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Hydrological Scenarios of Changes in the Seasonal Runoff Distribution in Slovakia

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The potential impact of a changed climate on monthly river runoff in 20 selected basins in Slovakia was evaluated using a monthly water balance model. Pilot basins were chosen as repreňsentative regions for various types of seasonal runoff distribution and existing or perspective water use. They are located along two transects from north to south and west to east across Slovakia. The monthly water balance model was calibrated with data from a standard period of 1951-1980, which is considered to be representative for the distribution of runoff in unchanged conditions. Four different climate change scenarios were used in the impact study. Two scenarios were downscaled from the outputs of the CCCM97 and GISS98 General Circulation Models (GCMs); the others represent analogies with warmer climatic periods in Slovakia in the past. The scenarios were given as changes in the long-term mean values of monthly precipitation and air temperature for the time horizons of 2010, 2030 and 2075. Runoff generated by the model was considered to represent an estimation of the impact of climate change on river runoff and was compared with a baseline time series. The results showed a similar trend in monthly runoff changes, with the maximum increase usually in January and February (or March). The highest decrease in the mean monthly discharges could fall into the spring months in the northern basins, this decline shifted to the summer months in the southern basins.