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FLOOD RISK AND HYDROLOGICAL RESPONSE IN THE ZARQA MAIN BASIN: A GEOMORPHOLOGICAL AND HYDROGEOLOGICAL PERSPECTIVE

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Abstract

Flash flooding represents a considerable threat in semi-arid and arid areas, especially where geomorphological and hydrological factors maximize the impact of extreme rainfall. The research evaluates flash flood risk in the Zarqa Main Basin (ZMB) of central Jordan, emphasizing the roles of topography, land use, and geology in flood susceptibility. The study utilizes Geographic Information System (GIS) methodologies combined with hydrological modeling in the delineation of areas at greater risk, utilizing the 2018 flash flood occurrences as case studies. On October 25, 2018, an unusual precipitation event (43 mm in 22 minutes) resulted in widespread flooding culminating in 21 deaths. A second flooding event took place on November 10 in southern Jordan and resulted in fatalities.

Although recent heavy precipitation events are interpreted within the context of larger climatic fluctuations, climate model projections and trend analyses over the long term are not included in this study. RCPs and vulnerability indices should be included in future studies to more effectively interpret climate change implications for flood regime in the region. The study informs an understanding of geomorphological and hydrological controls' interactions under the present climatic regime and thereby informs risk reduction measures in similar arid basins.

Key words: climate change, flash flood, hydrological conditions, Zarqa Main Basin

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