Performances of Var Models over Univariate Techniques in Forecasting Climatic Factors in Batticaloa District

Karunarathna, KANK[*] & Vithyasangaran, K

Abstract

Forecasting climatic factors is much useful in humans' day today life. The use of proper forecasting techniques yields accurate estimates of climatic factors. The climatic factors like rainfall, maximum temperature and minimum temperature are inter-correlated among each other. Forecasting these factors jointly by incorporating correlation among each other may be better than forecasting them separately. Aim of this study was to investigate whether joint forecasting is better than single forecasting of climatic factors by using monthly average rainfall, monthly average maximum temperature and monthly average minimum temperature from January 1978 to December 2014 in Batticaloa district. Under the univariate case, moving average (MA), auto regressive (AR), auto regressive moving average (ARMA) and auto regressive integrated moving average (ARIMA) models were fitted separately for each climatic factors considered by including seasonal pattern of lag of 12. Vector auto regressive (VAR) models were considered under the multivariate technique. Among all univariate models fitted, seasonal ARIMA (0,0,2) (1,1,1)12 model fitted well monthly average rainfall. The best model fitted for monthly average maximum temperature was seasonal ARIMA(1,0,1) (1,0,1)12. Monthly average minimum temperature was modeled well with seasonal ARIMA (1,0,2) (1,0,1)12 model. In the case of multivariate techniques, three models VAR(5), VAR(6) and VAR(7) , which were suggested by models selection criterions, were fitted by ignoring seasonal effect and the best model (VAR(7)) were selected based on diagnostic tests and forecasting performances. According to the average error of forecasting for year 2014, univariate ARIMA models yield lower average error of forecasting for rainfall and maximum temperature while autoregressive model of order 7 shows lower average forecasting error for minimum temperature. There is no advantage in applying VAR model without inclusion of seasonal effect to forecast climatic factors in Batticaloa district compared to univariate techniques. Inclusion of seasonal affects to VAR model may be giving better forecasting than univariate techniques do.

Key words: Forecasting Techniques, VAR models, Univariate Techniques

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To whom correspondence should be addressed: nkkarunarathna@gmail.com

[*]Department of Mathematics, Eastern University, Sri Lanka.