Abstract

  The hydrological regimes of minimum annual flows are crucial for an efficient development of water resources management tools, especially in those areas stressed by the combination of a dry climate and an excessive water demand, such as the Mediterranean basins. Many effort have been made by the worldwide scientific community to predict the characteristics of the minimum annual flows in ungauged catchments. The aims of the this study are: (1) the quantification of minimum annual flow characteristics, in particular with regard to the BFI and (2) the application of a simple regional approach to predict the BFI at ungauged sites. The investigated area is located in Northwest Algeria and has an extension of about 130,000 km2. The relevant extension and the poorly dense monitoring network, which consist of 24 hydrometric stations, require the identification of homogeneous regions, for further application of simple linear regional regression models. Regions delineation is accomplished through the Principal Component Analysis method (PCA) and the cluster analysis, based on physiographic and climatic data. Three significantly different homogeneous areas have been identified, and comparisons between global and local regional multiple linear regression models indicate a large percentage of BFI explained variance in each area. **Key words**: Base flow index (BFI), Principal component analysis (PCA), Cluster analysis (K-Means), Algeria.