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Evaluation of statistical downscaling methodologies for Indian river basin

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Statistical downscaling has become a convenient tool to bridge the gap between the scales of the outputs of GCM and the weather parameters needed for hydrologic analysis. Over the years many innovative methodologies have been developed and tested for the statistical downscaling to assess the impact of climate change on the hydrologic processes. In this study, three different methods of downscaling are studied for the Brahmani-Baitarani river basin for the Indian catchments: Classification using KNN, regression using multi-linear regression and change factor using Delta method. The comparison is based on 3 GCMs from the phase 5 of Coupled Model Inter-comparison (CMIP 5) and for the RCP 8.5 scenario. The observed data is taken from four meteorological stations spread over the basin. Various performance evaluation tests like coefficient of determination (R²), normalized mean square error (NMSE), Nash-Sutcliffe Efficiency (NSE) and percentage bias (PBIAS) are implemented to evaluate the different methods. Kolmogorov Smirnov (KS) test is applied to the three different methods so that comparison can be done of the distributions of the modeled values to the distribution of the observed data sets. Each method has its own set of virtues and vices. All the three methods are able to capture the pattern of monthly rainfall adequately.

Biography

Kanhu Charan Patra has experience of 35 years in the field of water resources and hydraulic engineering. He has authored 8 books in water resources engineering and published more than 200 papers in the international journals and conferences. He has worked in the water resources engineering departments over a decade gaining unique experience in the planning, design, construction and management of water resources projects. Presently, he is working as a Professor, gaining experience in research, evaluation, teaching and administration.

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