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## Application of PLS-Regression as Downscaling Tool for Pichola Lake Basin in India

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### ABSTRACT

In this paper, downscaling models are developed using Partial Least Squares (PLS) Regression for obtaining projections of mean monthly precipitation to lake-basin scale in an arid region in India. The effectiveness of this approach is demonstrated through application to downscale the predictand for the Pichola lake region in Rajasthan state in India, which is considered to be a climatically sensitive region. The predictor variables are extracted from (1) the National Centers for Environmental Prediction (NCEP) reanalysis dataset for the period 1948-2000, and (2) the simulations from the third-generation Canadian Coupled Global Climate Model (CGCM3) for emission scenarios A1B, A2, B1 and COMMIT for the period 2001-2100. The selection of important predictor variables becomes a crucial issue for developing downscaling models since reanalysis data are based on wide range of meteorological measurements and observations. In this paper, we use PLS regression for quality prediction and its use for the variable selection based on the variable importance. The results of downscaling models using PLS regression show that precipitation is projected to increase in future for A2 and A1B scenarios, whereas it is least for B1 and COMMIT scenarios using predictors.

### KEYWORDS

PLS Regression, Precipitation, VIP Score

### Cite this paper

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