

Future change in the frequency of warm and cold spells over Pakistan simulated by the PRECIS regional climate model

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Abstract Climate change caused by anthropogenic activities has generated a variety of research focusing on investigating the past climate, predicting the future climate and quantifying the change in climate extreme events by using different climate models. Climate extreme events are valuable to evaluate the potential impact of climate change on human activities, agriculture and economy and are also useful to monitor the climate change on global scale. Here, a Regional Climate Model (RCM) simulation is used to study the future variations in the temperature extreme indices, particularly change in frequency of warm and cold spells duration over Pakistan. The analyses are done on the basis of simulating two 30 years simulations with the Hadley Center's RCM PRECIS, at a horizontal resolution of 50 km. Simulation for the period 1961–1990 represents the recent climate and simulation for the period 2071–2100 represents the future climate. These simulations are driven by lateral boundary conditions from HadAM3P GCM of Hadley centre UK. For the validation of model, observed mean, maximum and minimum temperatures for the period 1961–1990 at all the available stations in Pakistan are first averaged and are then compared with the PRECIS averaged grid-box data. Also the observed monthly gridded data set of Climate Research Unit (UK) data is used to validate the model. Temperature indices in the base period as well as in future are then calculated and the corresponding change is observed. Percentile based spatial change

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