Elsterbach
Elsterbach catchment, Germany

Basin characteristics

Weser river basin
From 1972 to 2005
4.25 km²
Mountainous
784 mm (1972-2004), 7.7°C (1961-1990, DWD Beberbeck)
95% forest: Norway spruce 46%, European beech 28%, oak 7%, other tree species 19%
Eutrophic brown earth, Parabraunerde, Pseudogley and Stagnogley
Sandstone with quartenary overlying strata, basalt
Northwestern part: very deep and well permeable soils
Northeastern part: soils hardly permeable to water
5.0 l/s, 3511 l/s, 33.4 l/s (1972-2005)

Impact of climatic changes on the runoff

Precipitation and discharge during the dry year 2003
Trend of number of days with runoff > 2 * Q\text{mean}

Instrumentation and data

<table>
<thead>
<tr>
<th>Measured hydrological parameters</th>
<th>Measuring period</th>
<th>Temporal resolution</th>
<th>Number of stations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream flow</td>
<td>Nov 1972 – Oct. 2005</td>
<td>1h</td>
<td>1</td>
</tr>
<tr>
<td>Precipitation</td>
<td>1972 – 2005 daily</td>
<td>monthly</td>
<td>1</td>
</tr>
<tr>
<td>Air temp. (DWD Beberbeck)</td>
<td>1961 – 1990</td>
<td>1h</td>
<td>1</td>
</tr>
</tbody>
</table>

Applied models

None

Main scientific results

1. The average runoff adds up to 246 mm which is 31 % of the yearly precipitation. The ratio runoff / precipitation varies between 18 and 50 %.
2. Runoff shows a very wide range from 1,2 l / s·km² to 826 l / s·km² and is similar to the runoff of alpine creeks.
3. Two little creeks that rise from different geological strata (basalt; sandstone) form the Elsterbach creek.
4. Important steps of runoff formation process:
   (i) The plateau of the northeastern part of the watershed is characterized by low infiltration capacity due to almost impermeable clay-layers. There is a high proportion of subsurface flow after heavy rain fall and this creek contributes above average to flood waters. During summer this creek often falls dry.
   (ii) The soils in the northwestern part of the watershed are very deep and highly permeable with quick drainage through macropores towards greater depths and low saturation of topsoils.
5. The two creeks are very different concerning water chemistry. While the pH (median) of the northwestern creek is 6.7, the pH of the northeastern creek is between 4.4 and 4.6. Sulfate concentration is a much higher in the northeastern creek due to coal sources in this area. A declining trend could be observed for strong acids, particularly for sulfate, because of strongly reduced deposition rates. There is no declining trend for nitrogen concentration, which is between 0.5 and 2 mg/l during vegetation period and 8 to 10 mg/l during winter months.

Key references for the basin


Contact

Birte Scheler, Henning Meesenburg
Northwest German Forest Research Station
Grätzelstraße 2
37079 Göttingen
Germany
birte.scheler@nw-fva.de, henning.meesenburg@nw-fva.de