RC: Figs. 1, 2, and 4: Scales are necessary in the maps.

Reply: Thank you for your precious reminder. We have added the scale in the maps. The revised Figs are shown in the attachment.

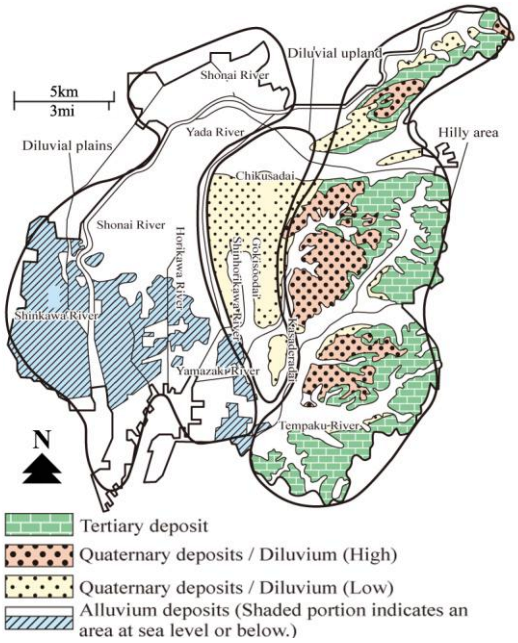


Figure 1: The geological features of Nagoya City (Introduction of Outline Section of Planning for Nagoya, 2012. Accessed from the official website of Nagoya City: http://www.city.nagoya.jp/jutakutoshi/page/0000045893.html).

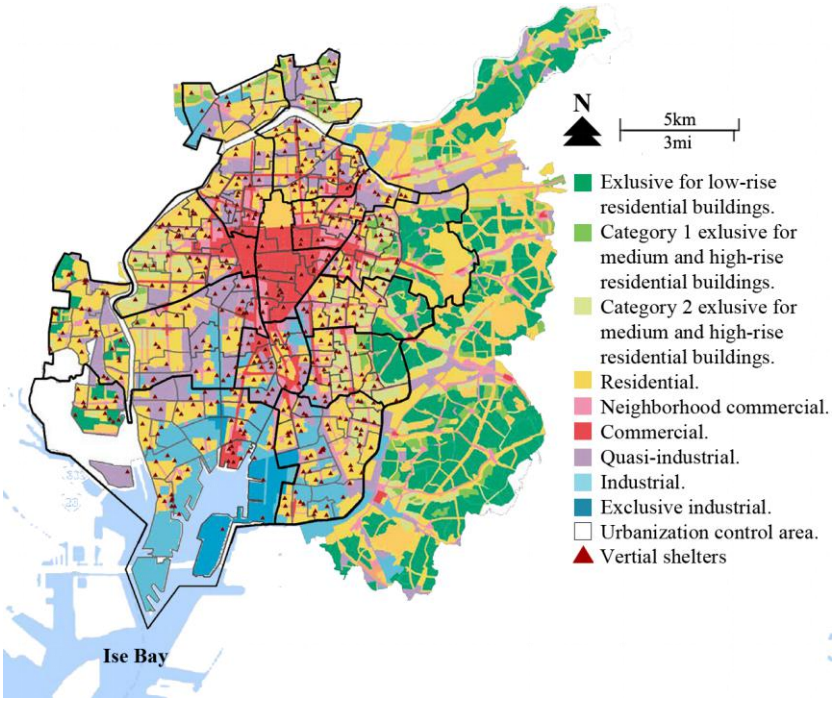
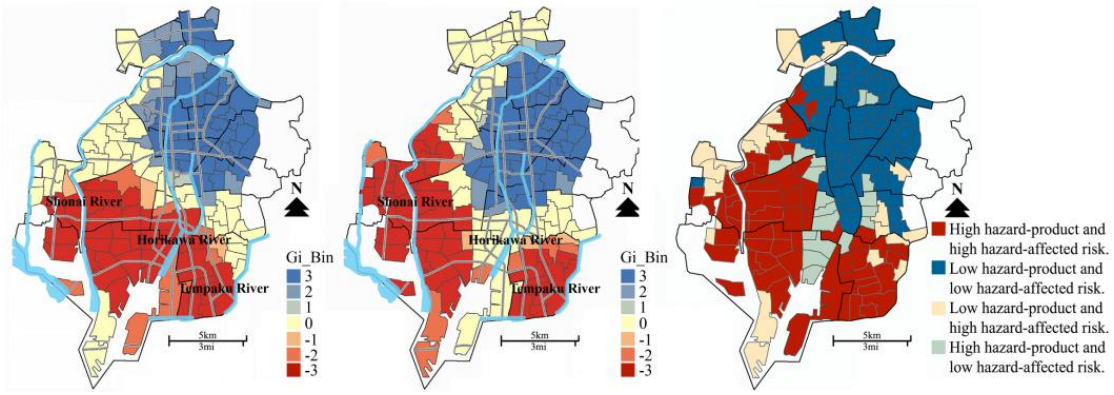


