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The uncertainty impact of multiple linear statistical downscaling model (SDSM) on runoff

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The pattern with the center of high/low pressure over the western Mediterranean which reflects the Mediterranean oscillation is the most important climate variability mode in the region. Atmospheric systems affecting the West of Iran are mostly Mediterranean. Semiarid landscapes represent an important ecosystem surrounding the Mediterranean Basin for which little is known on runoff generation. Knowledge of the sources and patterns of variation in infiltration–runoff processes and their controls is important for understanding and modeling the hydrological functions of such ecosystems. The purpose of this study is runoff modeling during the years of 2040 to 2069 on Behesht- Abad sub-basin. For this purpose, first using AOGCM model's climate scenarios, the best model for the area was selected on the years 1961 to 1990. Then, by record of Shahrekord and Borujen synoptic stations Precipitation, Minimum temperature and Maximum temperature in these stations were downscaled. In the next step, the uncertainty analysis of downscaled data and possible use in SWAT Hydrological Model were considered. After running SWAT model, Calibration and validation using SUFI-2 reverse modeling method have been done and capability of SWAT model to predict runoff was determined. In the last step, using climate scenarios generated for the period 2040 to 2069, runoff was estimated. Results indicate that the HADCM3 is the best GCM Model in this area. Uncertainty analysis was shown that the SDSM model has a good result in downscaling at Shahrekord synoptic station opposite to Borujen station and the SWAT model has a good result for calibration and validation. Based on the obtained results, total annual rainfall will reduce 49%, minimum and maximum temperature will increase 10% and 30% respectively. Generally, the results of this study indicate a reduction in runoff and the changes of the climate from Semi-arid to dry. From the viewpoint of possibility of flood, the years of 2046, 2040, 2056, 2058, 2055 and 2048 are the most critical.

Keywords: Uncertainty, Statistical Downscaling Model (SDSM), Runoff, North Karon, Iran