CHAPTER 2
REVIEW OF RELATED LITERATURE

Time Series Analysis on hourly rainfall (Cutrim et al 2000)

Time Series Analysis was used on an average hourly precipitation. The method determined whether statistically significant differences existed from each season. The data gathered is a 20-year period consisting of 2-hour intervals per day. In a seasonal analysis it was defined that winter, spring, summer, and fall are the seasons to be used. The Box-Jenkins methodology, a sample autocorrelation function (ACF) and a partial auto correlation function (PACF) plot were employed for each of the 12 periods of the day, for both precipitation accumulations and counts. A plot of ACF values at different lags was used to find a working series of stationary time points for the precipitation parameters accumulation and counts. For both precipitation parameters, the ACF plots clearly indicated the time series to be a non-seasonal component, but the same plot showed the need for further differencing of the seasonal component of the series, which occurs every four time periods. The periods of differencing, therefore, are 1 for the seasonal component of order 4. This differencing scheme produced a stationary time series, which is a prerequisite in ARIMA Modeling.

The ACF and PACF plots of the differentiated series were then used to determine the autoregressive (AR) component and a moving average (MA) component of the series. Except for precipitation count at 6 a.m. the ARIMA model for cache of the differenced precipitation time series year were identified. (See Figure (2.1)).

A large set of data involving more than 50 years of rainfall and temperature data were examined using Spectral Analysis, Time Series Analysis-ARIMA Methodology to analyse climatic trends and interactions. Fourier analysis, linear regression and ARIMA based time series models were used to analyze the large data sets using Matlab, SPSS and SAS programs. The results that came up showed that the rainfall data was variable and appeared seasonal while the temperature data appeared stationary. Spectral analysis also showed variations in rainfall and temperature over 50-60 years