Floodplain influences on Irish Flood Frequency

Abstract

This study explores the influence of floodplain effects on Irish Frequency. As recommended by NERC (1975) in Ireland Generalised Extreme Value (GEV) type I distribution is still commonly used estimate the flood risk. However influence of flood-plain storage on the magnitude of the peaks can, in turn, have a significant effect on the shape of the downstream flood-frequency curve compared to sites upstream from floodplain. For moderate floods with relatively high peak to volume ratios, attenuation effects can be significant and are influenced by channel-floodplain morphology, valley width, stream slope, and hydraulic resistance. Certain parts of the Ireland experience this influence in greater extent. When two gauging stations separated by wide shallow flood plain without substantial intervening tributary inflow, there is increase tendency of flatter flood frequency curve at downstream gauging station. In other words, shape parameters of the assumed flood frequency distributions are likely to be quite different between upstream and downstream gauging stations. Assumption of same two parameter flood frequency distribution at both gauging stations is not flexible enough to pick up this shift and will result in markedly different estimate of flood quantile through flood frequency analysis. One way of deal this shift to specify the three parameter GEV distribution. Again the important question as to which of the GEV family distribution type (1, 2, and 3) is appropriate at particular Irish gauging station would still be left open. Current approach offers no help in this regard where the need is greatest. Since the great difference exists between the members of the GEV family itself, in the manner in which Q varies with T, the correct form of the GEV family distribution need be identified at particular gauging station. This study systematically investigate shift in flood frequency distribution with in GEV family for long series 133 gauging stations of 89 Irish rivers. First stage of the study involved in estimation and analysis of descriptive statistics of these gauging station flow records. Second stage involved in application of three statistical tests namely Hosking algorithm, moment & L moment diagram, probability plots on these flow data to distinguish particular GEV family distributions at specific site. Final stage of this study involved in investigation underlying reasons thus causes this shift in flood frequency. Study results indicated that 84, 11 and 38 numbers of gauging station annual maximum flood series follow GEV type I, type II and type III distribution respectively. The certain clusters of EV2 and EV3 distribution regions identified in west, north east and south west regions.