

OPERATIONAL CLIMATE SERVICES: A DIALOGUE ON PRACTICAL ACTION

Climate Change Projection over Iran using the PRECIS Regional Modeling System

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Abstract:

As Iran has very complicated climate consisting from desert, forest, mountainous area, three water bodies of Caspian Sea in the north and Persian Gulf and Oman Sea in the south, in this regard assessment of future climate conditions over Iran is of important for regional planning, mitigation and adaptation to climate change. Based on goals of GFCS providing useful information for user's climate services is important, therefore this study was conducted using **PRECIS** (Providing REgional Climate for Impact Studies) regional climate system. The HadAM3P boundary conditions data with two different scenarios of A2 and B2 data as well as model code were obtained from UK Met Office/Hadley Center.

Model has been run in 0.44×0.44 degree in latitude and longitude (approximately 50 km \times 50 km) horizontal resolutions. Monthly to seasonal error and bias of the model outputs have been calculated for each precipitation regimes of Iran. We found that overall precipitation error of model is 5.3%. Monthly maximum precipitation errors occurred in September as the transition month from summer to autumn and minimum monthly precipitation has happened in May. Seasonal minimum and maximum biases are found to be in spring and winter with % -0.1 and % -17.2 errors, respectively. As a main result, PRECIS can model well the total precipitation of Iran, but its skill in modeling regional precipitation, especially over the regions with high amount of convective and local precipitation, is relatively low. Results of future hydro-climate modeling of Iran during 2071-2100 confirms that mean annual precipitation over Southeast of Caspian Sea, South Zagros mountain chain, Northwest and Southeast provinces will be decreased by 0.1-0.2mm/day both in A2 and B2 scenarios comparing to 1961-1990. By the end of 21st century, the average temperature of Iran will increase by 5-6°C relative to the base period of 1961-1990 in A2 scenario. Mean future temperature of Iran in B2 scenario is 1.5-2°C less than A2 scenario. Results from A2 and B2 scenarios indicate an 85% increase in annual runoff by the end of 21st century in central and western part of Caspian Sea and south Zagross mountain chains, but in the other regions of the countries the runoff rate change is negligible. These results could be potentially disadvantage for water resources and agriculture all over the Iran.

Key words: PRECIS, Climate Change, precipitation, temperature, runoff