The new WegenerNet Climate Station Network Web Portal - A Gateway to over 10 Years of High-resolution Precipitation Data

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WegenerNet - Brief Overview

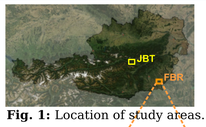


Fig. 1: Location of study areas.

a) Feldbach Region (FBR)

- 154 meteorological stations within 23 km x 18 km area
- main parameters: air temperature, relative humidity, precipitation, wind and soil moisture
- 5 minute sampling
- automatic processing system (data transfer, quality control, generation of weather and climate data products)
- interpolated gridded data for main parameters (200 m x 200 m UTM)
- data provided at data portal (www.wegenernet.org)
- data available since January 1, 2007

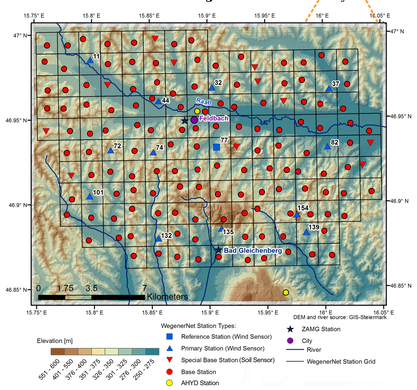


Fig. 2a: WegenerNet Feldbach Region (23 km x 18 km, mean alt. ~330 m) and station locations in the station grid.

b) Johnsbachtal (JBT)

- 11 meteorological stations (plus 1 hydrographic station)
- stations operated by Wegener Center and several partner organizations
- alpine setting, altitudes ranging from below 700 m to over 2100 m
- main parameters: air temperature, relative humidity, precipitation, wind, radiation, and snow depth
- 10 minute sampling
- automatic processing system
- quality controlled data provided at data portal (www.wegenernet.org)
- data available partly since October 2010, partly since January 2007

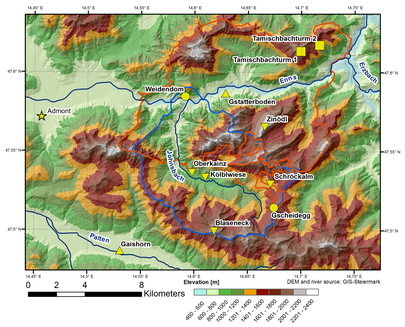


Fig. 2b: WegenerNet Johnsbachtal area (25 km x 18 km), station locations (yellow), catchment (blue), and border of the Gesäuse National Park (red). WEGC stations (five) are marked by downward looking triangles, partner stations by upward triangles, circles, and squares; ZAMG reference station by a star.

Web Portal (www.wegenernet.org)

After almost two years of development, the new web portal went online in March 2017. It gives access to 10+ years of high-resolution station- and gridded data.

A) Station data
- Station selection (1)
- Station details (2)
- Parameter selection (3)
- Data plots (4)
- CSV Data download (5)

B) Grid data
- Display and download of gridded (200 m x 200 m) data

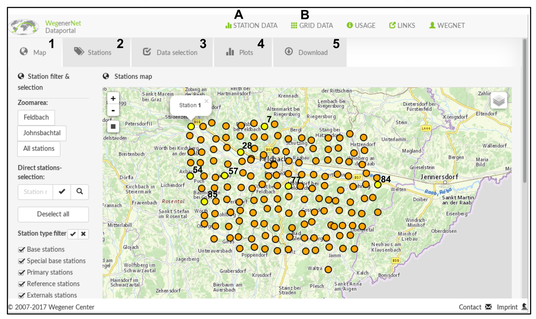


Fig. 3: WegenerNet web portal with station selection page.

Station Data - Precipitation Data Time Series

Station data are available for all stations in different temporal resolutions: From 5-minutes over half-hourly, hourly, daily, monthly to seasonal and annual. **Figs. 4a-e** show examples of precipitation data (plotted using the web portal) for three WegenerNet FBR stations (54, 77, and 84) with increasing temporal resolution and detail. The stations represent a west-east cut through the region (see Fig. 3 for locations) and thus allow to see the differences in precipitation between the western and eastern borders of the study region.

