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## COMPARISON OF CLUSTERING METHODS FOR HISTORICAL FLOODS OF IGUAÇU RIVER IN THE CITY OF UNIÃO DA VITÓRIA

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**ABSTRACT:** Floods are natural phenomena that have affected human societies for millennia; its consequences are aggravated by a function of symmetrical growth at the rate of expansion of human settlements, especially when disorderly built in natural flood beds. Due to its geographical location and characteristic relief, the city of União da Vitória, located in the State of Paraná, is often impacted by this type of phenomenon, causing environmental damage, drastically compromising its economy and, not infrequently, causing loss of human life. Efforts should be made to mitigate the consequences of these floods, and the analysis of flood indicators is the key to develop strategies to ensure that the population feels less the impacts of rainfall. In this scenario, aiming to deepen the knowledge about the hydrological behavior of the middle Iguassu river basin, and to help in the determination of hydrological model parameters, the Fuzzy logic-based flood grouping is inserted, which seeks to group similar scenarios, aiming at further analysis of the mechanisms involved in flood formation. However, in the implementation of clustering algorithms, questions arise regarding the relevance of the method used in the formation of groups. In this context we insert the present work, which uses the K-means algorithm as a cluster metric, in the same database calculated by Steffen (2017), which used the Fuzzy c-means algorithm to classify 85 maximum annual flood events in the Iguassu River, which occurred in the city of União da Vitória in the State of Paraná, from 1931 to 2015, classifying them into four distinct groups, namely: low, medium and high severity groups, and catastrophic event group. The present work compares the groups formed by the two algorithms, K-means and Fuzzy c-means, elucidating the triggering factors of the discrepancies observed in the formation of the severity groups, relating them to the clustering methods used.

Keywords: Flood clustering. Flood indicators. Fuzzy logic. Fuzzy c-means. K-means.

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