



## **Evaluation of flow regime in the Mediterranean streams using flashiness index**

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Streamflows vary on time scales of hours, days, seasons, years and longer based on the specific characteristics of each river basin.

River flow regimes show regional patterns that are determined largely by watershed size, geographic 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.

This paper presents a study where 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 stream flow per unit discharge and consists of summing the absolute value of day-to-day changes in mean daily flow for a year and dividing this sum by the total annual discharge. This Index has relatively small inter-annual variability, making it efficient also in short term trend detection.

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 in time. For small basins, it 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 flush floods.

The RB Index values have been compared and related to watershed area, baseflow and other geomorphological parameters. In general, the index value decreases as water-

shed area increases. There is a significant variation in the flashiness among streams with similar area, in particular basins located in the South have index values higher than those located in the North. 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 discharge data basis.

The study shows an increase in all streams of the trends in R-B index values. This is probably due to climate and land use changes. In fact, in this area, there was an increase of extreme events in the last decades; moreover the conversion of grassland or forest to cropland and the construction of drainage systems has modified the natural flow regime in many streams. These changes have great influences on the hydrological balance and, therefore, require an adequate management strategy.