



Hydrochemical differences between Carpathian streams with similar physico-geographical conditions of catchments (the Polish Flysch Carpathians)

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The study was conducted during one hydrological year (2012/2013) in two Jaszcze and Jamne catchments (11.39 km² and 8.95 km², respectively) located in the Gorce Mountains with environmental features representative for the Western Flysch Carpathians (in 2012/2013 hydrological year). The Jaszcze and Jamne streams (9.3 km and 6.4 km long, respectively), are left tributaries of the Ochotnica river. Both catchments are in the range of the Magura nappe of the Carpathian Flysch. The Jaszcze and Jamne valleys are located in two climatic vertical zones: 1) a temperate cold zone (of a mean annual temperature of 4-6 °C) and 2) a cold zone (2-4°C), above 1,100 m a.s.l. Mean annual precipitation for this region in the years 1958-2008 was 841 mm.

The aim of the research was to determine differences in the physicochemical properties between streams, the valleys of which are characterised by similar physico-geographical conditions. The discussed valleys are alike because of their proximity, and the similarity manifests itself through the occurrence of the same geology, relief and exposure of both valleys, as well as inclination and soil cover. The climatic conditions and circulation of groundwater are also similar. In both valleys, forest is the dominant land use form (the Jaszcze catchment – 77% and the Jamne – 55%).

The research showed that the Jaszcze stream is characterised by a higher discharge throughout the year than the Jamne stream. In spring, the mean water flow rate calculated for the entire longitudinal profile of the Jaszcze stream was 1.6 times higher than the rate obtained for the Jamne stream. In summer and autumn, this rate was respectively 1.8 and 2.2 times higher in the Jaszcze stream than in the Jamne stream.

The mean annual temperature of water in the Jamne stream is higher by 0.8 °C than the temperature of water in the Jaszcze stream. This is caused by the higher temperature of groundwater (even by up to 2-3 °C) and the lower discharge (the temperature increases more quickly). The pH values in the Jaszcze and Jamne streams show only slight variation in the annual cycle and along the longitudinal profiles of the streams, and amount to 8.4-8.9. The Jamne stream, due to the lower discharge, is also characterised by greater conductivity of water in comparison to the Jaszcze stream. The mean value of conductivity of water in the Jamne stream is higher throughout year by around 60 microsiemens. During the 2012/2013 hydrological year, the total mineralization of water in the Jamne stream was greater than in the Jaszcze stream. The differences in the values ranged from 4.65 mg/l (in spring) to 13.88 mg/l (in autumn). The analysis of chemical composition showed that apart from the bicarbonate ions, the water in the Jaszcze and Jamne streams is rich in calcium and sulphates ions. The study also observed a relatively large percentage of iron ions in the overall chemical composition.

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