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A COMPARISON OF GIS-BASED LANDSLIDE SUSCEPTIBILITY ASSESSMENT OF THE MERKEZ AND OVACIK DISTRICTS (KARABÜK, NW TÜRKİYE) BY FREQUENCY RATIO AND FUZZY INFERENCE SYSTEM METHODS

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Abstract

Landslides can lead to catastrophic consequences, endanger human lives, and result in significant economic losses amounting to billions of dollars. Therefore, it is crucial to accurately map areas prone to landslides to minimize the risks associated with them. The current study produces the landslide susceptibility map (LSM) of the Merkez and Ovacık districts of Karabük province in the Western Black Sea Region of Türkiye using fuzzy inference system (FIS) and frequency ratio (FR) method. Landslides that cause loss of life and property occur frequently in the mentioned districts and therefore the districts have been exposed to landslide-induced disasters from past to present. In the susceptibility evaluations, the variables of lithology, slope, elevation, distance to fault lines, aspect, land-use and distance to the road were used as predisposing factors for landslides. The produced landslide susceptibility maps were determined as four classes, namely low, moderate, high and very high. In the final evaluation, when compared with the landslide inventory map, the natural breaks classification method was used to generate landslide susceptibility maps. It is observed that the fuzzy inference system method achieved an accuracy rate of 80.07% for the combination of very high and high susceptibility levels, while the frequency ratio method achieved an accuracy rate of 82.58%. According to the obtained results, it has been determined that the frequency ratio method yields more realistic results compared to the fuzzy inference system method.

Key words: fuzzy inference system, frequency ratio, landslide susceptibility, GIS, Karabük

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