



## **Investigating the hydrological regimes in some Mediterranean streams using a flashiness index**

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The climate in the Mediterranean area is characterized by low annual rainfall, mostly concentrated in autumn and winter, with very dry summers; furthermore, the rainfall has a very high variability in space and time. For small basins, this has a significant influence over peak discharge and river flow regime that, for this reason, results very variable, with periods without runoff and with extreme flash floods.

River flow regime shows regional patterns that is determined largely by watershed size, variation in climate, geology, soil type, topography and land cover. It has multiple impacts on physical and chemical habitat of a stream, on the erosion and sediment delivery, on the non point source pollutant transport and on the biological communities inhabiting a stream.

In this paper the Richards-Baker Flashiness Index (RB Index) has been used in order to analyse the flow change rates for several Mediterranean streams. This index reflects the oscillations in streamflow per unit discharge and shows relatively small inter-annual variability.

The RB Index values have been compared and related to watershed area, baseflow and other hydrological indices. In general, the index value decreases as watershed area increases. There is a significant variation in the flashiness among streams with similar area, in particular basins located in the Southern Mediterranean area have index values higher than those located in the northern Mediterranean countries. In addition

southern streams have some inter-annual variability. All small streams show a very flashy character and, hence, in those cases it is advantageous to calculate RB Index on hourly basis.

The study shows an increase in many streams of the trends in RB index values. This is probably due to climate and land use changes. In fact, in the Mediterranean area, an increase of extreme events in the last decades has been recorded; moreover the conversion of grassland or forest to cropland and the construction of drainage systems have modified the natural flow regime in many streams. These changes have great influence on the hydrological balance and on the responsiveness of river networks, therefore, a specific consideration of flashiness is required when drafting adequate management strategies.