Principal component analysis for morphometric modelling for small watersheds of Tapi basin in India

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■ **ABSTRACT :** Geomorphological models have been developed for prediction of sediment production rate and runoff from the small watersheds of Tapi basin, Maharashtra, India. In this study, total of twelve morphological parameters were selected and used after under gone principal component analysis. Principal component analysis was carried out for grouping the different parameters into the principal components. To understand the behaviour of all the parameters pertaining to study areas, and to reduce the dimensionality of database, the data pertaining to twelve parameters of ten small watersheds were submitted for principal component analysis. The method of components analysis, then, involves the rotation in the total variable space - an orthogonal or uncorrelated transformation wherein each of the n original variables is describable, in terms of the n new principal components. An important feature of the new components is that they account, in turn, for a maximum amount of variance of the variables. Analysis extracted three components as a principal components with 10 parameters, accounting for a total variance of 97.256 %. The first component was highly correlated with R_e, R_c, S_b and L_{bw} accounting for 68.52 % variance. Second component is strongly correlated with R_N accounting for 18.60 % variance and third with S_c, accounting for 10.13 % variance. Finally, these extracted 10 parameters were used for modeling for prediction of sediment yield and runoff from selected small watersheds of Tapi basin, Maharashtra, India.

■ **KEY WORDS :** Principal component analysis, Geomorphological parameters, Morphometric model, Small watersheds

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