Abstract

With the context of climate change, it is necessary to refine the information pertaining to climate trend in a country like Algeria that might be negatively affected by global change. In actual fact, various climates studies and future forecasts are, for the most part, done on some ɕ basins and are based on the outputs of climate models with low resolution which do not allow addressing accurately the local scales. The first part of this work relates to the follow-up of Algeria's current mean climate by the use of the data from different spectrometers images aboard by different satellites. Furthermore, the analysis of the temporal variability of annual and seasonal temperatures and precipitations and their link with four (04) climate indexes, measured at seven (07) coastal rainfall stations of Algeria, during the period from 1970 to 2013, revealed a rising trend along with progressive breaks in means are generally a characteristic of the temperatures series. This reflects an increase in temperature since the 1970s. As for rainfall, no significant secular trend was observed. Canonical correlation analysis revealed that the temperatures which characterize atmospheric circulation over the Mediterranean basin are better correlated with the Western Mediterranean Oscillation index (WeMOI) while temporal variability of rainfall would be much more influenced by the mechanism involved in the global circulation (SOI). The assessment of future climate changes (2006-2100) of rainfall and temperatures occurring in Algeria is carried out from regional climate models CORDEX-Africa based on two scenarios related to Representative Concentration Pathway (RCP4.5 and RCP8.5) with a resolution about 45 km. A data set of monthly temperatures and rainfall extracted from observed series (CRU Version TS.3.22 of Delaware University) on a 0.5°×0.5° spatial resolution grid for the period ranging from 1951 to 2005, were used to assess the performance of regional climate models CORDEX. For the 2045-2100 horizons, a widespread decrease in rainfall over the north of Algeria would concern the winter season, and a warming would appear both at seasonal and annual scales in Algeria.

The second section of our research work concern the modeling of the transformation of the rainfall in runoff. In this section, a rainfall-runoff model, at a month scale, by means of an artificial neural network approach specific to the climate of northern Algeria developed. Several RNA are developed and tested on a set of data of Algiers coastal basin. The review for the assessment of discharge curve uncertainty impact on the performance for the prediction of the best model was carried out. The most

probable discharge curve, and the associated uncertainty, at the 95% confidence level, were determined by Bayesian inference method and Monte Carlo simulations with Markov chain (MCMC). It has been found that the uncertainty in the rating curve of the Fer à Cheval hydrometric station has a significant impact on the performance of the model in which the error of the prediction was improved in the calibration and validation phases.