CORRIGENDUM

to

"CONSTRUCTING THE FLOOD EVACUATION ZONES BASED ON USER-CENTRIC TIME-DISTANCE REPRESENTATION"

by Kim, J. O. and S. Park,
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The following paper has to be considered as a replacement of the originally published version. The paper was sent by mistake in an incorrect version to the organizing committee of GI4DM2019. Corrected error: Briefly revised the overall content. Deletion of Table 1 and Equation 1.

The Authors apologize with the Editors for the inconvenience.

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CONSTRUCTING THE FLOOD EVACUATION ZONES BASED ON USER-CENTRIC TIME-DISTANCE REPRESENTATION

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KEY WORDS: Flood Evacuation Zones, Flood Evacuation Map, Time-distance Map, Multi-dimensional Scaling

ABSTRACT:

In the current scenario, where there is no quantitative criteria for the location, size, etc. of the shelter, an empirical study was conducted on the location distribution of the shelter considering accessibility. In this study, a safety zone that can be immediately evacuated using a pedestrian-level network is set up for each shelter. For the case area, a GIS network analysis service area analysis was used to divide the area to be evacuated to each shelter and to generate a base map in which the shelter that can reach the shelter as soon as possible can easily be identified. It is possible to provide a suitable area and evacuation route using pedestrian networks. In an urgent situation, it should be possible to get to the evacuation shelter at least as soon as possible, to avoid the high risk of flooding. Therefore, the service area that considers the flooding maps to be effective for evacuation.

1. INTRODUCTION

Human activity changes the Earth's atmosphere, contributing to climate change, and increasing the frequency and intensity of many natural disasters such as hurricanes, floods, heavy rains, landslides and debris. The current defence of most coastal cities against storm surges and floods is designed to withstand only the current state. They are not prepared for rising sea levels with climate change that will further devastate future floods. For this reason, it is important to establish emergency shelters to reduce casualties during disasters to ensure safety. At present, many countries and regions have planned locations for shelters (Kaiser et al., 2010). The study aims to analyse the service area of the shelter to plan evacuation routes using pedestrian-level networks. And that process is applied to Samcheok, Korea to evaluate the application experimentally.

2. METHODS AND RESULTS

According to Park, Kim (2012), the walking speed at evacuation was assumed to be 1.3 m/s for adults, 2 m/s for fast walkers, and 1 m/s for elderly and children. Under the guidance that evacuation should be completed within 5 minutes after the alarm was issued, and within 25 minutes after the evacuation began, the evacuation time was assumed to be at least 5 to 25 minutes. Based on these assumptions, the standard values of the distance by evacuation time and pedestrian type are calculated. Therefore, when calculating the flood evacuation zone, the zone that can be reached within the next distance reference is calculated. The final walking time can be calculated by considering the elevation and the depth of water. Naismith's Rule is widely known for predicting walking time according to slope (Langmuir, 1984).

In Samcheok, a total of 22 flood shelters were built with point data. In the case of Figure 1(a), most residential and commercial areas are included in the evacuation area within 25 minutes unless inundation map is reflected. However, as shown in Fig. 1(b, c), most of the evacuation sites within 5 minutes have been reduced to reflect the inundation map.

3. CONCLUSION

Considering the inundation map, the shelter service area using time-distance representation narrows where flooding is expected, so that time required to reach the shelter is relatively long. According to this study, flood evacuation maps using time-distance are important in that they provide an effective way of providing practical flood evacuation information to people in real flood situations.

ACKNOWLEDGEMENTS

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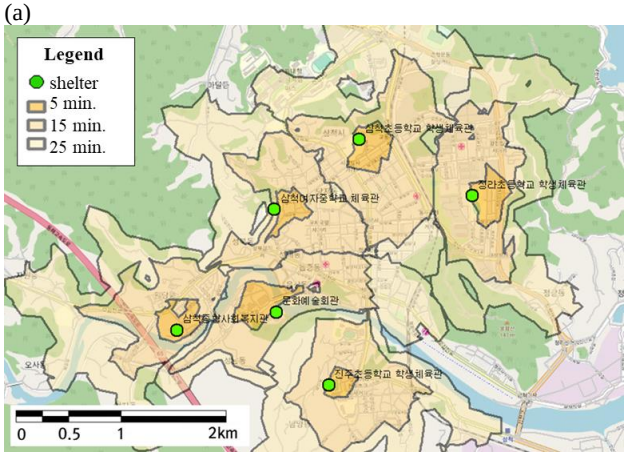
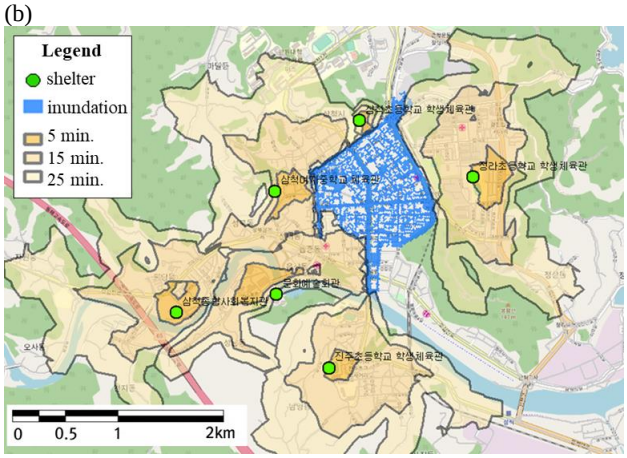
(a)



(b)



(c)

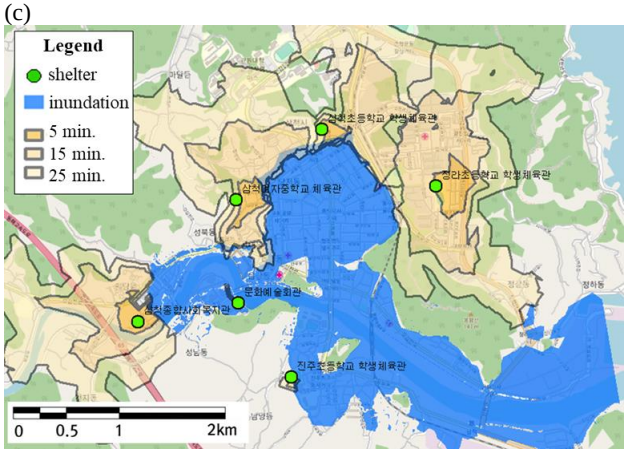


Figure 1. Figure placement and numbering