Centre de Recherche Public
Gabriel Lippmann

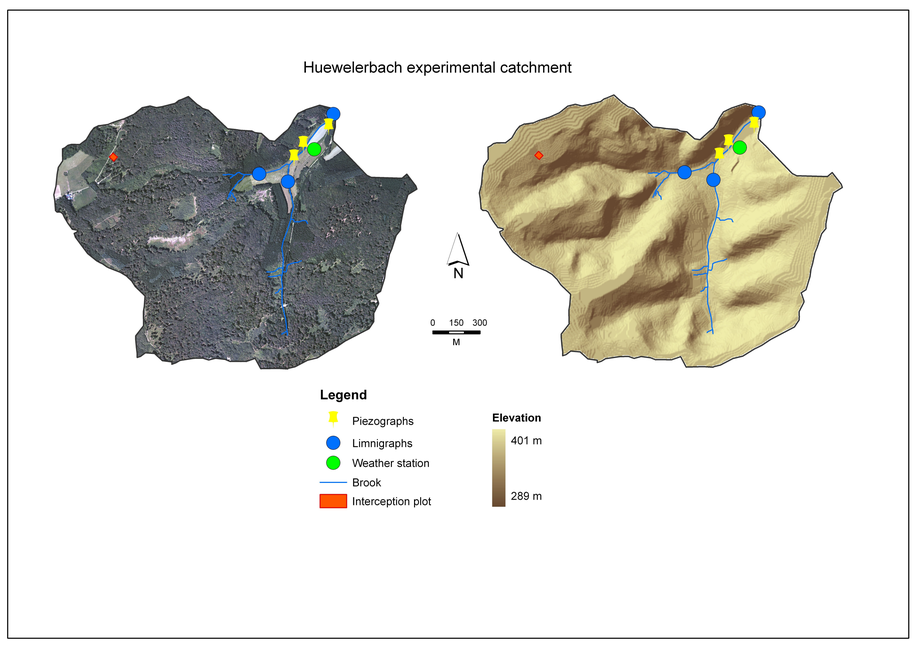
Huewelerbach

Huewelerbach catchment, Luxembourg

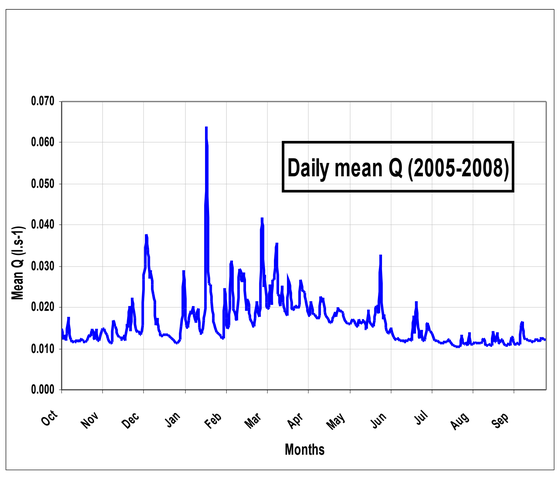
Basin characteristics

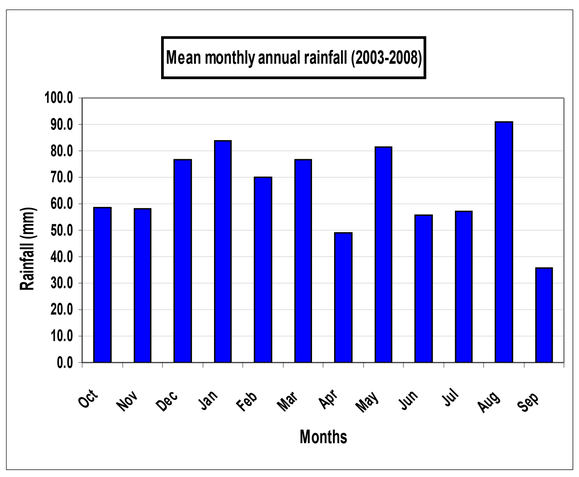
River Basin / River Basin (according EU-WFD)	Upper Attert basin / Mosel basin
Operation (from… to…)	Since autumn 2001
Gauge coordinates / Gauge datum:	49°43'6.1'' N / 5°54'20.5'' E / 288.50 m a.s.l.
Catchment area:	2.7 km ^{2}
Elevation range:	289 m - 401 m a.s.l.
Basin type: (alpine, mountainous, lowland)	Mountainous
Climatic parameters: (mean precipitation, temperature and others)	796 mm, 8.8 °C (2005 – 2008)
Land use:	91.5 % forest, 7 % grassland, 1.5 % urbanised
Soils:	Hypoluvic Arenosol, Regosol (Arenic), Planosol (Ruptic, Clayic)
Geology:	Sandstone, alternation of marls and limestones
Hydrogeology: (Type of aquifers, hydraulic conductivity)	Porous and fractured aquifer, average HC of the sandstone in Luxembourg: 5.10^{-5} m.s^{-1}
Characteristic water discharges: (daily Q_{min}, Q_{max}, Q_{mean})	5.0 l.s^{-1}, 156 l.s^{-1}, 16.3 l.s^{-1} (2005 – 2008)