Fig. 4a: Annual precipitation sums from 2007 to 2016 (10 yrs.) at stations 54, 77, and 84

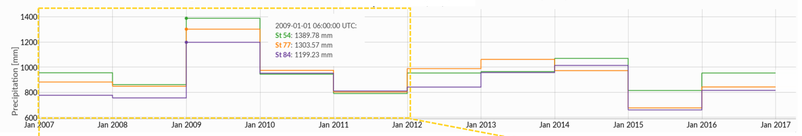


Fig. 4b: Monthly precipitation sums from 2007-01 to 2011-12 at stations 54, 77, and 84

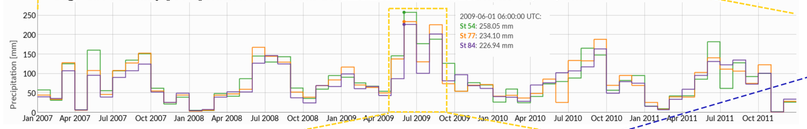


Fig. 4c: Daily precipitation sums from 2009-05-31 to 2009-08-31 at stations 54, 77, and 84

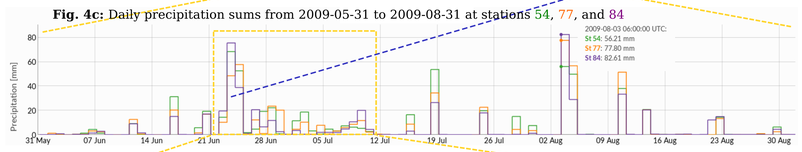


Fig. 4d: Hourly precipitation sums from 2009-06-21 to 2009-07-11 at stations 54, 77, and 84

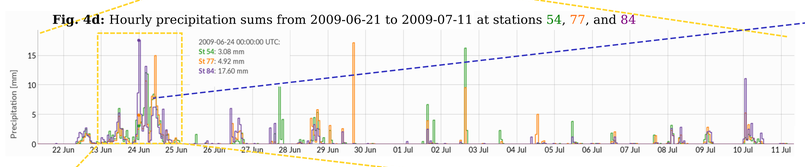
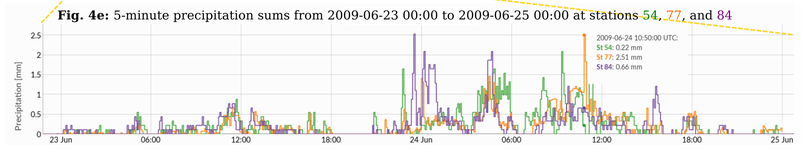
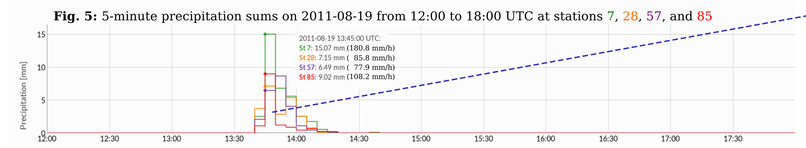


Fig. 4e: 5-minute precipitation sums from 2009-06-23 00:00 to 2009-06-25 00:00 at stations 54, 77, and 84



A convective rainfall event is illustrated in **Fig. 5** below. Stations 7, 28, 57 and 85 (locations see Fig. 3) represent a NE-SW cut through the region. Note the rain rate of ~15 mm/5 min (~180 mm/h) at station 7, which is more than twice the rate of station 28 (located only 4 km away).

Fig. 5: 5-minute precipitation sums on 2011-08-19 from 12:00 to 18:00 UTC at stations 7, 28, 57, and 85

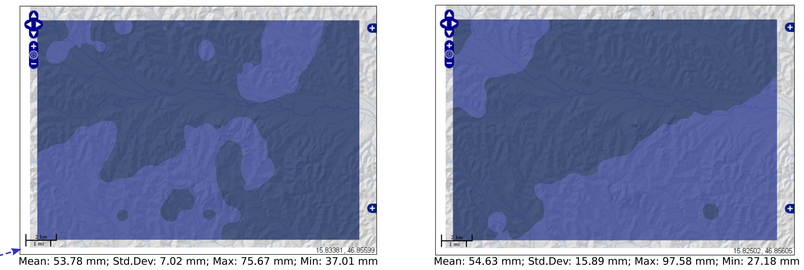


Gridded Data - Precipitation Data Maps

Station data are interpolated onto a regular 200 m x 200 m resolution UTM grid. Like station data, gridded data are also available in all the different temporal scales from 5-minutes to annual. **Figs. 6a,b** show two examples for gridded daily precipitation data, and **Figs. 6c,d** show hourly precipitation. The dates of the images are in the range of dates shown in Figs. 4c,d, thus a direct comparison to the station data is possible.

