Integrated flood evacuation simulator considering time–space distributions of flood risk

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Abstract An integrated flood evacuation simulator that takes into account the time–space distributions of both the flood risk and safe evacuation routes at community levels was developed. Two-dimensional models for flood inundation flow were employed using an unstructured grid model to consider the detailed land use at the community level. Using the calculations of the inundation water depth and flow velocity, the time–space distributions of flood risk during flood evacuation on foot were examined, taking into account phase lags between the inundation water depth and flow velocity. Flood evacuation simulations using a multi-agent model were also performed to examine the evacuation timing and proper location planning of evacuation refuges. The proposed evacuation simulator can be considered a useful tool for disaster prevention planning at community levels. The simulator can also be used for disaster education and evacuation planning and training at both individual and community levels.

Key words multi-agent system model; community-based flood risk management; flood evacuation; flood hazard map