Abstract

Industrial societies have led to an increase in greenhouse gases, especially CO_2 emissions. However, if the gases are not reduced it may be 1.1 to 4.6 grade average global temperatures could increase by 2100, leading to the phenomenon of climate change. According to reports from the IPCC, climate change could increase the likelihood of extreme climatic events such as floods in some parts of the Earth. Thus, in the present study to determine the effects of climate change and increased greenhouse gas emissions resulting from economic and social development of communities, the runoff of Maharlou basin examined. In this regard, the HadCM3 model and A2, B1 and A1B scenarios that known as maximize, minimize and intermediates scenarios to produce precipitation and temperature periods 2045-2011, 2080-2046 and 2100-2081 were used. IHACRES for runoff simulation model was also used. IHACRES model with data of rainfall, temperature and flow rate of the base period (1988-2002) with a correlation coefficient of 0.66 was verified and validated. The results of the data showed A2 scenario (maximum scenario) has the greatest difference between the data in the data base with the other scenarios. Rainfall generated from all periods except the period 2045-2011 of B1 scenarios that predict the reduction of 0.04 mm per month. Increased rainfall in the coming years shows that the maximum value of the A2 scenario focuses on the period from 2046 to 2080 the rate of 0.35 mm. Reduction in Predicted future temperatures in all cases is the value between 6.3 to 8.5 degree that the Maximum rate is the period 2045-2011 at a rate of 5.8 in the A2 scenario. Also it is important that flow has been increased on the period from 2011-2045 of A2 scenario and on the period of 2046-2080 of B1 scenario, respectively is 0.7 and 0.09 cubic meters. In other cases, the reduction in flow has been predicted that the maximum value is 0.42 is related to period 2046-2080 of A2 scenario. The result of mean comparison test between future data and base data shows that there are no significant differences between future data and base data, except period of 2081-2100 of A2 and A1B scenarios. For temperature In all cases there is significant difference between the data produced and base period. Also For flow, there is significant difference between the data produced and base period except period of 2011-2045 of A2 and A1B scenarios. Also it is Noteworthy that all tests have been carried out at 95 percent. And the turning point test for data trend showed there is trend in whole data.

Key words: Climate Change, HadCM3, LARS-WG, IHACRES, Maharlou Basin

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**The Thesis Submitted for the Degree of Master of Science
(In Watershed management)**

Prediction of climate change impacts on Maharlou basin runoff

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May 2014