Applicability of hydrological similarity measures based on linkage between rain and flood regime for regional flood frequency analysis in Mediterranean catchments

G. Aronica (1), A. Candela (2), M. Santoro (2)

(1) Università di Messina, Dipartimento di Ingegneria Civile, Messina, Italy,
(aronica@ingegneria.unime.it / Fax: +39 090-3977480), (2) Università di Palermo,
Dipartimento di Ingegneria Idraulica e Applicazioni Ambientali, Palermo, Italy

Flood frequency estimation at ungauged sites is one of the most significant issues in hydrology, especially in Mediterranean areas where absence of in-situ measures is a common situation. The current best performing methods in terms of accuracy of prediction of extremes are still those based on statistic, regional analyses which involve the identification of fixed regions ("homogeneous") usually based on geographical similarities. In this contribution, the so called region of influence approach (ROI) (Zrinji and Burn, 1996) has been implemented to identify homogeneous group of basins in Sicily, Italy. The ROI approach to the formation of a pooling group is site-oriented in that it groups together all the basins that have a high hydrological similarity with the site of interest. The similarity among basins has been measured by means of rain and flood regime descriptors (i.e. timing of annual maximum daily rainfall and annual maximum flood peaks) using the approach outlined in Cunderlik and Burn (2002). The main reason why these descriptors have been used is they are practically error-free and more robust than flood magnitude data. Further, previous studies of the same authors (Aronica et al., 2005) have been shown the importance of interactions between climate, soil moisture and vegetation in flood formation processes, and, hence, the capability of these descriptors in describing the flood regime. The results were compared to an existing regionalisation scheme adopted in the Italian Flood Estimation National Project (VAPI) and to another scheme based on a Monte Carlo derivation of Flood Frequency Curve