Evaluation of flood potential under basins based on morphometric parameters and correlation test (Case: Zab catchment to Mirabad)

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Introduction

The concept of morphometry involves the measurement and numerical analysis of land surface, shape, dimensions and form of land. In relation to flooding, watershed morphometry includes quantitative indicators describing watershed physical characteristics that control the pattern and quantitative characteristics of floods such as amount, time of occurrence, delay time, and flow hydrograph. Unusual development of cities due to population growth and consequent land use change has caused disruption of hydrological balance and increased flooding of basins. The purpose of this study was to prioritize the sub-catchments of Zab River based on a novel combination of morphometric analysis and statistical correlation and zoning of flood potential under sub-catchments.

Data and Method

to disregard for human and social sub-basins, which has a great impact on the hydrological processes of the catchment. Based on the validation results, the Shinabad and Sufian basins have the highest priority, and the new method of morphometric analysis and statistical correlation have considered them the highest priority for managers' attention.

The elongation ratio helps to understand the hydrological characteristics of the drainage basin and ranges from 1 for circular basins to 0 for extended basins and its high values indicate the shape of the basin circle, high peak discharge and high flood potential. Is. The values of tensile strength in all sub basins are more than 0.5 and indicate high potential for flooding. Straller (1964) considers the circle ratio a quantitative measure for visualizing the shape of the basin. High values of this parameter indicate circular shape, high to medium ruggedness and low permeability in the basin, which causes peak discharge in less time. The ratio of the circular ratios under the Lavin Tea Basins is 0.17, Copar 0.19, and Zab Small 0.27, indicating relatively low flooding potential in this parameter. The amount of this parameter is 0.35 under Shinabad basin and 0.31 under Sufian basin which indicates their higher flood potential in this parameter (Table 7). The branching ratio is an important parameter affecting peak runoff hydrograph discharge with high values indicating high instantaneous discharge and flood event. The mountainous and steep areas have a split ratio of 3 to 4. Branching ratio values indicate low flooding potential except for Shinabad basin which shows this ratio of 6.19 and this ratio indicates high flood potential

Results and Discussion

Since hydrological units are based on morphometric parameters to prioritize flood mapping, firstly, using channel networks and elevation curves, topographic maps of 1: 50000 and digital elevation data are analyzed. The boundaries of the hydrological units became. Then, because the catchment morphological parameters have different effects on soil erosion processes and runoff formation, prioritization of the sub-basins was done in a new way based on the difference of morphological parameters and statistical correlation analysis between them. Morphometric parameters were calculated for all sub-basins in GIS software. Then, statistical correlation of morphometric parameters was performed based on the t-Kendall method using SPSS software. Based on the correlation matrix we can analyze the relationship between the parameters and define the relative weight for each parameter without All twelve variables including circular

elongation ratio, branching ratio, flow frequency, drainage density, drainage texture, compaction index, shape factor, mean slope, roughness ratio, roughness, and roughness number for all sub-basins are calculated in Table 2. The Kendall correlation coefficient was used to investigate the relationship between Validation results showed that the new method of morphometric analysis and statistical correlation did not perform well in prioritizing all sub-basins, but this method was accurate in identifying the most priority sub-basins (most acute conditions). The reason for this may be due to the lower performance of morphometric analysis and the characterization of waterways in low-slope catchments. Also, the precise reason for not estimating the priority of some sub-basins is due.

Conclusion

The selected twelve parameters are directly related to runoff and flood potential. Therefore, high values of parameters have a direct relationship with runoff and flood potential due to their greater impact on the selected twelve parameters. Indicator (Cv) values for each sub-basin are obtained from averaging of 12 indices and accordingly sub-basins of Shinabad and Sufis with high flood potential, sub-basin with small potential and sub-basin zab basin. Copar and Lavin Tea have physiographic and morphometric characteristics of the sub-catchments have a great influence on flooding and hydrological behavior, it is possible to study the status and potential of flooding below the catchments. In this research, in order to potential of flooding, firstly, Zab sub-basins were prioritized based on the new method of morphometric analysis and statistical correlation. Based on this method, the results showed that the Shin abad and Sufi basins are the top priority for the implementation of management measures to ensure.

Key Words: Flood, Morphometry, Correlation, Zab river

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