Vallecebre research basins
Vallecebre (Eastern Pyrenees), Spain

Basin characteristics

River Basin / River Basin (according EU-WFD)
Saldes river basin / Llobregat river basin

Operation
Since 1991, still in operation

Gauge coordinates / Gauge datum:
402948,467232 UTM (31n) / 1104 m a.s.l.

Catchment area: 0.56-4.17 km²

Elevation range: 1104-1643 m a.s.l. (mean = 1299 m a.s.l.)

Climatic parameters:
Sub Mediterranean climate . 862 (1983-2006), 90 rainy days per year, snowfall less than 5% / 9.1°C

Land use:
60 % Scots Pine, 21% meadows, 8% sparse vegetation, 7% bedrock outcrop, 3% bad-lands

Soils:
Silt loam, silty clay loam / soil thickness: 0 to 3m

Geology:
Limestones, mudstones

Hydrogeology:
Shallow aquifers, ∆ connected / perched with respect to regional aquifer

Soils water content (0-10cm, TDR):
37.23 ± 2%, 35.42 ± 2.5% (daily values, 1994-2004)

Groundwater level:

Main scientific results

1. Rainfall interception in forests represents up to 24% of annual precipitation, and is especially efficient during both long rainy periods under atmospheric wet conditions and shorter rainy events of moderate intensity under atmospheric dry conditions.

2. Soil moisture shows a temporal pattern characterised by significant and frequent changes and by the occurrence of marked deficit periods in summer and, eventually less pronounced, in winter.

3. The overall response to water deficits of Scots pine and Picea oaks is similar, but Scots pine is more sensitive to soil drought, reducing markedly its transpiration during dry summer periods.

4. The rainfall-runoff relationship at the basin scale is strongly non-linear along the year. Above a given threshold, the water table position can influence the rainfall-runoff relationship. Finally three types of characteristic hydrological behaviour with different dominant runoff generation processes happen during the year.

5. Suspended sediment concentrations are very low in waters coming from vegetated areas but very high in basins with badlands areas. The seasonal pattern of erosion processes in badlands areas is characterised by physical weathering during winter, severe regolith breakdown during spring, intense erosion in summer, and efficient transport in autumn.

6. Tests performed with several types of hydrological models demonstrate their capacity to simulate accurately basin response during wet periods, but also stress the need of an increased model complexity to simulate properly runoff events during summer and wetting up periods and to improve the overall basin water balance.

Key references for the basin


Contact

Francisco Gallart, Pilar Lioret, Jérôme Latron
Surface Hydrology and Erosion Group, Institute of Environmental Assessment and Water Research (IDAEA), CSIC. Sot de l’Sabaris s/n 08028 Barcelona, Spain
E-mail: francisco.gallart@idea.csic.es , pilar.lioret@idea.csic.es , jerome.latron@idea.csic.es
Web Page: http://www.idea.csic.es/ (Geosciences Department Surface Hydrology and Erosion Group)