



Projected impacts of climate change on the flow regime from Bârlad River Basin, Romania

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The paper presents the partial results, obtained within the CLIMHYDEX project (www.climhydex.meteoromania.ro), regarding the assessment of the climate change impact on flow regime from Bârlad River Basin by long term hydrological simulation.

To estimate the impact of variability and climate change on monthly mean, seasonal and annual flow regime, in the Bârlad River Basin, the long-term simulations were performed, by means of CONSUL hydrological model, using as input data series of precipitation and temperature resulted from the data processing obtained from simulations of climate evolution by means of regional climate model REMO having spatial resolution of 10 km.

The CONSUL model is a deterministic hydrological mathematical model which allows the simulation of flow in small as well as in large and complex basins, divided into homogeneous units (sub-basins). The model enables the computing of discharge hydrographs on sub-basins, their routing and composition on the main river and tributaries.

Using of CONSUL model assumed the calibration of model parameters, an operation that was performed by the simulation of flow from the period 1975 - 2010 in the analysed river basin. Calibration of model parameters was performed in two stages: based on events and global. Calibration based on events was made considering 25 rainfall-runoff events, chosen to cover a wide range of possible situations in the case of floods formation. Global calibration of rainfall-runoff model parameters was done by simulating the flow on considered calibration period. Flow simulations using the CONSUL model, having optimal parameters derived from the calibration process, were conducted for two periods: the reference period 1971 - 2000 and the future period 2021 - 2050 respectively, at 9 hydrometric stations from the river basin analysed.

For the input data in the CONSUL model, i.e. precipitation and temperature series, averaged on the sub-basins corresponding to the gauge stations, a comparative analysis was performed, for the two periods considered, highlighting the general trends of variation at annual level and for every season and month.

Comparative analysis of water flow simulation in Bârlad river basin were performed, with the CONSUL hydrological model, for both reference and future period, regarding the mean monthly, seasonal and multiannual flow regime.

Following the analysis of mean monthly discharges in Bârlad River Basin, as main results obtained for the variation trends of meteorological parameters we could notice a significant increase of discharges in July and October and their decrease in April, August, September and November which indicates a decrease of the probability of occurrence of extreme events in these months.

Regarding the seasonal variation of mean discharges in Bârlad River Basin, the results indicated their decrease in all seasons, with a more pronounced decrease in the spring and autumn seasons.

Generally, for the Bârlad River Basin the simulations have indicated a decrease trend of the mean annual discharges, up to -13.4%.