Map of the research basin

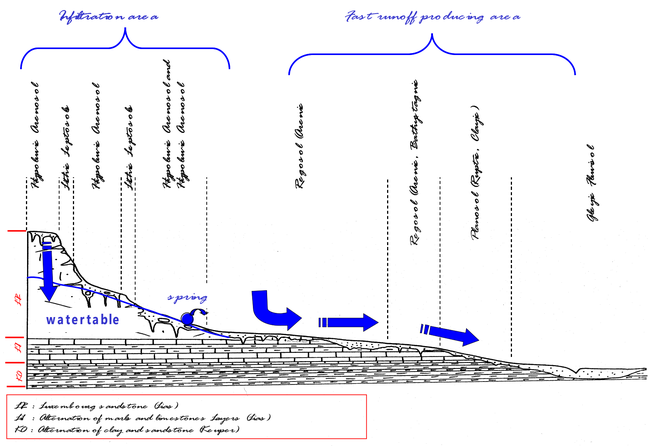


Mean hydrograph / Pardé flow regime





Special basin characteristics (hydrogeology, lakes, reservoirs etc.)



GEOLOGICAL CROSSECTION and SOIL CATENA OF THE HUEWELERBACH BASIN

Instrumentation and data

Measured hydrological parameters	Measuring period	Temporal resolution	Number of stations
Stream flow outlet secondary study specific	Oct. 2002 --- Spring 2004 --- 2004 – 2008	15 min	1 2 10 (not continuous)
Meteorological station (T/RH-GR-R-WV&WD)	April 2003 ---	15 min	1
Groundwater level	May 2003 --- May 2003-Oct. 2008	1 h 2 weeks	3 21
Chemical analysis (anions-cations-others)	2002 ---	1 h to 1 week	1 to more than 30
Sediment trapping	2005 - 2008	Period depending	1
Interception plot (beeches, around 150 y old)	Automn 2003 ---	15 min 2 weeks	4 pluviographs 80 pluviometers

Applied models

1. Various conceptual models with regionalised parameters
2. EMMA for hydrograph decomposition

Main scientific results

1. At baseflow level, water is coming from the springs emerging at the base of the Luxembourg Sandstone (at the interface with the underlying marls), with a very stable chemical signal.
2. After a rainfall event, the falling limb of the hydrograph is systemtically very steep and initial baseflow levels are reached very rapidly, indicating the influence of a rapid surface and/or subsurface runoff.
3. Discharge observed in the western creek of the Huewelerbach is stable and is due to very constant feeding through springs located in the sandstone, whereas the discharge of the southern creek gets higher contributions through surface runoff. Most storm runoff eventually is produced in the footslope area, where the two creeks converge. In this part of the basin, the soils are clayey (Planosol (Ruptic, Clayic)).
4. At peak flow, the overland flow contribution can reach up to 75 %.
5. The piezographs in the lower, mainly alluvial, part of the basin show a rapid reaction to all rainfall events. The water table is close to the surface during wet periods.
6. At the interception plot, located in a beech forest, stemflow and throughfall are continuously measured all over the year at very high spatial and temporal resolution. Average stemflow ranges from 5 to 6 % and total rainfall interception varies between 0 to 10 % in winter and reaches up to 20 % in summer.
7. The sediments exported from the basin originate principally from bed sediments, with major fluxes occurring during flood events.

Key references for the basin

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5. Pfister L. & al., 2006. 'Cycleau project - Final report to the National Research Fund'. 133 p.
6. Van den Bos R., Hoffmann L., Juilleret J., Matgen P., Pfister L., 2006. 'Regional runoff prediction through aggregation of first-order hydrological process knowledge: a case study'. Hydrological Sciences Journal, 51 : 1021-1038.

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