

Abstract

The final thesis deals with the issue of hydrological drought in the context of climate change. The basins of the Blšanka River and the Loděnice River have been suffering from water shortages in recent years, therefore they have been selected for the purposes of this final thesis. The thesis summarizes the basic principles used to estimate climate change on the water resources with emphasis on the occurrence of hydrological drought. At the same time, individual components and processes of hydrological modelling conditioning the formation of affected time series in the near (2020–2050) and far future (2070–2100) are described. A total of sixteen simulations created from the seven global climate models (GCM) of the CMIP5 project and three climate scenarios (RCP; Representative Concentration Pathways) are used. The time series of precipitation and air temperature, which have been influenced by the climate change, were derived by an advanced delta method that counts also with the change of variability. The conceptual hydrological model BILAN is used to simulate changes, due to its availability from the T. G. M. Research Institute of Water Management and its wide use in Czech conditions. The parameters of the BILAN model are calibrated based on the observed time series of both selected river basins. Afterwards, the values of the parameters were used to create scenario series affected by climate change. The results of the thesis suggest that the created projections assume to influence the air temperature and precipitation. The differences in runoff process and hydrological balance are caused by the mentioned changes. Based on the created simulations, changes in the range and seasonal monthly runoff are identified. At the same time, an increasing frequency of occurrence and the size of deficit volumes can be expected in scenario periods. The individual results are evaluated both in terms of climate scenarios (RCP) and in terms of global climate models (GCM).

Key words: hydrological drought, climate change, model BILAN, deficit volumes