DEVELOPMENT OF BASE FLOW INDICES FOR RIVERS OF WESTERN GHATS OF KARNATAKA STATE

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ABSTRACT

Baseflow is an important genetic component of a streamflow hydrograph, which comes from groundwater and/or shallow subsurface storages. Baseflow may be characterized by its hydrogrpah, which is derived from the total streamflow hydrograph by various baseflow separation techniques. A variety of event-based separation methods are available, which focus on separating baseflow from a flood hydrograph and are eventually aimed at the estimation of surface runoff component of a flood.

There are various types of baseflow separation techniques designed to generate baseflow hydrograph for a long-term period - a year, several years or for the entire period of observations. These techniques normally make use of a filtering procedure of some kind, which allows a streamflow time series to be disintegrated into quickflow and baseflow. Perhaps, the most well known techniques of this type is the UK "smoothed minima" method (FREND, 1989) and "recursive digital filter" (Nathan and McMahon, 1990) although other methods to separate baseflow on a continuous basins have reported (Smakhtin and Hughes, 1993). These methods are rather aimed at the derivation of objective quantitative indices related to the long- term baseflow response of a catchment (baseflow index (BFI) - the ratio of baseflow to total streamflow) and at the estimation of continuous time series, which specifically characterised baseflow regime.

In the present study, an attempt is being made to estimate the baseflow index for 17 streams originating from Western Ghats of Karnataka with the catchment area varying between 5 km^2 to 600 km^2. The daily mean flow for 10 years was

collected from Water Resource Development Organisation, Karnataka Irrigation Department. The algorithm detailed by Gustard et al.,(1992) has been used to separate the baseflow from mean daily flows. A regional regression model was developed relating the non-dimensional topographic parameters such as slope index and drainage index with baseflow index. The result shows that, the catchmnet size has no effect on baseflow index. However, the regional regression model, indicates that, the total stream length, length of main stream and slope index dominates the relationship between baseflow index and the topographic index.