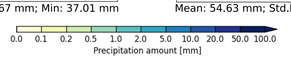
Daily precipitation data

Figs. 6a and 6b: Daily precipitation sums at June 23 (left) and June 24 (right), 2009



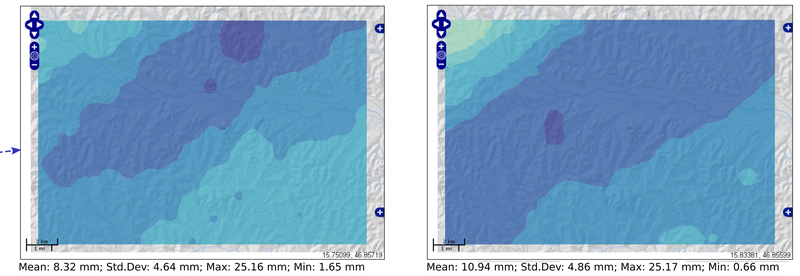
Mean: 53.78 mm; Std.Dev: 7.02 mm; Max: 75.67 mm; Min: 37.01 mm

Mean: 54.63 mm; Std.Dev: 15.89 mm; Max: 97.58 mm; Min: 27.18 mm



Hourly precipitation data

Figs. 6c and 6d: Hourly precipitation sums at June 24, 2009: 08:00 - 09:00 (left) and 10:00 - 11:00 (right)



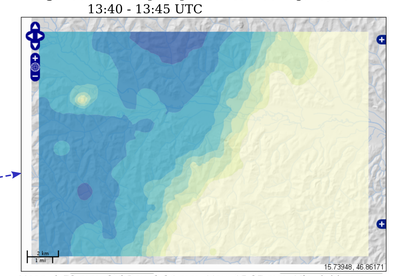
Mean: 8.32 mm; Std.Dev: 4.64 mm; Max: 25.16 mm; Min: 1.65 mm

Mean: 10.94 mm; Std.Dev: 4.86 mm; Max: 25.17 mm; Min: 0.66 mm

5-minute precipitation and temperature data

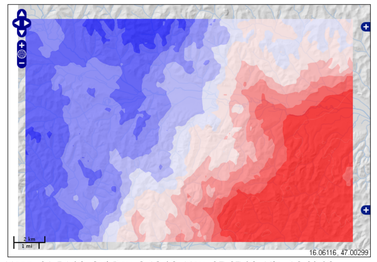
Fig 7a shows a 5-minute precipitation sum of the convective event depicted in Fig. 5. The corresponding temperature anomaly grid is shown in **Fig. 7b**.

Fig. 7a: 5-minute precipitation sum at Aug. 19, 2011 13:40 - 13:45 UTC

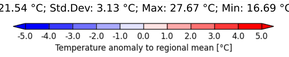


Mean: 2.73 mm; Std.Dev: 3.34 mm; Max: 15.37 mm; Min: 0.00 mm

Fig. 7b: Temperature data at Aug. 19, 2011, 13:45 UTC



Mean: 21.54 °C; Std.Dev: 3.13 °C; Max: 27.67 °C; Min: 16.69 °C



WegenerNet Cooperations: LTER Austria (Austrian Long-Term Ecosystem Research Network); NASA; International Soil Moisture Network; LINET Lightning Detection Network

Reference: Kirchengast, G., T. Kabas, A. Leuprecht, C. Bichler, and H. Truhetz (2014): WegenerNet: A pioneering high-resolution network for monitoring weather and climate. Bull. Amer. Meteor. Soc., 95, 227-242, doi:10.1175/BAMS-D-11-00161.1

Further information, data access and references: www.wegcenter.at/wegenernet