Assessment of Suitable General Atmosphere Circulation Models for Forecasting Temperature and Precipitation Amounts in Iran Under Condition of Global Warming

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Introduction
Exacerbation of the global warming will be inevitable in the coming decades due to the current pace of emission of greenhouse gases. So that the global warming will have the same impact on either environment and natural flora and fauna or human activities. Due to locating most part of Iran in the arid and semi-arid climate, the study of regimes of temperature and precipitation in Iran under the impact of global warming gains importance. Different methods have been developed to simulate and predict the future climate, the most comprehensive of which is general circulation models (GCM). These models have been developed with the objective of simulating all tree-dimensional properties of the weather. This feature makes these methods the most comprehensive of the atmospheric models of forecasting the future regimes of the weather. Specifying the best model that can prognosticate the future climatic conditions from general circulation models helps develop tools and strategies to prevent wasting of national natural resources and better managing of the risks. With having this in mind, the present paper aims at the examination of the suitable model among the general circulation models to predict the temperature and precipitation values for Iran under the impact of global warming.

Research Methodology
The present research has used 20 models of GCM and the unitary scenario of P50, the mean of SRES scenario or emissions scenarios. Temperature and precipitation data for Iran in time of 1961-1990 was selected as the base data and changes in temperature and precipitation for 2000-2005 were investigated according to the proposed scenario and changes in temperature and precipitation for 1961-1990 to develop the suitable model compatible with the experimental data on temperature and precipitation for the proposed period. To this end, to predict and modeling the changes in temperature and precipitation as the result of rise in greenhouse gas emissions, the integrated MAGICC SCENGEN has been used.
Discussions and Results
One of the findings of this research at calculation and interpretation of the real values of temperature and precipitation of country for the period 2000-2005 was identifying the presence of inverse curve of temperature and precipitation during the period of study in such a way that with increase (or decrease) in temperature, a decreasing (or increasing) trend of precipitation can be seen. This finding is related to regions of mid-latitudes and sub-tropical regions which have precipitation of cold season. In these latitudes, increase in precipitation (or decrease) coincides with decrease in (or increase) in temperature. The findings of simulated temperature and precipitation for period of 2025 and 2050 indicate an increase in the country’s temperature as 1.24 degrees Celsius for 2025 and 2.44 degrees Celsius for 2050 compared to that in 2005. For example, for regions such as Kerman, Yazd, Sistan and Baluchestan, Hormozgan, and Southern Khorasan experience the maximum increase in temperature. Changes in precipitation for 2025 and 2050 compared to that in 2005 shows an increase of 25.19 and 26.40 percent, respectively. This increase, however is more tangible in regions such as Kerman, Sistan and Baluchestan, and Southern Khorasan, but remember that maximum increase has been predicted for these regions.

Conclusion
The findings of the simulation of changes in temperature and precipitation in Iran for the period 2000-2005 indicates that the most suitable model to predict the future values of these parameters is the combined output of two models, GISS-EH and CNRM-CM3. The findings of each model displays significant correlation with the real data of precipitation compared to other models. According to the higher correlation of INMCM-30 with the real data series of temperature, this model is proposed as most suitable model. The findings show that none of the general circulation models can simulate the real atmospheric conditions of the change in temperature and precipitation, so this fact renders them without any additional merit and credit in better simulation of temperature and precipitation. The interesting point is that the use of integrated models apparently works more effectively than the use of an output model of a GCM model.

Keywords: Forecasting, Simulate, GCM model, temperature and precipitation, Iran.

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