the interpretation of the values as local point estimations leads to substantial interpolation errors compared to the interpretation as area mean values (see e.g. Isotta et al., 2014).

The time series are not expected to be climatologically homogeneous. This is because variations in the station network used for the Grid-Data do affect the long-term consistency. This aspect should be born in mind in climatological applications, notably the usage of the time series for statistics on local extremes and trend analysis. Furthermore errors due to interpolation may limit the utility of the LTS products for estimating the magnitude of extremes, such as in evaluations for insurance.

Available outputs

Text file or time series diagram. In both outputs a list of meta-information is provided in the header of the text file or the accompanying diagram:

- variable name and units (e.g. Daily Mean Temperature, degC)
- product name of the Grid-Data used (e.g. TabsD)
- details on the Grid-Data (grid type, version number)
- interpolation method used to deduce local estimates from the Grid-Data
- location's coordinates (X, Y and height. The height is not used for all interpolation methods.)
- date and time of production

References

Isotta F. A., Frei C., et al., 2014. The climate of daily precipitation in the Alps: development and analysis of a high-resolution grid dataset from pan-Alpine rain-gauge data. International Journal of Climatology, Vol.34, Issue 5, 1657-1675, doi: 10.1002/2013MS000288.

Additional references are specified in the corresponding documentation of the Grid-Data.

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