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DEFINING THE REGIONAL RAINFALL INTENSITY DURATION FREQUENCY RELATIONSHIP USING DIFFERENTIAL EVOLUTION ALGORITHM

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Abstract

In this study, the regional Rainfall Intensity Duration Frequency (RIDF) relationship for the Black Sea in Turkey was studied at 18 meteorological observation stations located in the area using the differential evolution algorithm. Before the start of the optimization process, stations were clustered using the fuzzy C means (FCM) method in terms of geographical and rainfall intensities characteristics. In the optimization process, the coefficient of efficiency (E) was defined as the objective function, and the maximization of E was aimed. The optimization process was performed for two models. The first model was run without using geographic location information. In the second model, geographical location information was included. In this study, which aimed to obtain a single relationship for each cluster, it was determined that the second model gave better results. It was also determined that rainfall intensity of different return periods and rainfall durations can be calculated by using geographical location information and regional formula in the regions where rainfall measurements are not taken, or short-term measurements are taken. Results also showed that the regional Rainfall Intensity Duration Frequency models were useful.

Keywords: clustering, differential evolution algorithm, fuzzy C means, optimization, rainfall intensities

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