



Runoff simulation in the Ferghana Valley (Central Asia) using conceptual hydrological HBV-light model

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Glaciers and permafrost on the ranges of the Tien Shan mountain system are primary sources of water in the Ferghana Valley. The water artery of the valley is the Syr Darya River that is formed by confluence of the Naryn and Kara Darya rivers, which originate from the mountain glaciers of the Ak-Shyrak and the Ferghana ranges accordingly. The Ferghana Valley is densely populated and main activity of population is agriculture that heavily depends on irrigation especially in such arid region. The runoff reduction is projected in future due to global temperature rise and glacier shrinkage as a consequence. Therefore, it is essential to study climate change impact on water resources in the area both for ecological and economic aspects.

The evaluation of comparative contribution of small upper catchments ($n=24$) with precipitation predominance in discharge and the large Naryn and Karadarya River basins, which are fed by glacial melt water, to the Fergana Valley water balance under current and future climatic conditions is general aim of the study. Appropriate understanding of the hydrological cycle under current climatic conditions is significant for prognosis of water resource availability in the future. Thus, conceptual hydrological HBV-light model was used for analysing of the water balance of the small upper catchments that surround the Ferghana Valley. Three trial catchments (the Kugart River basin, 1010 km^2 ; the Kurshab River basin, 2010 km^2 ; the Akbura River basin, 2260 km^2) with relatively good temporal quality data were chosen to setup the model. Due to limitation of daily temperature data the MODAWEC weather generator, which converts monthly temperature data into daily based on correlation with rainfall, was tested and applied for the HBV-light model.