Modification of Streamflow Forecasts using El Niño-Southern Oscillation in south-western Iran

Amin Haghnegahdar[1] and Mohammad Karamouz[2]
Amirkabir University of Technology, Tehran, Iran

Abstract. Using climate signals in streamflow forecasting has been subject of numerous studies in recent years. The objective of this research is to examine the effects of El Nino-Southern Oscillation (ENSO) on streamflow forecast in south-western Iran. To achieve this, a statistical non-parametric forecasting model is developed based on K-nearest neighbor (K-NN) method. Southern-Oscillation Index (SOI) is used as the ENSO indicator. Sea surface temperature (SST), rainfall and streamflow data are also used as the model inputs. To find the best predictors, the dependence structure of each input variable (predictor) is determined with the desired forecasted flow by correlation analysis and the variables with high correlation are used directly in the model. As the correlation of SOI with streamflow was low, it is not directly used as an input in the model. Considering flow variations in different phases of ENSO, it was found that generally, cold phase of ENSO (La Nina) will cause occurrence of flows less than average and vice versa. Based on this result, some forecasts are made using data grouped into different phases of ENSO. The results suggest that, forecasts based on the K-NN model are reasonably good and are significantly improved when the model is applied separately for each phase of ENSO.

---

[1] E-mail: aminhagh@engr.colostate.edu
[2] Professor of Civil Engineering Department, University of Tehran, Tehran, Iran