Using catchment indices in regional frequency analysis

P. Claps (1), A. Viglione (1), F. Laio (1)

(1) Politecnico di Torino (pierluigi.claps@polito.it)

In regional frequency analysis data samples coming from a number of stations are grouped together to form clusters or regions. The approach to follow to form homogeneous regions is a critical point of the procedure. The aim of this work is to provide objective criteria to select catchments characteristics that can be used as classification variables in cluster analysis. This requires that the at-site probability distribution is either summarised with a single representative statistic, capable of explaining its entire variability, or it is compared to the other distributions in the region using a 'distance function'. If a single variable can be identified (a possible representative statistic is the L-coefficient of variation) the selection procedure can be carried out by means of a regression analysis between the chosen statistic and tentative catchment characteristics and indices. Those should summarise the physical features involved in the underlying processes. Morphological and average climatic basin indices have been proposed here for the analysis of annual maximum floods and mean annual streamflows. With reference to the second of the above approaches, the 'distance' between the distributions have been related to the corresponding 'distances' between different basin characteristics, using a technique known as the Mantel test. Application of both methodologies show that catchment indices can be effectively used as classification variables in regional frequency analysis.