1 WegenerNet - Brief Overview

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)
- processed data provided at data portal (www.wegener.net)
- data available since January 1, 2007

b) Johnsbachtal (JBT)

- 11 meteorological stations (plus 1 hydrographical 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.wegener.net)
- data available partly since October 2010, partly since January 2007

2 The Raab Catchment Hydro-pedologic Dataset (RCHD)

2.1 Raab Catchment overview

The Raab catchment (marked in blue in the above figure) covers an area of 987 km². It includes the highly instrumented WegenerNet (gray rectangles) and is surrounded by the South Eastern Styria (SES) region. They serve as focus regions for investigating hydrological extremes.

2.2 Input Data

Soil data for the RCHD are taken from the digital soil archive eUFO (yellow color and red circles, respectively), from the Styrian government’s soil inventory profiles (green circles), and from forest soil inventory profiles (blue circles).

2.3 Output Data

Soil type

Soil type has been calculated as content of silt, clay, and sand for three depth layers (0-20 cm, 20-50 cm, and >50 cm). The above image shows the modeled silt content of the 20-50 cm soil layer.

Hydro-pedologic data:

Hydrological and hydro-pedological characteristics have been derived using a special pedotransfer function (see Klebinder et al. 2017 for references).

Output values include:
- Saturated hydraulic conductivity \( k_s \)
- Total pore volume
- Air capacity
- Permanent wilting point
- Available water capacity
- Mualem-Van Genuchten parameters \( \theta_s, \theta_r, n \)
- Runoff coefficients
- Soil moisture distribution

Surface runoff coefficient

Runoff coefficients were modeled using the HYDROBOD model (see Klebinder et al. 2017 for references). The model calculates runoff for various layers (infiltration, soil, and geology), for instance, surface runoff coefficients for a rain event (1 h, 84 mm) in the above map.

Distribution of soil moisture was also calculated using the HYDROBOD model. The final runoff coefficients were modeled using different precipitation and soil moisture scenarios including heavy precipitation with a frequency of up to 100 years.

References:


Further information, data access and references:

www.wegener.net