



Changes in hydrological regime under changed climate and forest conditions in mountainous basins in Slovakia

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The impacts of land use and climate change on hydrological regime have been an important field of research in recent decades, especially with respect to runoff formation. Land use directly impacts basic hydrological processes, such as evapotranspiration, infiltration and runoff. The study focuses on estimating impact of land use and climate changes on runoff generation in selected mountainous basins in Slovakia. Changes in land use were represented by changes in forest distribution and composition induced by changed climate. Two climate scenarios of the daily air temperatures, specific air humidity and precipitation (KNMI A1B and MPI A1B) regionally downscaled for the territory of Slovakia until the time horizon of 2075 were applied. For simulations of runoff and other components of hydrological balance under changed conditions a distributed rainfall-runoff model was used. The simulations were done with an emphasis on the parameterization of the land cover properties (spatially distributed model parameters) and calibration of global parameters of the hydrological model in changed conditions. The outcomes of the runoff simulations indicate that changes in the long-term mean monthly discharges are expected. During the winter and early spring periods, an increase in the long-term mean monthly runoff could be assumed. The period of an increase in runoff could occur from November/December to February/April. This increase could be caused by an increase in air temperature and a shift in the snow melting period from the spring months to the winter period. The period of a decrease in runoff could occur from March/April to September/November. The increase in winter runoff and the decrease in summer runoff are expected to be more extreme for the later time horizons.