ABSTRACT

Statistical Downscaling (SD) modeling is to construct a model of functional relationship between the outcome of the Global Circulation Model (GCM) with local rainfall. A domain (area and location) GCM as a predictor variable and the local rainfall as the response variable is needed in modeling of SD. An initial step in preparing the SD model is to determine the GCM domain. In general, GCM output data is curse of dimensionality and multicollinearity, then the second step in the SD modeling is the pre-processing of data by reducing the dimension of GCM output. Pre-processing method of Principal Component Analysis (PCA) can be used to solve the nature of the curse of dimensionality, which can perform PCA dimension reduction. While Bayes regression method can be used to solve the case of multicollinearity. This study uses data precipitable water (prw), sea level pressure (slp), meridional wind component (va), zonal components (ua), geopotential height (zg), and specific humidity (huss) GCM with altitude (level) used in the study were 850 hPa, 500 hPa and 200 hPa and the monthly rainfall data in Ambon, Pontianak, and Indramayu on 3x3 grid, 8x8, and 12x12. Review results of quantitative analysis: (1) SD Modelling with Bayes-PCA regression approach has been able to resolve the case consistent with higher multicollinearity average value $R^2_{pred}$ amounted to 56.79%, (2) Measuring the performance of SD Modelling with Bayes-PCA regression produces the good criteria models RMSEP and $R^2_{pred}$ if compares favorably with other linear regression methods such as PCA Regression and PLS.

Keywords: Statistical Downscaling, GCM, multicollinearity, PCA, Bayes Regression.