

Influence of mining safekeeping activities on hydrological situation and aquatic biocoenosis in a small catchment

Gregor Ollesch and Ralph Meissner

UFZ - Helmholtz Centre for Environmental Research, Department of Soil Physics, Germany

Technical intervention has degraded water bodies and modified hydrological processes. This paper describes the modification of the regional water balance and runoff generation processes by mining activities in the Eastern Harz Mountains, Germany. The pristine condition before 1973 is characterised by a well balanced water flow with soil moisture increase and storage filling in winter and high discharge situations during spring. Base flow contribution guaranteed a minimum of water flow during summer time. The opening of a mine led to a decrease of the regional groundwater level. The related hydrological situation with long dry periods and episodic flash floods had significant negative effect on the chemical and biological water quality. In the course of the safekeeping at the end of the mining activity in 1989 the groundwater level rose again since 1993 and has reached a new stable situation in 1999. The annual runoff volume is now about 50 % of the runoff volume that was recorded at the end of the sixties. Although the physical and chemical parameters indicate a good water quality, the concentrations and loads of sediment and nutrients may reach critical levels during spring snowmelt floods. Due to a reduced base flow dry situations occur in summer and fall which narrows the biological water quality. The safekeeping process that has started already in 1991 and was accompanied by other measures like fish passes did not carry the region to the former conditions so far. Today it is unclear if the safekeeping process will further improve the hydrological situation and thus open the opportunity for a natural ecological status of the regional surface water bodies.