Evaluation of the EV1 distribution in representing low flow series in the Shannon basin

Ahmed Nasr and Michael Bruen

Abstract

The Shannon river basin is the largest in Ireland and it encompasses a number of urban and rural towns. The water of this river provides the demand for drinking, agriculture, ecology, industry, etc. Therefore it is essential to ensure that such demands are available during dry season where the rainfall ceases and the source of water is the baseflow from groundwater. In this study a frequency analysis of the time series of different low flow events have been carried out. The results of this analysis allow of assessing the availability of water to satisfy the required demands during the case of any drought period which may occur in the future.

The EV1 distribution, which has been adopted in Ireland, has been fitted to each time series using three methods: (i) method of moments; (ii) method of maximum likelihood; and (iii) method of probability weighted moments. Time series of six low flow events including (1) annual minimum; (2) 3-day sustained low flow (3-SLF); (3) 7-SLF; (4) 10-SLF; (5) 15-SLF; and (6) 30-SLF have been extracted for 55 hydrometric stations in the basins. These stations have been selected because of the availability of flow records which allow of having enough points in each time series. They are also representative for the basin since their catchments cover wide area in the basin.