Abstract
This research was carried out in Gharib Abad watershed in Zahedan with an area of 9924.4 ha in Sistan and Baluchestan province. In this research, using the hydrological distribution-spatial model Wetspa, rainfall-run off model using daily precipitation, evapotranspiration and discharge data, as well as the combination of three major map inputs (digital elevation model, soil texture and land use) for the statistical period 2008-2016 was simulated. Thus, the period of 2008-2012 and 2012-2016 was used for calibration and validation of the model, respectively. After implementation of the model, in the model calibration stage, the Nash-Sutcliff criterion for general, maximum flows and minimum flows were estimated at 57.49, 76.14 and 54.39 percent respectively. After optimizing the parameters in the calibration stage, validation of the model was performed for the second statistical period (2012-2016). In the model validation stage, the Nash Sutcliffe criterion for general, maximum flows and minimum flows were estimated at 73.35, 72.32 and 50.37 percent, respectively. The values indicate the acceptability of the model results to simulate daily flows. Then, in order to compare the effect of land use change on the amount of runoff of Gharbiabad watershed, with the constant of the required parameters of the model, except the land use map, the model was simulated with the land use map of 2012. At this stage, the calibration results of the model for the period of 2008-2012 based on the general Nash-Sutcliffe criterion, maximum flow and minimum flow were estimated at 65.49, 73.14 and 55.37 percent respectively. In the validation of the model for the period of 2012-2016 based on the general Nash-Sutcliffe criterion, maximum flow and minimum flow were estimated at 50.73, 73.14 and 55.37 percent respectively. The results show that the Wetspa model estimates the high flows more efficient than low flows, which can be due to the weakness of the model structure in the low flow estimation or the existence of deviations before the outlet of the basin for extraction of water, but in general, it simulated the total flow with acceptable accuracy. Comparison of calculated and observable hydrographs for calibration and validation periods also indicates a good fit between hydrographs. Also, comparing the effect of land use changes between two periods showed that decreasing the area of rangeland increased the maximum flow and the amount of runoff coefficient increased with land use change from rangeland to urban and industrial. It rises from 10.47 m^3 to 24.94 m^3 from land use of rangelands to urban and industrial. The sensitivity analysis of model parameters in this basin showed that k_g (groundwater drop coefficient) and k_{ep} (potential evapotranspiration correction factor) were the most sensitive parameters.

Key words: Vegetation, Runoff, Evapotranspiration, Wetspa hydrologic model, Gharib Abad Watershed.

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