Figure 2: The School Districts and tsunami shelters of the studied administrative regions in Nagoya City (The authors combined the Nagoya City land use map from Initiatives in Planning for Nagoya, 2012. Accessed at the official website of Nagoya City: http://www.city.nagoya.jp/jutakutoshi/page/0000045893.html).



(a) (b) (c)

Figure 4: Distribution of hazard risk: (a) Hot Spot Analysis outcome of hazard-product risk; (b) Hot Spot Analysis outcome of hazard-affected risk; (c) High hazard-product/hazard-affected risk and low hazard-product/hazard-affected are divided by the average of hazard-product/hazard-affected value.

RC: Table 2: As for spatial scale, the upper half lines seem to be Cross-region evacuation, and the lower half lines seem to correspond to on-site evacuation.

Reply: We so appreciate that you pointed out this mistake. We are sorry about it and have revised it which is shown in the attachment. Thank you for your careful correction again.

Table 2: List of accessibility indicators for this study.

Spatial scale	Traffic tool	Roadway	Indicator	Type	Measure
Cross-region evacuation	Vehicle	Regional expressway	1 Dist_e	Length	Proximity
			2 Dist_junc_e		Connectivity
On-site evacuation	Vehicle	City main road	3 Dist_m		Proximity
			4 Dist_ junc_m		Connectivity
			5 C_m	Ratio	Congestion
			6 C_junc_m		
	Pedestrian	All city road	7 Dens_a		Proximity
			8 Dens_junc_a		Connectivity

RC: In Section 5.2, or in any earlier section, there should be some references and comments on the range of time after the earthquake occurrence tsunami is expected to hit along the coastal area of Nagoya city and also on the distance pedestrian evacuees or evacuees using vehicles may possibly move to and reach some safe shelters.

Reply: Thank you for your valuable suggestions. Yes, we have obtained effective data about tsunami's arrival time and evacuation's distance which are applicable to Nagoya City study. These data are achieved mainly from official Disaster Prevention Planning documents in Japan, and reports and studies on Great East Japan Earthquake. We have added these references in Section 3.2 where we think it would be more appropriate. We also enriched Fig.3 to show these references more clearly.

Section 3.2 has been revised (in blue) as:

"According to Disaster Prevention Plan documents from Nagoya City and other coastal cities in Japan, early during a heavy earthquake, most populations are encouraged to immediately evacuate to nearby seismic shelters (Dai, 2015). These seismic shelters are usually public open spaces that can protect evacuees from earthquakes and fires (Hossain, 2014; Islas and Alves, 2016; Jayakody et al., 2018). However, they do not protect evacuees from surge waves and flood damages. As such, populations evacuated to these seismic shelters should wait for tsunami warnings or evacuation orders.

According to Japan's coastal city disaster prevention document and Great East Japan Earthquake's experience (Disaster Prevention Plan of Tokyo Port Area, 2016; Tanaka, 2017), tsunami warnings are issued by administrative departments in 2 to 3 min after a heavy earthquake. And the tsunami will finally arrive at 30 to 60 min (Atwater et al., 2005). After receiving tsunami announcements, and based on the predicted available time for tsunami evacuation, the population will evacuate from these seismic shelters individually on foot to nearby tsunami shelters. They will also be organized by rescue authorities and sent by vehicles from the seismic shelters to nearby or remote tsunami shelters. The moves to the seismic shelter and then to tsunami shelters are the first transfer stage after an earthquake, but before a tsunami arrives.

