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Effect of green space spatial pattern on the role of multi-hazard risk reduction in urban area

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Growing population and rapid urbanization changed the environment of the urban area. The increase of impervious surface causes flash flood and heat island effect. Green infrastructure became an emerging concept of planning and design strategy to reduce the vulnerability of multi-hazard. Green space in urban area function as water treatment and heat reduction. Due to the limitation of urban space, increasing total amount of green space in the urban area is very limited. To optimize the effect of multi-hazard reducing multi-hazard risk, the spatial pattern of green space is critical. In this study, assessment model was developed to estimate reduction effect of green space on multi-hazard. Using leaf area density (LAD) and soil texture, vegetation and soil effect including storage, evaporation, and infiltration is calculated. Long and shortwave radiation reduction by evaporation and stormwater runoff reduction by storage and infiltration of vegetation and soil is calculated in the model. By generating random virtual domain of urban area, the spatial pattern of the landscape and green space is compared. The spatial pattern of the landscape is assessed using FRAGSTATS using landscape metrics including largest patch area (LPI), total edge (TE), aggregation index (AI), and mean patch size (MPS). The result shows the effect of multi-hazard reduction of green space on concentrated or dispersed spatial pattern.