**Prioritizing flood potential based on morphometric parameter analysis**

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**Abstract**

One of the most important aspects of basin management is the prioritization of sub-basins. The flood potential of Kan sub-basins in Iran is prioritized in this study using morphometric parameters combined with model statistical correlation and multi-criteria decision-making systems. The Kan basin was studied using 17 morphometric parameters such as slope, elevation, curvature, ruggedness number, elongation coefficient, circularity coefficient, equivalent rectangle, drainage density, stream length, infiltration factor, time of concentration, duration-intensity of rainfall, land cover, land use, geology, bifurcation ratio, and length of overland flow. The relationship between parameters and weighting results revealed that climate and morphotopography were important factors in AHP flooding. Slope and time of concentration (0.11) duration-intensity of rainfall (0.12) have become one of the most critical factors in flooding in the ANP method. The Shannon entropy method identified stream length (0.15), elevation (0.11), and geology (0.11) as important flooding factors. Ranking in the AHP method revealed that the sub-basins of Imamzadeh Davood, Talun, and Doab had the highest score (0.74, 0.50, 0.41), and in the ANP method, the sub-basins of Imamzadeh Davood, Talun, and Sangan had the highest score (0.97, 0.51, 0.48). They were ranked first through third. Furthermore, Imamzadeh Davood, Talun, and Rendan rank first to third in Shannon entropy with points (0.97, 0.68, and 0.52). The TOPSIS method was deemed the best ranking method by Kendall and Spearman's correlation method. The results demonstrated that this model is highly accurate, and that morphometric sub-basins have a significant impact on flooding. For validation, the HEC-HMS from the Natural Resources Organization's method was used. The HEC-HMS method yields results that are consistent with the Shannon entropy and ANP methods.