After the tsunami warning has been temporarily canceled or after a tsunami happened, a second tsunami transfer stage is activated to prevent possible or secondary tsunami damage, or to move people away from the damaged shelters. In general, only tsunami shelters in inland and high terrain can support long-term safe sheltering. In contrast, shelters in flooding-risk areas are appropriate for short-term emergency sheltering. Therefore, populations in these short-term shelters are organized in a way that allow them to be continuously transferred by vehicles to inland or higher terrain.

There are also populations who have assembled in seismic shelters and who have received tsunami warnings, but who decide to return to their homes for different reasons, such as to contact family and protect private property (Murakami et al., 2014; Suppasri et al., 2012). Then, they may again decide to individually walk or drive to nearby tsunami shelters, or drive to tsunami shelters in inland and high terrain. These evacuation activities are all ordered through an emergency plan by local governments. Based on these major evacuation activities, the multiple tsunami evacuation time-space routes were refined for this study (see Fig. 3).

Combined with a statistical research on evacuation traffic patterns in Great East Japan Earthquake (H. Murakami et al., 2014), three evacuation traffic patterns can be sorted out in the multiple tsunami evacuation time-space routes: on-site pedestrian evacuation (90% pedestrian evacuation in 1000m), on-site vehicle evacuation (80% vehicle evacuation in 2000m), and cross-regional vehicle evacuation (20% vehicle evacuation over 2000m). Therefore, these three traffic patterns refer to tsunami shelter accessibility needs and are studied in this paper. They can be measured along with three-hierarchy roads, and include a total of eight accessibility indicators. Each indicator is calculated based on the arithmetic mean of tsunami shelters in each School District sample (see Table 2)..."

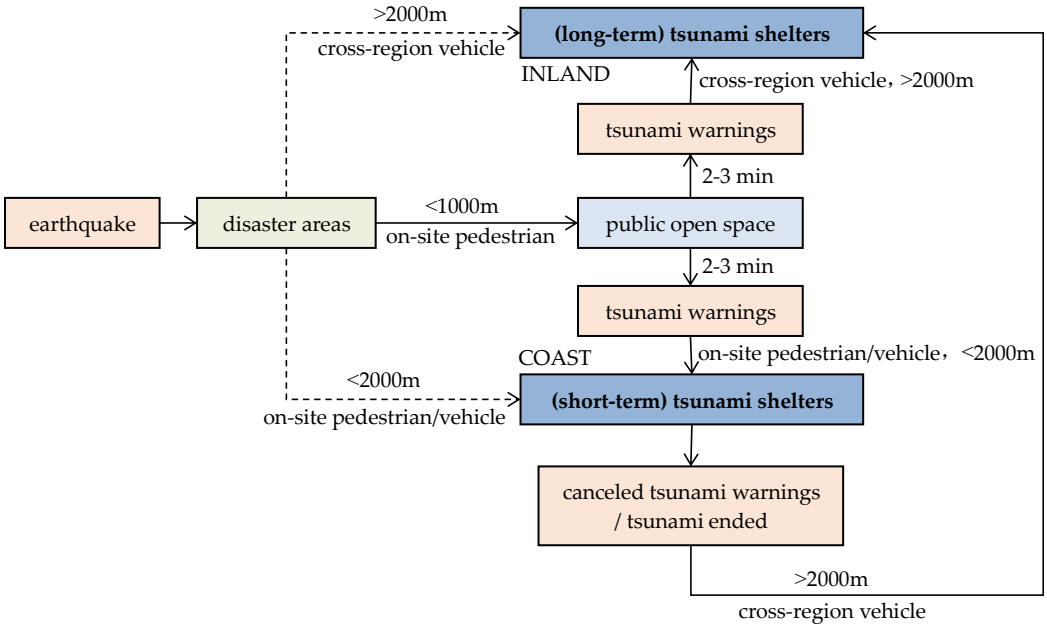


Figure 3: Tsunami evacuation time-space routes with major evacuation activities.