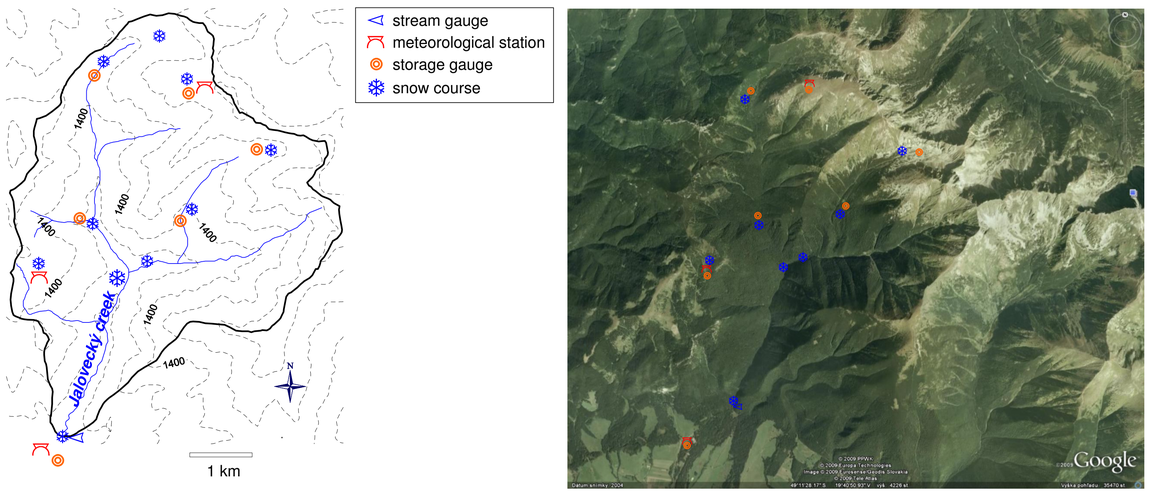
The Jalovecký creek, mountain part

The Jalovecký creek basin, Slovakia

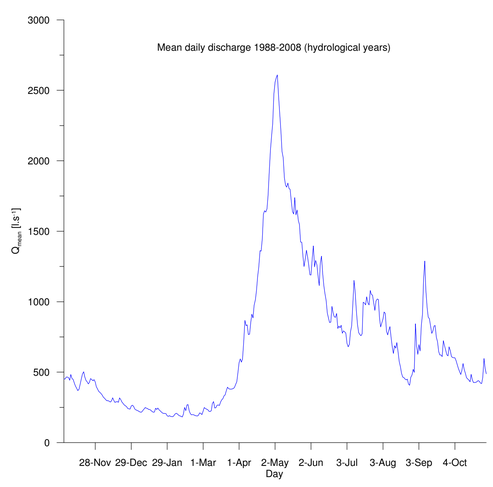
Basin characteristics

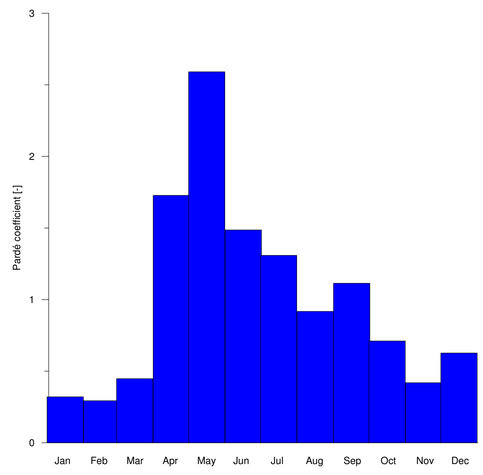
River Basin / River Basin (according EU-WFD)	the Váh river basin/ the Danube basin
Operation (from… to…)	1987 till present
Gauge coordinates / Gauge datum:	19°38'44''E; 49°9'46''N / 816 m a.s.l.
Catchment area:	22.2 km^2
Elevation range:	816-2178 m a.s.l.
Basin type: (alpine, mountainous, lowland)	mountain
Climatic parameters: (mean precipitation, temperature and others)	1570 mm (1989-2008), 3.5 C (1989-2008)
Land use:	conifer. forest 44% , dwarf pine 31%, meadows 25%
Soils:	Cambisol, Podzol, Lithosol
Geology:	Crystalline rocks, granodiorite, Quaternary sediments
Hydrogeology: (Type of aquifers, hydraulic conductivity)	Fissured aquifer, deep weathering zone , moraines
Characteristic water discharges: (Q_{min}, Q_{max}, Q_{mean})	58 l/s, 6797 l/s, 702 l/s – daily discharges (1988-2008)

Map of the research basin



Mean hydrograph / Pardé flow regime





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

1. The basin is situated in the national park, i.e. human interventions are restricted.

View to the highest part of the catchment from its south-western boundary

Instrumentation and data

Measured hydrological parameters	Measuring period	Temporal resolution	Number of stations
Runoff	since June 1987	hourly 10-min. since 2002	1
Precipitation	since November 1987 1988-2008 since 2002	weekly monthly 10-min., summer	2 6 3
Air temperature	since June 1987	hourly	2
Snow depth, water equivalent	1987-2008 since 1996	3-4 times per winter weekly	4-36 2
Environmental isotopes ^{2}H, ^{18}O	since November 1990	varying	varying

Applied models

1. WaSim-ETH
2. UEB (Utah Energy Balance Snow accumulation and Melt model)
3. SOIL

Main scientific results

1. Spatial differences in (annual) precipitation in the mountains are relatively small compared to the difference between the mountains and foreland.
2. Precipitation increases with altitude only until certain altitude, similar effect is observed for snow characteristics (depth, water equivalent).
3. The range of precipitation interception in the forest even at the same characteristics locations (forest window, dripping zone, near-stem zone) reaches tens of percents.
4. Despite the importance of snow cover in runoff regime (the highest discharges are mostly connected with snowmelt period), extreme floods caused by snow melt did not occur (almost 400 mm of snow can melt in a week).
5. Diurnal runoff oscillations during snowmelt that are typical for glaciated catchments occur almost every year although the catchment is not glaciated.
6. Soils in the forests are drier than outside of the forests.
7. Overland flow occurs very rarely. It seems its occurrence is more frequent after after heavy rainfalls, than during snowmelt.
8. Hydrological response of the catchment is fast. Flood peaks typically occur within 2 hours after rainfall peaks. However, the relation of hydrological response to antecedent wetness conditions is weak.
9. Water conductivity and temperature measurements did not indicate sudden inflows of groundwater into the main streams. Stream water conductivity at catchment outlet seems to respond only to bigger runoff events following relatively drier periods.
10. Mean residence time of water in the catchment is about 2 years.
11. Catchment mean annual evapotranspiration is about 500 mm which is much higher than the values calculated by climatologists (about 300 mm). The difference may be caused by the fact that standard networks do not provide correct data (e.g. for precipitation) for small mountain catchments and by underestimating of the role of forests in the long-term water balance.

Key references for the basin

1. Kostka, Z., Holko, L. (1997) Soil moisture and runoff generation in small mountain basin. SVH Publ. 2, Inst. of Hydrology SAS and Slovak NC IHP UNESCO, ISBN 80-967808-1-6., 90 p.
2. Holko, L., Kostka, Z. (2006) Hydrological research in a high-mountain catchment of the Jalovecký creek. J. Hydrol. Hydromech., vol. 54, no. 2., 192-206.

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